PALMDALE HYBRID POWER PROJECT

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(08-AFC-9)
FINAL STAFF ASSESSMENT

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INTRODUCTION

This Final Staff Assessment (FSA) contains the California Energy Commission staff's independent evaluation of the Palmdale Hybrid Power Project (PHPP) Application for Certification (08-AFC-9). The FSA examines engineering, environmental, public health and safety aspects of the PHPP project, based on the information provided by the applicant, the City of Palmdale and other sources available at the time the FSA was prepared. The FSA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA). When issuing a license, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the preparation of an EIR.

The Energy Commission staff has the responsibility to complete an independent assessment of the project's engineering design and its potential effects on the environment, the public's health and safety, and whether the project conforms to all applicable laws, ordinances, regulations and standards (LORS). The staff also recommends measures to mitigate potential significant adverse environmental effects and proposes conditions of certification for construction, operation and eventual closure of the project, if approved by the Energy Commission.

The FSA will serve as staff's formal testimony in evidentiary hearings to be held by the Energy Commission Committee assigned to hear this case. The Committee will hold evidentiary hearings and will consider the recommendations presented by staff, applicant, interveners, government agencies, and the public prior to proposing its decision which will be circulated for a 30-day public review. In the last step, the full Energy Commission will issue the final decision.

ENERGY COMMISSION'S "IN LIEU" PERMITTING PROCESS

Staff has implemented an objective of the Renewable Energy Action Team (REAT), as identified in the Governor's Executive Order S-14-08, to create a "one stop" process for permitting renewable energy generation facilities under California law. This permit streamlining process is being implemented according to the Energy Commission's "in lieu permit" authority established under the Warren-Alquist Act. Accordingly, staff coordinated a joint environmental review with other agencies such as the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, U.S. Air Force, Lahontan Regional Water Quality Control Board, State Water Project, California Department of Fish and Game, California Department of Water Resources, the California Air Resources Board, City of Lancaster, County of Los Angeles, California Independent System Operator, and Antelope Valley Air Quality Management District to ensure that substantive requirements of these agencies, including requirements of state and local permits that would ordinarily be issued but for the Energy Commission's exclusive jurisdiction, are incorporated into the Commission's permit, if the project is approved.

PROJECT LOCATION AND DESCRIPTION

The proposed site for the PHPP project is located approximately 60 miles north of downtown Los Angeles and in the northernmost portion of the city of Palmdale. The site address is 950 East Avenue M, at the intersection of Sierra Highway and E Avenue M.

Construction of the proposed PHPP would require permanent use of a 377- acre site that is currently vacant and undeveloped, and is part of a 613.4-acre property owned by the City of Palmdale in an industrial area of the city which is currently zoned industrial. The power plant site would require 250 acres for the solar field, 26 acres for the power block, and 56 acres combined for the access road, setbacks and drainage facilities. Construction lay down would require a separate 50-acre temporary area located west of and adjacent to the proposed power plant site. The site is relatively flat with the main population base of the community of Palmdale approximately 4 miles south. The proposed site is comprised of multiple parcels owned by the City of Palmdale.

The property is located immediately north and west of the combined facilities of Los Angeles/Palmdale Regional Airport and Air Force Plant 42. The Air Force Plant 42 site is over 6,600 acres and supports facilities for the production, engineering, final assembly and flight testing of high performance aircraft. The city of Lancaster borders immediately north of the project site along East Avenue M.

Segment 1 of the transmission line from the project site to the interconnection of Southern California Edison's (SCE) Pearblossom substation is approximately 23.7 miles long located within new and existing rights-of-way (ROWs). Segment 2 involves installation of new poles on an approximately 11.9-mile route from the Pearblossom substation to the Vincent substation. Most of route 1 is located within Palmdale; the remainder of segment 1 and all of segment 2 are in unincorporated Los Angeles County and in an existing SCE ROW.

PHPP is designed to use solar technology to generate a portion of the project's output and thereby support the State of California's goal of increasing the percentage of renewable energy supplies. Primary equipment for the generating facility would include two General Electric (GE) Frame 7FA natural gas-fired combustion turbine-generators (CTGs) rated at 154 MW each, two heat recovery steam generators (HRSGs) rated at 169 MW, one steam turbine-generator (STG) rated at 267 MW, and 250 acres of parabolic solar-thermal collectors with associated heat transfer equipment. The 250-acre solar field would consist of parabolic solar-thermal collectors and associated heat transfer equipment arranged in rows. Spacing between the rows would allow for maintenance vehicles and periodic spray washing to remove dust and maintain efficiency of the solar collectors. The proposed PHPP will have a nominal electrical output of 570 MW.

The project would also include one evaporative (wet) cooling tower for steam condensation and evaporative inlet air cooling for the CTGs, an operations building and auxiliary equipment.

PHPP is designed for base load and peaking operations, with capability for rapid start-up, shut-down, and load regulations, and to provide ancillary services. In terms of the

California transmission grid, the plant site is located outside the Big Creek/Ventura Load and Los Angeles Serving Area. Compared to most other combined-cycle power plants, PHPP will be able to start-up in about half the time of other similar technologies as a result of GE's Rapid Start Process. Annual availability of the PHPP is expected to be in the range of 90 to 95%. The solar collectors are designed to pivot and track the sun during daylight hours, maximizing the efficiency of the parabolic trough design. During daylight periods when the solar collectors are in use, the solar field will provide heat directly to the HRSGs to produce steam, allowing the facility to reduce use of natural gas, and contributing up to 50 MW of generation from the STG. The contribution from solar will also generally follow the on-peak periods when power is needed most.

Air emissions from the combustion of natural gas in the CTGs and duct burners of the HRSGs would be controlled using best available control technology applied to their exhaust. Oxides of nitrogen (NOx) from the CTG's stack emissions would be controlled by dry low-NOx combustors followed by a selective catalytic reduction system in the HRSGs. An oxidation catalyst located within each HRSG would also control carbon monoxide (CO) and volatile organic compounds (VOC). The tallest components of the project would be the two 145-foot high HRSG exhaust stacks. In order to be considered for licensing by the Energy Commission, the project would be required to conform to rules and regulations of the Antelope Valley Air Quality Management District and be issued a Determination of Compliance from the Air District.

The proposed generator tie-line would be owned, operated and maintained by the City of Palmdale and would consist of a 35.6-mile long overhead generator tie-line with two segments. The proposed segment 1 would be 23.7 miles long and located within new and existing rights-of-way (ROW) as it extends from the on-site substation through the northeast corner of the site, along 10th St E and East Ave L. The line would then continue over industrial and agricultural areas, over open spaces, and along new and existing road rights-of-way, until it connects at the California Department of Water Resources (DWR) Pearblossom substation. The generator tie-line along segment 1 would be a single circuit 230 kV line supported on steel poles spaced approximately 750 feet apart, and between 100 feet and 135 feet in height. The majority of segment 1, approximately 18.2 miles, would be located within the City of Palmdale, while the remaining 5.5 miles would be within unincorporated Los Angeles County.

Segment 2 is 11.9 miles long, proposed to be built along the existing Southern California Edison's (SCE) ROW, and would proceed from north of the Department of Water Resources Pearblossom substation southwest to the SCE's Vincent Substation.

Segment 2 would be constructed for double-circuit transmission with conductors on both sides of the support poles. One set of conductors would be the new 230 kV interconnection between Pearblossom and Vincent substations, the other would be the replacement for the 230 kV line currently providing power to DWR's water pumping station via the Vincent Substation. The Segment 2 line would be designed, built, operated, and maintained by SCE, as the line is located within an existing SCE ROW. The proposed segment 2 is located in unincorporated Los Angeles County within an existing SCE ROW.

Natural gas would be delivered to the project through a new 20-inch, 8.7-mile

underground gas line that will be designed and constructed by the Southern California Gas Company (SCGC). The proposed gas line will be constructed from the project site south along Sierra Highway, east along Lockheed Way, south along 10th Street E, to East Avenue S along existing streets and will share the same route as the proposed secondary-treated water line.

The PHPP proposes using secondary-treated water for construction and tertiary-treated water for plant operations. Los Angeles County Waterworks would supply this water under an agreement between the Palmdale and Lancaster water treatment plants. These plants are undergoing upgrades which are scheduled to be completed by early 2012. The tertiary-treated water will be delivered through a new 18-inch, 7.4-mile tertiary water supply pipeline. The underground waterline would follow the same route as the underground gas supply line and will be constructed along existing streets. Drinking water would also be supplied by the Waterworks by a 1.37-mile connection line along East Avenue M to an existing Waterworks potable water service pipeline.

Industrial process wastewater, which includes cooling water, would be treated using a Zero Liquid Discharge (ZLD) system, separating water for reuse from solids in the form of brine that would be converted into solids for landfill disposal at an appropriately permitted offsite disposal facility.

Sanitary wastewater will be disposed by connecting to the Los Angeles County Sanitation District's sewer system. The project proposes a new 6-inch, 1.54-mile line along East Avenue M which will connect with an existing sewer line just north of the project. Approximately 5,400 gallons per day of wastewater will be disposed of through this sewer connection.

PUBLIC AND AGENCY COORDINATION

On August 21, 2008, the Energy Commission staff provided the PHPP project description to a comprehensive list of libraries, agencies, organizations and residences/business within 1,000 feet of the proposed project. The Commission staff's notification letter requested public and agency review, comment, and continued participation in the Energy Commission's certification process.

On December 4, 2008, an Information Hearing and a Site Visit for the PHPP project was conducted at the City Council Chambers in the City of Palmdale. On February 4, 2009, staff conducted a publicly noticed Data Response and Issue Resolution staff workshop in the City of Palmdale and discussed the following topics: Air Quality, Alternatives, Biological Resources, Cultural Resources, Hazardous Materials, Land Use, Soil and Water Resources, Traffic and Transportation, Transmission System Engineering, and Waste Management. Participating stakeholders and agencies in the workshop included the applicant, California Department of Water Resources, Southern California Edison, Los Angeles County Waterworks and Los Angeles County Farm Bureau.

The staff prepared a Preliminary Staff Assessment (PSA) in two volumes that presented for the applicant, organizations, agencies, other interested parties, and members of the public the staff's preliminary analysis, conclusions, and recommendations. Volume 1 of

the PSA was issued on December 23, 2009, and Volume 2 was issued February 9, 2010. After publishing the PSA, staff provided a comment period to resolve issues between the parties and to narrow the scope of issues requiring adjudication in the evidentiary hearings. In addition to a public comment period, staff conducted PSA workshops on February 11, 2010 and March 16, 2010 to discuss its conclusions, proposed mitigation, and proposed compliance-monitoring requirements.

In addition to these workshops, extensive coordination has also occurred with numerous other local, state and federal agencies that have an interest in the project including : the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, U.S. Air Force, Lahontan Regional Water Quality Control Board, State Water Project, California Department of Fish and Game, California Department of Water Resources, the California Air Resources Board, City of Lancaster, County of Los Angeles, California Independent System Operator, and Antelope Valley Air Quality Management District.

LIBRARIES

On August 21, 2008, the Energy Commission staff sent the PHPP AFC to local libraries in Bakersfield, Barstow, California City, Lancaster, Palmdale, Rosamond, San Bernardino, Sylmar and Victorville and to state repository libraries in Eureka, Sacramento, San Francisco, Los Angeles, and San Diego.

AGENCY AND PUBLIC COMMENT

The California Energy Commission has received numerous comments and letters from the public raising concerns about environmental issues associated with the proposed PHPP project. Public comments on the PHPP project were as follows:

Air Quality - USEPA Region 9 provided a comment letter dated October 26, 2010 that stated the information provided to them by the Antelope Valley Air Quality Management District for review in regard to ERCs does not make clear whether the proposed inter-district, inter-basin Emission Reduction Credits (ERCs) from San Joaquin Valley Air Pollution Control district will be adjusted at the time of use, and further states that discounting ERCs at the time of use is a federal requirement. EPA requests that this information be provided to them to further facilitate their review of the Final Determination of Compliance (see **Air Quality** section of this FSA). In a December 15, 2010 letter to US EPA, the Antelope Valley AQMD indicated that San Joaquin Valley APCD's Rule 2201 annually tracks ERCs and makes adjustments as necessary so that their banked emissions reductions meet federal NSR offsetting requirements on an ongoing basis. These are called "RACT adjustments." Thus, it is not possible to know at this time whether or not RACT adjustments will reduce the amount of offsets at the time they are allocated to the project. The applicant would be required to identify additional offsets that could be substituted if RACT adjustments reduce the available ERCs because no ERCs over the minimum amount required have been identified. In addition, a comment letter from the Center for Biological Diversity was received challenging Antelope Valley Air Quality Management District's final determination of compliance, namely, the lack of specific Air District rule to allow for the use of road paving to

substitute for emission reduction credits (ERCs), and lack of evidence to demonstrate the Air District conducted an environmental review of the applicant's proposal to use road paving before it issues any ERCs. The comment letter also challenged the applicant's proposal to use road paving, and provided information to challenge road paving as a scientific approach to mitigate air quality impacts. Staff has addressed these issues in the **Air Quality** section of this FSA.

Alternatives – Staff received a comment letter on staff's PSA from Los Angeles County, Department of Regional Planning dated February 25, 2010. The letter commented on the location of the applicant's proposed generator tie-line (also referenced in this document as applicant's proposed transmission line) which would traverse into unincorporated Los Angeles County and commented that the applicant's alternative route 3, a partial underground/overhead route would shorten the transmission route by 23 miles, and would have less environmental impacts than the applicant's proposed route. Staff has addressed Los Angeles County's letter by completing an alternative transmission analysis which is contained in the **Alternatives Appendix A** of this document.

Geo Paleo – Los Angeles County Department of Public Works commented on soils and the close proximity of the project to the San Andreas Fault zone. Staff has addressed these issues in the **GeoPaleo** section of the FSA.

Land Use – Los Angeles County Department of Parks and Recreation sent a comment letter which requested staff adopt an easement to facilitate the Avenue S Connector Trail. Staff has adopted the County's recommendation in staff's **Land Use** section of this FSA.

Soil and Water – Staff received several comment letters from Antelope Valley United Municipal Group (AVUMG) regarding use of recycled water being provided to the proposed project from the Los Angeles County Waterworks. The AVUMG is a group composed of fifteen mutual water companies in the Antelope Valley, and the group was concerned that staff did not address the relation of recycled water in the context of ongoing litigation of groundwater supplies in the basin. In addition, a comment letter was received from the City of Lancaster raising concerns the city had to the proposed PHPP's project water use. Staff has addressed the concerns of both the City of Lancaster and AVUMG in the **Soil and Water Resources** section of this FSA.

Traffic and Transportation – The City of Lancaster sent several comment letters to staff discussing traffic-related impacts, specifically that traffic impacts to their city were omitted in the discussion of local LORS, and the traffic study provided to staff from the applicant was inaccurate, as well as incomplete. Staff has addressed the concerns of the City of Lancaster and prepared a detailed traffic study. These issues are addressed in staff's **Traffic and Transportation** section of the FSA.

Transmission System Engineering - Public concerns about the applicant's proposed generator tie-line were raised at several workshops. Staff has addressed these issues in the **Transmission System Engineering**, and **Alternatives** sections of this FSA.

ENVIRONMENTAL JUSTICE

The steps recommended by the U.S. EPA's guidance documents to assure compliance with the Executive Order 12898 regarding environmental justice are: (1) outreach and involvement; (2) a screening-level analysis to determine the existence of a minority or low-income population; and (3) if warranted, a detailed examination of the distribution of impacts on segments of the population. Though the Federal Executive Order and guidance are not binding on the Energy Commission, staff finds these recommendations helpful for implementing this environmental justice analysis. Staff has followed each of the above steps for the following sections in the FSA, which are the technical areas capable of affecting environmental justice: Air Quality, Public Health, Hazardous Materials, Land Use, Traffic and Transportation, Socioeconomics, Soils and Water, Transmission Line Safety and Nuisance, Noise, Visual Resources, and Waste Management. Over the course of the analysis for each of these areas, staff considered potential impacts and mitigation measures, significance, and whether there would be a disproportionate impact on an environmental justice population.

The purpose of staff's environmental justice screening analysis is to determine whether a below- poverty-level and/or minority population exists within the potentially affected area of the proposed site. Staff conducted the screening analysis in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in U.S. EPA's National Environmental Protection Act Compliance Analysis" (Guidance Document) dated April 1998. People of color populations, as defined by this Guidance Document, are identified when:

- the minority population of the affected area is greater than 50% of the affected area's general population; or
- one or more U.S. Census blocks in the potentially affected area have a minority population of greater than 50%; or

DETERMINING MINORITY POPULATION

Socioeconomics Figure 1 (see **Socioeconomics** section of this FSA) shows the minority population within the six-mile radius of the proposed PHPP site. A minority population is identified when the minority population of the potentially affected area is greater than 50% or when one or more U.S. Census blocks in the potentially affected area have a minority population greater than 50%.For the PHPP project, the 2000 U.S. Census total population within the six-mile radius indicates a total minority population of 100,297 persons, or 52.26%, which is greater than the 50% threshold.

DETERMINING POVERTY-LEVEL POPULATION

Below-poverty-level populations are identified based on Year 2000 census block group data. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old. The below-poverty-level population within a six-mile radius of the PHPP site (for which poverty status was determined by the US Census) consists of 21.1% of the total population in that area.

ENVIRONMENTAL JUSTICE - SIGNIFICANT IMPACTS

Staff has concluded that in the above-mentioned sections of the FSA, (Air Quality, Hazardous Materials, Land Use, Noise, Public Health, Socioeconomics, Soils and Water Resources, Traffic and Transportation, Transmission Line Safety/Nuisance, Visual Resources, and Waste Management) there is a reasonable likelihood that significant impacts can be mitigated through the Conditions of Certification thereby ensuring that there would be no disproportionate or significant impact on an environmental justice population.

Staff has worked closely with the applicant and the residents of the area to identify local mitigation measures designed to reduce, to the greatest extent possible, any impact that will occur in the community surrounding the proposed project. Staff's environmental justice outreach has been incorporated into its overall outreach activity. This activity is summarized in the **Introduction** section to the FSA, and in the subsection to this **Executive Summary** titled Public and Agency Coordination.

In addition, the Public Adviser's Office has been involved in this project since the October 1, 2009 Informational Hearing and Site Visit and has helped to ensure that meaningful participation by members of the public has occurred in this commission proceeding.

PROJECT'S COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Staff believes that with the Commission's adoption of staff's proposed mitigation measures and the proposed conditions of certification, the PHPP would comply with all applicable laws, ordinances, regulations, and standards (LORS.

SUMMARY OF PROJECT RELATED IMPACTS

With the exception of **Air Quality**, as identified below, staff believes the project as currently proposed, including the applicant's and staff's proposed mitigation measures and with the Commission's adoption of staff's proposed conditions of certification, the PHPP would not cause significant adverse impacts and would comply with all applicable laws, ordinances, regulations, and standards (LORS). For a more detailed review of potential impacts and LORS conformance, see staff's technical analysis in the FSA. The status of each technical area are summarized in the table below and the subsequent text.

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	No*	No*
Biological Resources	Yes	Yes
Cultural Resources	Yes	Yes
Efficiency	Yes	Yes
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes

Hazardous Materials	Yes	Yes
Land Use	Yes	Yes
Noise	Yes	Yes
Public Health	Yes	Yes
Reliability	Yes	Yes
Socioeconomic Resources	Yes	Yes
Soil & Water Resources	Yes	Yes
Traffic & Transportation	Yes	Yes
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	Yes	Yes
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

*The project, as proposed, would not comply with LORS. However, if the COCs proposed by staff are fully implemented, staff believes the project could comply with LORS.

AIR QUALITY

The PHPP as proposed currently does not meet LORS and has unmitigated CEQA impacts. As the project would be located in the Antelope Valley Air Quality Management District (AVAQMD), because of limited availability of ozone precursor Emissions Reduction Credits (ERCs) in the air district, the applicant will rely on ERCs from the San Joaquin Valley Air Pollution Control District (SJVAPCD). The applicant provided staff with a term sheet for potential offsets, however a complete list of offsets that would mitigate the impacts of the PHPP to less- than-significant have not been received. In order for the applicant to obtain these interdistrict ERCs, additional requirements would be placed on AVAQMD. Specifically, rules require both the AVAQMD and the SJVAPCD Board to approve these offsets; however, the applicant has not provided adequate written verification that the SJVAPCD and AVAQMD transfer of ERCs has been approved, and as a result, staff cannot determine that the significant air quality impacts would be mitigated to a less than significant level.

Use of ERCs from the SJVAPCD to mitigate the facility oxides of nitrogen (NOx) and volatile organic compounds (VOC) emissions contributions to existing violation of ozone air quality standards would comply with LORS, if sufficient ERCs are obtained and approved by both air agencies. Obtaining ERCs from the SJVAPCD will place additional requirements on the AVAQMD, specifically AVAQMD Rule 1305 which requires that ERCs obtained from another district comply with the requirements of Health & Safety Code §40709.6, which defines source upwind and downwind designations. The AVAQMD states their rule complies with Health & Safety Code §40709.6, but require AVAQMD and SJVAPCD board approval. Although the applicant has indicated the air districts' approval, staff does not have written verification from the air districts.

The AVAQMD is a very small district that does not have any distance ratios noted in their rules and regulations. Federal guidance on the requirement for a positive net air quality benefit is present in Appendix S of 40 CFR 51, which requires a demonstration of a positive net air quality benefit that can require modeling if emission offset ratios are insufficient and/or the location of the offsets are significantly different than the emissions

being offset. Therefore, the SJVAPCD limitations on the distance between the ERC and new emission source should be considered as a guide in determining the relative effectiveness of the proposed ERCs. SJVAPCD Rule 2201 requires that an offset ratio of 1.5 to 1 be used for all ERCs that are more than 15 miles from the source. In addition, SJVAPCD Rule 2201 states that offsets from another district may be used only if the source of the offsets is within 50 miles of the proposed emissions increases and the APCO has reviewed the permit conditions issued by the district in which the proposed offsets are obtained and certifies that such offsets meet the requirements of this rule and California Health & Safety Code Section 40709.6. Since the project site is almost 50 miles from the AVAQMD/SJVAPCD border, potential sources of SJVAB emission reduction credits meeting these requirements might be very limited.

The applicant proposed to obtain PM10/PM2.5 ERCs by paving roads following the procedures that would be defined in a new rule that would be passed by the AVAQMD. The new rule would be modeled after Mojave Desert AQMD Rule 1406, which provides a detailed approach to estimating and banking PM10 offsets that are needed by the project. Although the applicant has provided staff with a candidate list of roads from Palmdale, Lancaster, and unincorporated Los Angeles County, and preliminary data on vehicle miles traveled for each road segment, their proposal does not meet California Air Resources Board (ARB) regulation requirements. The ARB has rules that address ERCs from mobile sources; Rule 1305(B)(3)(i) states that “The applicant demonstrate(s) sufficient control over the Mobile Sources to ensure the claimed reductions are real, enforceable, surplus, permanent and quantifiable,” and Rule 1304(D)(2)(c)(i) which specified the methodology to be used to estimate ERCs for mobile, area or indirect sources, and states that “any calculation formula and protocol as approved by the District, ARB and U.S. EPA.” When it becomes possible to demonstrate that emissions are real, permanent, quantifiable, enforceable, and surplus, ERCs may be granted.

The AVAQMD is required to develop a rule allowing for the generation of ERCs for all non-traditional emission sources. The California PM10 State Implementation Plan (SIP) includes the existing AVAQMD rules and regulations, but no rule allowing for the banking of road paving ERCs. An EPA-approved SIP is federal law and does not change unless and until EPA approves a revision requested by a state. Once “a SIP is adopted by a state and approved by the EPA, it becomes controlling and must be carried out by the state” and the SIP’s “requirements and commitments become binding upon the state as a matter of federal law.” (United States District Court, Eastern District of California 2007). Therefore, EPA has requested that the AVAQMD develop Rule 1309.2 in order to allow for the banking of Road Paving ERCs.

Prior to adopting the needed regulation to allow for road paving ERCs, the AVAQMD would be required to develop a comprehensive PM10 emissions inventory and prepare and submit an Attainment Demonstration and Maintenance Plan (ADMP), which must be approved by U.S. EPA and incorporated in the State Implementation Plan. Regulations specify appropriate quantification methodologies, and other provisions that ensure the reduction meet all the applicable tests, and the regulatory process allows for public review and comment. To date, California air districts have not succeeded in gaining U.S. EPA approval to issue ERCs for road paving activities, and staff believes it is unlikely that U.S. EPA approval will be granted in time for road paving to be considered as viable ERCs for the PHPP project.

BIOLOGICAL RESOURCES

Staff has analyzed the proposed project for potential impacts to vegetation communities, aquatic resources, and special-status species and determined that with implementation of staff's recommended conditions of certification, the project's impacts can be mitigated to less-than-significant.

Development of the power block, solar arrays and linear facilities would result in the permanent loss of approximately 463.33 acres of native and non-native plant communities. No threatened or endangered plants were identified in the project area, however, one sensitive plant was observed during botanical surveys in the project area. Impacts to plants would be mitigated to less-than-significant levels through staff's proposed conditions of certification.

Common wildlife and nesting birds would be adversely affected due to construction of the power block and solar arrays. To reduce the project effects on wildlife, staff has proposed conditions of certification which propose habitat loss to be compensated by the applicant, as well as avoidance measures addressing construction impacts. It is unknown how birds will respond to the project once operational, due to the fact that solar technology has not been implemented and studied on a large scale. Therefore, staff cannot conclude that impacts to birds from collision with the placement of solar arrays are not significant. Staff has proposed a condition of certification that requires the applicant to prepare and implement an Avian Protection Plan, including a Bird Monitoring Study to monitor the death and injury of birds from collisions with facility features, such as the solar arrays.

Construction of the power block, solar arrays and linear facilities also have the potential for impacts to listed species including desert tortoise, Mohave ground squirrel, and Swainson's hawk, as well as other sensitive wildlife species including coast horned lizards, small mammals, and burrowing owls. Potential direct and indirect impacts to wildlife at the PHPP plant site and linear facilities can be reduced to less-than-significant levels with impact avoidance and minimization measures with staff's proposed conditions of certification, as well as compensatory mitigation. Staff concludes that the compensatory measures proposed reduce impacts to less-than-significant levels and satisfy the California Department of Fish and Game's (DFG) requirements.

A total of 43 U.S. Army Corps of Engineers jurisdictional features were identified in the project area. Twelve of these have been identified by the U.S. Army Corps of Engineers as waters of the United States. Although construction of the PHPP power plant site would not result in permanent impacts to State or federal jurisdictional waters, the project's proposed transmission line would span and access roads would cross a variety of jurisdictional features. Staff has proposed conditions of certification which are consistent with DFG's Streambed Alteration Agreement requirements that require restoration and compensation should permanent loss of state jurisdictional habitat occur. With implementation of this condition, temporary impacts to 0.08 acre of State waters associated with desert washes would be mitigated to less-than-significant levels. This condition also fulfills requirements of DFG's Lake and Streambed Alteration Agreement program.

ALTERNATIVES SUMMARY

The "Guidelines for Implementation of the California Environmental Quality Act," Title 14, California Code of Regulation, Section 15126.6(a), provides direction by requiring an evaluation of the comparative merits of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project." In addition, the analysis must address the "no project" alternative (Cal. Code Regs., tit. 14, §15126.6(e)).

Staff analyzed three alternative project sites and three alternative transmission routes, as well as several alternative energy producing technologies. **Appendix A** of this document includes staff's analysis of two alternative transmission routes, one overhead and one partially underground; both routes are modified versions of alternative routes proposed by the applicant.

Staff has determined the proposed PHPP site to be more feasible than the alternatives analyzed, as well as the applicant's generation technology more superior than alternatives examined to meet the project objectives. The applicant's proposed generator tie-line has been analyzed by staff, and staff concluded that an interconnection agreement for the 35.6-mile line connection from the PHPP site to the Vincent 500/230 kV substation would be required. In addition, a detailed Right-of-Way (ROW) Study would be required to determine the feasibility of using the Vincent-Pearblossom corridor (see **Transmission System Engineering**). Southern California Edison (SCE) stated in a letter dated November 19, 2009 that the PHPP "transmission line route is technically feasible, given sufficient resource, time, and money, and, barring any insurmountable legal or regulatory challenges. SCE has not found any fatal flaws to date," and as a result, staff has concluded that the generator tie-line appears to be feasible at this time.

On February 25, 2010, staff received a comment letter from Los Angeles County Department of Regional Planning which provided substantive comments regarding a shorter alternative transmission line route and encouraged staff to take a closer look at the alternative routes proposed by the applicant. As a result, staff expanded their analysis of the project's alternative transmission routes, investigated the feasibility of those routes and concluded several alternative transmission routes were feasible. Staff also concluded that these alternative routes are not only substantially shorter than the applicant's proposed route (12.8 or 14 miles versus 35.6 miles), but the routes lessen impacts on desert vegetation and wildlife, and could also reduce the potential for impacts to cultural or archaeological resources. Although the impacts associated with the applicant's proposed route can be mitigated to less than significant, staff's alternative routes can reduce the number of impacts being mitigated (see **Appendix A**).

Staff analyzed alternative transmission line routes to determine if a more direct and shorter route was feasible. Staff has concluded that a partially underground and above-ground alternative should be certified in addition to the applicant's proposed route to provide two options for the applicant to consider.

CUMULATIVE IMPACTS

Staff recently received notification of two potential development projects in the City of Palmdale. Both projects involve development of very large tracts of land and could potentially contribute to cumulative impacts to the proposed PHPP. However, no applications have been filed for these projects

The first project, the High Desert Corridor (HDC), a 50-mile, east-west freeway/expressway and truck toll facility between Los Angeles and San Bernardino counties, would be designed to accommodate an expected three to six fold increase in traffic between the Antelope and Victor Valleys.

The second project is located within the City of Palmdale and would consist of a 17,500 acre parcel of vacant land surrounding Palmdale Regional Airport to be developed into a renewable energy facility. The energy plant has been described as a $3 billion solar plant which could generate up to 2,200 megawatts of electricity. The exact configuration of the project, however, has not been determined and it is currently in the request for proposal stage. However, staff considers both of these projects to be speculative because they are still in the project development stage and have not begun project permitting; therefore, staff has not included these two projects in the cumulative analysis. For a detailed discussion of the projects that have been included and staff's conclusions regarding cumulative impacts, please see the Cumulative Impacts section of each technical area.

NOTEWORTHY PUBLIC BENEFITS

Staff concurs with the applicant regarding the following benefits associated with the PHPP project; that the proposed project will facilitate the use of solar technology to generate a portion of the facility's power output and thereby support the State of California's goal of increasing the percentage of renewable energy in the state's electricity mix.

INTRODUCTION

Testimony of Felicia Miller

PURPOSE OF THIS REPORT

This Final Staff Assessment (FSA) is the California Energy Commission staff's independent analysis of the proposed Palmdale Hybrid Power Project (PHPP). This FSA is a staff document. It is neither a Committee document, nor a draft decision. The FSA describes the following:

- the proposed project;
- the existing environment;
- whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations and standards (LORS);
- the environmental consequences of the project including potential public health and safety impacts;
- the potential cumulative impacts of the project in conjunction with other existing and known planned developments;
- mitigation measures proposed by the applicant, staff, and interested agencies which may lessen or eliminate potential impacts;
- the proposed conditions under which the project should be constructed, operated and closed, if it is certified; and

project alternatives.The analyses contained in this FSA are based upon information from the: 1) Application for Certification (AFC), 2) responses to data requests, 3) supplementary information from local, state, and federal agencies, interested organizations and individuals, 4) existing documents and publications, 5) independent research, and 6) comments at workshops. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification." The FSA presents staff's conclusions about potential environmental impacts and conformity with LORS, as well as proposed conditions that apply to the design, construction, operation and closure of the facility.

The Energy Commission staff's analyses were prepared in accordance with Public Resources Code section 25500 et seq. and Title 20, California Code of Regulations section 1701 et seq., and the California Environmental Quality Act (CEQA) (Public Resources Code, § 21000 et seq.)

ORGANIZATION OF THE FINAL STAFF ASSESSMENT

The FSA begins with an Executive Summary, Introduction and Project Description. The next 20 chapters contain the environmental, engineering, public health and safety and alternatives analyses of the proposed project. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report.
Each of the 20 technical area assessments includes a discussion of:

- laws, ordinances, regulations and standards (LORS);
- the regional and site-specific setting;
- project specific and cumulative impacts;
- mitigation measures;
- closure requirements;
- conclusions and recommendations; and
- conditions of certification for both construction and operation (if applicable).

ENERGY COMMISSION SITING PROCESS

The Energy Commission has the exclusive authority to certify the construction, modification, and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies and federal agencies to the extent permitted by federal law (Public Resources Code, § 25500). The Energy Commission must review thermal power plant applications for certification (AFC) to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts, and compliance with applicable governmental laws or standards (Public Resources Code, § 25519 and § 25523(d)).

The Energy Commission's siting regulations require staff to independently review the AFC and assess whether all of the potential environmental impacts have been properly identified, and whether additional mitigation or other more effective mitigation measures are necessary, feasible, and available (California Code Regs., tit. 20, § 1742 and § 1742.5(a)).

In addition, staff must assess the completeness and adequacy of the measures proposed by the applicant to ensure compliance with health and safety standards, and the reliability of power plant operations (California Code Regs., tit. 20, § 1743(b)). Staff is required to develop a compliance plan (coordinated with other agencies) to ensure that applicable laws, ordinances, regulations, and standards are met (California Code Regs., tit. 20, § 1744(b)).
Staff conducts its environmental analysis in accordance with the requirements of CEQA.

No additional environmental impact report (EIR) is required because the Energy Commission's site certification program has been certified by the California Natural Resources Agency as meeting all requirements of a certified regulatory program (Public Resources Code, § 21080.5 and California Code Regs., tit. 14, § 15251 (j)). The Energy Commission is the CEQA lead agency.

The staff prepared a Preliminary Staff Assessment (PSA) in two volumes that presented for the applicant organizations, agencies, other interested parties, and members of the public the staff's preliminary analysis, conclusions, and recommendations. Volume one of the PSA was issued on December 23, 2009, and Volume two was issued February 9, 2010.

After publishing the PSA, staff provided a comment period to resolve issues between the parties and to narrow the scope of issues requiring adjudication in the evidentiary hearings. During the comment period, staff conducted two workshops to discuss its conclusions, proposed mitigation, and proposed compliance-monitoring requirements. Based on the workshops and written comments, staff refined its analysis, corrected errors, and finalized conditions of certification to reflect areas where agreements have been reached with the parties and reflected in the Final Staff Assessment (FSA).

The FSA is only one piece of evidence that will be considered by the Committee (two Energy Commission Commissioners who have been assigned to this project) in reaching a decision on whether or not to recommend that the full Energy Commission approve the proposed project. At the public hearings, all parties will be afforded an opportunity to present evidence and to rebut the testimony of other parties, thereby creating a hearing record on which a decision on the project can be based. The hearing before the Committee also allows all parties to argue their positions on disputed matters, if any, and it provides a forum for the Committee to receive comments from the public and other governmental agencies.

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

AGENCY COORDINATION

As noted above, the Energy Commission certification is in lieu of any permit required by state, regional, or local agencies and federal agencies to the extent permitted by federal law (Public Resources Code, § 25500). However, the Energy Commission typically seeks comments from and works closely with other regulatory agencies that administer

LORS that are applicable to the proposed project. These agencies include: the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, U.S. Air Force, Lahontan Regional Water Quality Control Board, State Water Project, California Department of Fish and Game, California Department of Water Resources, the California Air Resources Board, City of Lancaster, County of Los Angeles, California ISO, and Antelope Valley Air Quality Management District.

OUTREACH

The Energy Commission's outreach program is primarily facilitated by the Public Adviser's Office (PAO). This is an ongoing process that to date has involved the following efforts:

LIBRARIES

On August 21, 2008, the Energy Commission staff sent the PHPP AFC to local libraries in Bakersfield, Barstow, California City, Lancaster, Palmdale, Rosamond, San Bernardino, Sylmar and Victorville and to state repository libraries in Eureka, Sacramento, San Francisco, Los Angeles, and San Diego.

PUBLIC OUTREACH EFFORTS

The PAO reviewed related information available from the applicant and others and then conducted its own, extensive outreach efforts to identify certain local officials, as well as interested entities within a six-mile radius around the proposed site for the PHPP. These entities include schools; churches; community, cultural and health-care facilities; and day-care and senior-care centers, as well as business, environmental, governmental, and ethnic organizations. By means of mailing letters and bilingual (English and Spanish) notices, the PAO notified these entities of the Informational Hearing and Site Visit for the project, held on December 4, 2008, in Palmdale, California. The PAO also identified and similarly notified local officials with jurisdiction in the project area.

Energy Commission regulations require staff to notice, at a minimum, property owners within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines, and water lines). This was done for the PHPP project. Staff's ongoing public and agency coordination activities for this project are discussed under the Public and Agency Coordination heading in the **Executive Summary** section of the FSA.

ENVIRONMENTAL JUSTICE

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," focuses federal attention on the environment and human health conditions of minority communities and calls on federal agencies to achieve environmental justice as part of this mission. The order requires the U.S. Environmental Protection Agency and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The

agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

For all siting cases, Energy Commission staff conducts an environmental justice screening analysis in accordance with the *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA (National Environmental Policy Act) Compliance Analysis,* dated April 1998. The purpose of the screening analysis is to determine whether a minority or low-income population exists within the potentially affected area of the proposed site.

California Statute section 65040.12(c) of the Government Code defines *environmental justice* to mean "fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." Staff's specific activities, with respect to environmental justice for the PHPP project are discussed in the **Executive Summary**.

PROJECT DESCRIPTION

Testimony of Felicia Miller

INTRODUCTION

On August 4, 2008, the City of Palmdale submitted an Application for Certification (AFC) to construct and operate the Palmdale Hybrid Power Project (PHPP), a hybrid of natural gas-fired combined cycle generating equipment integrated with solar thermal generating equipment, in the city of Palmdale, Los Angeles County. Although the original filing lacked required information, on October 1, 2008, the City of Palmdale provided a Volume III Data Adequacy Supplement to the AFC to satisfy the Energy Commission's informational requirements. At a business meeting held on October 8, 2008, the Energy Commission accepted the AFC with the supplemental information as complete. This determination initiated Energy Commission staff's independent analysis of the proposed project.

PURPOSE OF PROJECT

The Palmdale Hybrid Power Project (PHPP) consists of a 617 megawatt (MW) hybrid of natural gas-fired combined generating equipment integrated with solar thermal generating equipment. The solar thermal input will provide approximately 10 percent of the peak power generated by the project during the daily periods of highest energy demand. The project would provide base and peak load and ancillary power services designed to meet electric generation demand and reliability requirements in the City of Palmdale and surrounding local areas, and to provide additional generating capacity for the region and state. The City of Palmdale wants to increase its level of assurance that electrical power needs of residential, commercial and industrial users in the city can be met.

PROJECT LOCATION

The proposed site for the PHPP project is located approximately 60 miles north of downtown Los Angeles and in the northernmost portion of the city of Palmdale. The site address is 950 East Avenue M, located at the intersection of Sierra Highway and East Avenue M. **Project Description Figure 1** shows an overview of the project site and linears and **Project Description Figure 2** provides a simulation of the proposed project.

Construction of the proposed PHPP would require permanent use of a 377- acre site that is currently vacant and undeveloped, and is part of a 613.4-acre property owned by the City of Palmdale in an industrial area of the city which is currently zoned industrial. The power plant site would require 251 acres for the solar field, 26 acres for the power block, and 56 acres combined for the access road, setbacks and drainage facilities. Construction lay down would require a separate 50-acre temporary area located west of and adjacent to the proposed power plant site. The site is relatively flat with the main population base of the community of Palmdale approximately 4 miles south. The proposed site is comprised of multiple parcels owned by the City of Palmdale.

The property is located immediately north and west of the combined facilities of Los Angeles/Palmdale Regional Airport and Air Force Plant 42. The Air Force Plant 42 site

is over 6,600 acres and supports facilities for the production, engineering, final assembly and flight testing of high performance aircraft. The city of Lancaster borders immediately north of the project site along East Avenue M.

POWER PLANT EQUIPMENT AND LINEAR FACILITIES

The PHPP is designed to use solar technology to generate a portion of the project's output and thereby support the State of California's goal of increasing the percentage of renewable energy supplies. Primary equipment for the generating facility would include two General Electric (GE) Frame 7FA natural gas-fired combustion turbine-generators (CTGs) rated at 154 MW each, two heat recovery steam generators (HRSGs), one steam turbine-generator (STG) rated at 267 MW, and 250 acres of parabolic solar-thermal collectors with associated heat transfer equipment. The 250-acre solar field would consist of parabolic solar-thermal collectors and associated heat transfer equipment arranged in rows. Spacing between the rows would allow for maintenance vehicles and periodic spray washing to remove dust and maintain efficiency of the solar collectors. The proposed PHPP will have a nominal electrical output of 570 MW.

The project would also include one evaporative (wet) cooling tower for steam condensation and evaporative inlet air cooling for the CTGs, an operations building and auxiliary equipment.

The PHPP is designed for base load and peaking operations, with capability for rapid start-up, shut-down, and load regulations, and to provide ancillary services. Compared to most other combined-cycle power plants, the PHPP will be able to start-up in about half the time of other similar technologies as a result of GE's Rapid Start Process. Annual availability of the PHPP is expected to be in the range of 90 to 95%. The solar collectors are designed to pivot and track the sun during daylight hours, maximizing the efficiency of the parabolic trough design. During daylight periods when the solar collectors are in use, the solar field will provide heat directly to the HRSGs to produce steam, allowing the facility to reduce use of natural gas, and contributing up to 50 MW of generation from the STG. The contribution from solar will also generally follow the on-peak periods when power is needed most.

Air emissions from the combustion of natural gas in the CTGs and duct burners of the HRSGs would be controlled using best available control technology applied to their exhaust. Oxides of nitrogen (NOx) from the CTG's stack emissions would be controlled by dry low-NOx combustors followed by an aqueous ammonia selective catalytic reduction system in the HRSGs. An oxidation catalyst located within each HRSG would also control carbon monoxide (CO) and volatile organic compounds (VOC). The tallest components of the project would be the two 145-foot high HRSG exhaust stacks. In order to be considered for licensing by the Energy Commission, the project would be required to conform to rules and regulations of the Mojave Desert Air Quality Management District and be issued a Determination of Compliance from the Air District.

ELECTRIC TRANSMISSION LINE

The proposed generator tie-line would be owned, operated and maintained by the City of Palmdale and would consist of a 35.6-mile long overhead generator tie-line with two

segments. The proposed segment 1 would be 23.7 miles long and located within new and existing rights-of-way (ROW) as it extends from the on-site substation through the northeast corner of the site, along 10th St E and E Ave L. The line would then continue over industrial and agricultural areas, over open spaces, and along new and existing road rights-of-way, until it connects at the California Department of Water Resources (DWR) Pearblossom substation. The generator tie-line along segment 1 would be a single circuit 23 kV line supported on steel poles spaced approximately 750 feet apart, and between 100 feet and 135 feet in height. The majority of segment 1, approximately 18.2 miles, would be located within the city of Palmdale, while the remaining 5.5 miles would be within unincorporated Los Angeles County.

Segment 2 is 11.9 miles long, proposed to be built along the existing Southern California Edison's (SCE) ROW, and would proceed from north of the Department of Water Resources Pearblossom Pumping Station southwest to the SCE's Vincent Substation.

Segment 2 would be constructed for double-circuit transmission with conductors on both sides of the support poles. One set of conductors would be the new 230 kV interconnection between Pearblossom and Vincent substations, the other would be the replacement for the 230 kV line currently providing power to DWR's water pumping station via the Vincent Substation. The Segment 2 line would be designed, built, operated, and maintained by SCE, as the line is located within an existing SCE ROW. The proposed segment 2 is located in unincorporated Los Angeles County within an existing SCE ROW.

NATURAL GAS SUPPLY LINE

Natural gas would be delivered to the project through a new 20-inch, 8.7-mile underground gas line that will be designed and constructed by the Southern California Gas Company (SCGC). The proposed gasline will be constructed from the project site south along Sierra Highway, east along Lockheed Way, south along 10th Street E, to East Avenue S along existing streets and will share the same route as the proposed secondary-treated water line.

WATER SUPPLY/ WATER SUPPLY LINE

The PHPP proposes using secondary-treated water for construction and tertiary-treated water for plant operations. Los Angeles County Waterworks would supply this water under an agreement between the Palmdale and Lancaster water treatment plants. These plants are undergoing upgrades which are scheduled to be completed by early 2012. The tertiary-treated water will be delivered through a new 18-inch, 7.4-mile tertiary water supply pipeline. The underground waterline would follow the same route as the underground gas supply line and will be constructed along existing streets. Drinking water would also be supplied by the Waterworks by a 1.37-mile connection line along East Avenue M to an existing Waterworks potable water service pipeline.

WASTEWATER DISCHARGE

Industrial process wastewater would be treated using a Zero Liquid Discharge (ZLD)

system, separating water for reuse from solids in the form of brine that would be converted into solids for landfill disposal. Cooling water from the project will be processed to solid waste and disposed at an appropriately permitted offsite disposal facility.

Sanitary wastewater will be disposed by connecting to the Los Angeles County Sanitation District's sewer system. The project proposes a new 6-inch, 1.54-mile line along East Avenue M which will connect with an existing sewer line just north of the project. Approximately 5,400 gallons per day of wastewater will be disposed of through this sewer connection.

PROJECT CONSTRUCTION AND OPERATION

If approved by the Energy Commission, the City of Palmdale proposes to initiate construction after the city has secured a developer for the project and secured a power purchase agreement. Construction is expected to take about 27 months, including startup testing. The construction workforce would average 367 workers per month and would peak during the 12th month with up to 767 workers onsite

The construction schedule would typically consist of a 12-hour workday (Monday through Friday), between the hours of 6:00 a.m. and 6:00 p.m. The City of Palmdale anticipates operational hours for the project would be 7 days per week, 24 hours a day, employing 36 full-time employees.

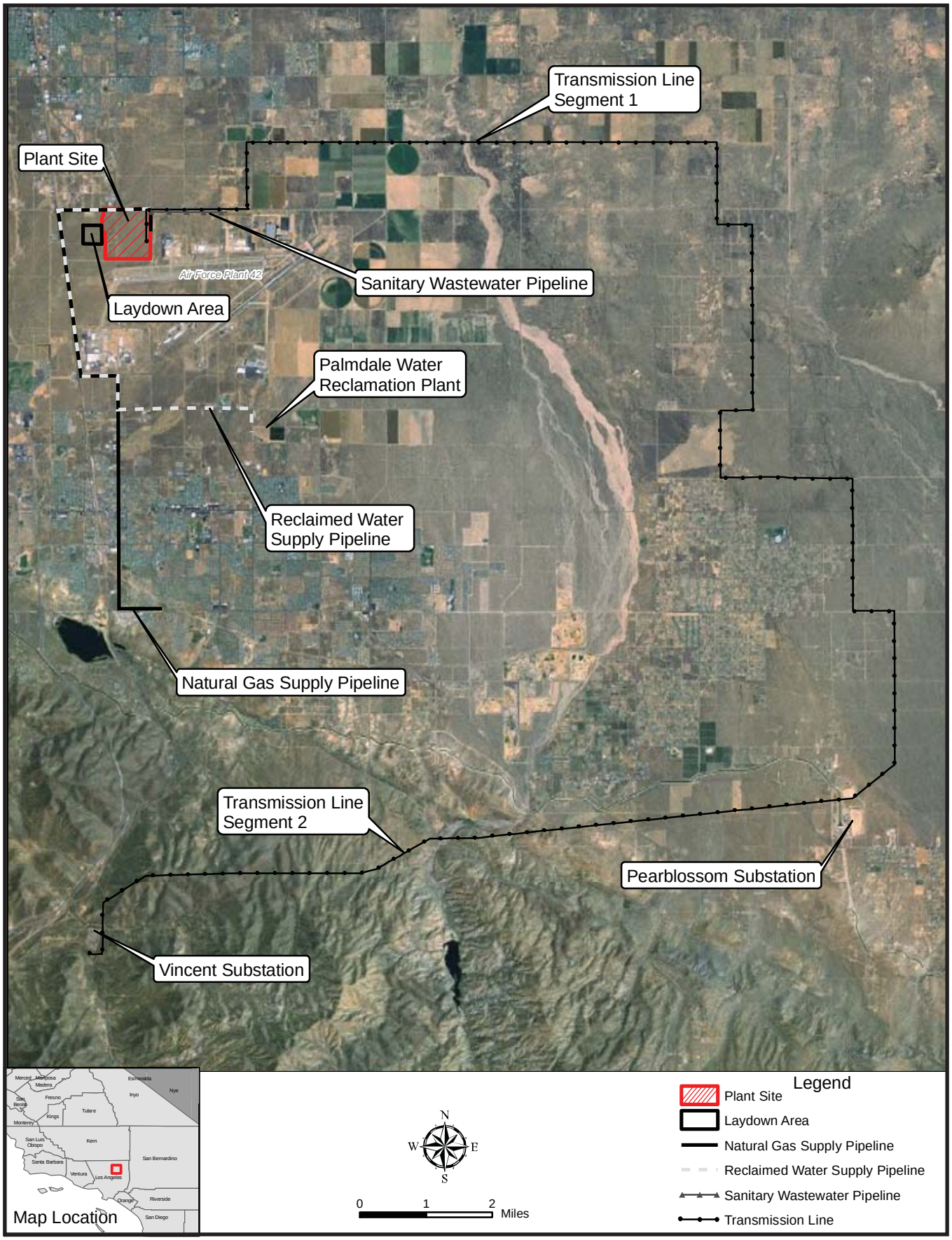
FACILITY CLOSURE

The PHPP would be designed for an operating life of 30 years. At an appropriate point beyond that, the project would cease operation and close down. At that time, it would be necessary to ensure that the closure occurs in a manner that protects public health and safety and the environment from adverse effects. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, Ordinances, Regulations and Standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure.

Decommissioning activities would be designed to optimize the recycling of facility components. Unused chemicals would be returned to suppliers or sold to other uses. Equipment containing chemicals would be drained and shut down in a manner to assure public health and safety and protect the environment. Nonhazardous wastes would be collected and disposed of in licensed landfills or recycled at licensed waste collection facilities. Hazardous wastes would be disposed of according to applicable laws, ordinances, regulations, and standards. The site would be secured 24 hours per day during the decommissioning activities.

PROJECT DESCRIPTION - FIGURE 1

Palmdale Hybrid Power Project - Project Site



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Application for Prevention of Significant Deterioration Permit for Palmdale Hybrid Power Project - Figure 2.1

PROJECT DESCRIPTION - FIGURE 2

Palmdale Hybrid Power Project - Plant Site with Simulated Project Facilities

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Application for Prevention of Significant Deterioration Permit for Palmdale Hybrid Power Project - Figure 2-2

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Testimony of Steve Radis

SUMMARY OF CONCLUSIONS

Staff concludes that the Palmdale Hybrid Power Project (PHPP) as proposed, would not comply with all applicable Laws, Ordinances, Regulations and Standards (LORS), nor would emissions from the proposed facility comply with California Environmental Quality Act (CEQA) requirements. In their final Determination of Compliance, the Antelope Valley Air Quality Management District (AVAQMD) determined that the project would comply with their applicable LORS, but staff does not agree. The rules needed to generate particulate matter offsets (PM10) are not yet adopted by AVAQMD nor are they approved by the Air Resources Board or the US Environmental Protection agency. In addition, staff concludes that a higher ozone precursor offset ratio is needed for CEQA purposes. Staff offers some additional Conditions of Certification which would overcome both of these problems. If all staff-recommended conditions are adopted by the Energy Commission, then staff concludes that both LORS and CEQA requirements would be met and staff would find:

- The project would comply with applicable Antelope Valley Air Quality Management District Rules and Regulations, including New Source Review requirements (AVAQMD 2010).
- The project would not cause new violations of any NO_2, SO_2, or CO ambient air quality standards, and therefore, the project direct NOx, SOx and CO emission impacts are less than significant.
- Without proper mitigation, the project NOx and VOC emissions would potentially contribute to existing violations of the state 1-hour and the federal 8-hour ozone air quality standards. Staff has determined that emission offset credits from the Mojave Desert Air Basin (MDAB) and San Joaquin Valley Air Basin (SJVAB) could mitigate the project's ozone impact to a level that is less than significant, if the transfer credits are available and approved by the appropriate air agencies (**AQ-SC8**).
- The project PM10 emissions and PM10 precursor emissions of SOx would contribute to existing violations of the state's annual and 24-hour PM10 ambient air quality standards. However, staff has determined that emission reductions from paving of local roads (**AQ-SC9** could mitigate the project's PM10 and PM10 precursor emissions impacts to a level that is less than significant.

INTRODUCTION

The city of Palmdale proposes to construct, own, and operate the Palmdale Hybrid Power Project (PHPP or project). The PHPP consists of a hybrid of natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment to be developed on an approximately 377-acre site in the northern portions of the city of Palmdale. The combined-cycle equipment utilizes two natural gas-fired combustion turbine generators (CTG), two heat recovery steam generators (HRSG), and one steam turbine generator (STG). The solar thermal equipment utilizes arrays of parabolic collectors to heat a high-temperature working fluid. The hot working fluid is

used to boil water to generate steam. The combined-cycle equipment is integrated thermally with the solar equipment at the HRSG and both utilize the single STG that is part of the project.

The proposed PHPP would include 250 acres of parabolic solar-thermal collectors and associated heat transfer equipment integrated into a traditional combined cycle project consisting of two natural gas-fired combustion turbine-generators (CTGs) rated at 154 MW each, two heat recovery steam generators (HRSGs), and one steam turbine-generator (STG) rated at 268 MW. The solar thermal equipment utilizes arrays of parabolic trough solar collectors that heat a working fluid used to generate steam. At full load solar operation, heat from the solar field can replace the equivalent of approximately 50 MW of duct firing.

The PHPP plant site is located south of East Avenue M (E Ave M) in the northernmost areas of the city of Palmdale. The 377-acre plant site is part of an approximately 600-acre city-owned property that is bounded by Sierra Highway to the west, East Ave M (Columbia Way) to the north, and U.S. Air Force Plant 42 on the south and east. Air Force Plant 42 is a government-owned contractor-operated facility for the production, engineering, final assembly and flight testing of high performance aircraft. Under a joint-use agreement with the U.S. Air Force, Los Angeles World Airport currently operates a passenger terminal on Air Force Plant 42 as LA/ Palmdale Regional Airport.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Air Quality Table 1 summarizes the applicable LORS. The Antelope Valley Air Quality Management District (District) issued its Preliminary Determination of Compliance (PDOC) (AVAQMD-2009a) for the project on February 12, 2009. The PDOC determined that the project would comply with District rules and regulations as long as a set of air quality conditions are included to ensure continuous compliance during construction and operation of the facility. The AVAQMD issued a revised PDOC on June 22, 2009 and a final Determination of Compliance (FDOC) on May 13, 2010. The AVAQMD determined that the project would comply with all applicable LORS. Although staff disagrees with this determination as explained more fully in the Operation Impacts and Mitigation of this staff assessment, staff has incorporated the District conditions from the FDOC in this Staff Assessment, in addition to other conditions needed in the judgment of staff to fully meet LORS and CEQA requirements.

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	***U.S. Environmental Protection Agency***
CAAA of 1990, 40 CFR 50	National Ambient Air Quality Standards (NAAQS).
CAA Sec. 171-193, 42 USC 7501,40 CFR 51	New Source Review (NSR) – Requires NSR permit for new stationary sources. This requirement is addressed through AVAQMD Regulation XIII, Rule 1302.
40 CFR 52.21	Prevention of Significant Deterioration (PSD) – Requires dispersion modeling to demonstrate no violation of NAAQS or PSD increments, for pollutants that attain the NAAQS. A PSD permit is required because the PHPP would be a new major

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
	stationary source under the federal definitions of these terms in the PSD rules. PHPP is considered to be a new major stationary source since the criteria pollutant potential to emit (PTE) would exceed the PSD major source threshold for the fossil fuel-fired steam-electric plant category, which is 100 tons per year for any PSD criteria pollutant (NO_2, CO, PM10, and SO_2). The PSD program in the Antelope Valley is administered by the U.S. EPA.
40 CFR 60, Subpart KKKK	Standards of Performance for Stationary Combustion Turbines, New Source Performance Standard (NSPS). Replaces NSPS Subparts Da and GG for the modified combustion turbines and new duct burners with heat recovery steam generators. Requires the proposed combined cycle units to achieve 15 ppm NOx and achieve fuel sulfur standards.
40 CFR 60, Subpart Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. Requires monitoring of the natural gas fuel source for the proposed auxiliary boiler.
40 CFR 60, Subpart IIII	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Requires the new emergency fire water pump engine to achieve: 3.0 grams per horsepower-hour (g/bhp-hr) of non-methane hydrocarbons and NOx (NMHC+NOx) and 0.15 g/bhp-hr PM, which are levels equivalent to U.S. EPA Tier 3 standards. The existing diesel-fired standby generator engine would not be subject to Subpart IIII.
40 CFR 70, CAA Sec 401, 42 USC 7651	Federal Title V Operating Permit Program. Consolidates federally-enforceable operating limits. Application required within one year following start of operation. This program is within the jurisdiction of the AVAQMD with U.S. EPA oversight [AVAQMD Regulation XXX, Rule 1303].
40 CFR 72, CAA Sec 401 42 USC 7651	Title IV Acid Rain – Applicable to electrical generating units greater than 25 MW. Requires Title IV permit and compliance with acid rain provisions, implemented through the Title V program. This program is within the jurisdiction of the AVAQMD with U.S. EPA oversight
State	***California Air Resources Board and Energy Commission***
Health and Safety Code (HSC) Section 40910-40930	Permitting of source needs to be consistent with approved clean air plan. The AVAQMD New Source Review (NSR) program is consistent with regional air quality management plans.
California Health & Safety Code Section 41700	Public Nuisance Provisions – Outlaws the discharge of air contaminants that cause nuisance, injury, detriment, or annoyance.
California Code of Regulations for Off-Road Diesel-Fueled Fleets (13 CCR §2449, et seq.)	General Requirements for In-Use Off-Road Diesel-Fueled Fleets – Requires owners and operators of in-use (existing) off-road diesel equipment and vehicles to begin reporting fleet characteristics to CARB in 2009 and meet fleet emissions targets for diesel particulate matter and NOx in 2010.
Airborne Toxic Control Measure for Idling (ATCM, 13 CCR §2485)	ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling – Generally prohibits idling longer than five minutes for diesel-fueled commercial motor vehicles.
Local	***Antelope Valley Air Quality Management District***
Regulation II – Permits	**Rule 212 –** Standards For Approving Permits. Establishes baseline criteria for approving permits by the AVAQMD for certain projects. In accordance with these criteria, the proposed project accomplishes all required notices and emission limits required through the FDOC and complying with stringent emission limitations set forth on permits. **Rule 218 -** Stack Monitoring. Requires certain facilities to install and maintain stack monitoring systems. The proposed project will be required to install and maintain stack monitoring systems by permit condition. **Rule 225 –** Federal Operating Permit. Requirements requires certain facilities to

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
	obtain federal operating permits. The proposed project will be required to submit an application for a federal operating permit within twelve months of the commencement of operations.
Regulation IV - Prohibitions	**Rule 401 –** Visible Emissions. Limits visible emissions opacity to less than 20% (or Ringelmann No. 1). During start up, visible emissions may exceed 20% opacity. However, emissions of this opacity are not expected to last three minutes or longer. In normal operating mode, visible emissions are not expected to exceed 20% opacity. **Rule 402 –** Nuisance. Prohibits facility emissions that cause a public nuisance. The proposed turbine power train exhaust is not expected to generate a public nuisance due to the sole use of pipeline-quality natural gas as a fuel. In addition, due to the location of the proposed project, no nuisance complaints are expected. **Rule 403 –** Fugitive Dust. Specifies requirements for controlling fugitive dust. The proposed project does not include any significant sources of fugitive dust emissions during operation so the proposed project is not expected to violate Rule 403. **Rule 404 –** Particulate Matter Concentration. Specifies standards of emissions for particulate matter concentrations. The sole use of pipeline-quality natural gas as a fuel will keep proposed project emission levels in compliance with Rule 404. **Rule 405 –** Solid Particulate Matter Limits particulate matter emissions from fuel combustion on a mass per unit combusted basis. The sole use of pipeline-quality natural gas as a fuel will keep proposed project emission levels in compliance with Rule 405. **Rule 408 –** Circumvention. Prohibits hidden or secondary rule violations. The proposed project is not expected to violate Rule 408. **Rule 409 –** Combustion Contaminants. Limits total particulate emissions on a density basis. The sole use of pipeline-quality natural gas a fuel will keep proposed project emission levels in compliance with Rule 409. **Rule 430 –** Breakdown Provisions. Requires the reporting of breakdowns and excess emissions. The proposed project will be required to comply with Rule 430 by permit condition. **Rule 431.1, 431.2 and 431.3 –** Sulfur Content in Fuels. Limits sulfur content in gaseous, liquid and solid fuels. The sole use of pipeline-quality natural gas a fuel will keep the proposed project in compliance with Rule 431. **Rule 476 -** Steam Generating Equipment. Limits NOx and particulate matter from steam boilers, including the auxiliary boiler, and specifies monitoring and recordkeeping for such equipment. The proposed project will have specific permit conditions requiring compliance with these provisions.
Regulation XI - Source Specific Standards	**Rule 1113 -** Architectural Coatings. Limits VOC content of applied architectural coatings. The proposed project will be required to use compliant coatings by permit condition. **Rule 1134 -** Emissions of Oxides of Nitrogen from Stationary Gas Turbines. Limits NOx emissions from combined-cycle turbines and specifies monitoring and recordkeeping for such equipment. The proposed project will have specific permit conditions requiring compliance with these provisions. **Rule 1135 -** Emissions of Oxides of Nitrogen from Electric Power Generating Systems. This rule is only applicable to units existing in 1991 which are owned by specific utilities or their successors. Since PHPP will be constructed after 1991 and is not owned by any entity listed in the rule, this rule is not applicable to PHPP. **Rule 1146 -** Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters. This rule does not apply to boilers used to generate electricity, but would apply to the HTF heater. The proposed project will meet the requirements of this rule by implementing

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
	BACT levels. The proposed project will have specific permit conditions requiring compliance with these provisions.
Regulation XIII – New Source Review	**Rule 1300 –** General. Ensures that Prevention of Significant Deterioration (PSD) requirements apply to all projects. The proposed project has submitted an application to the USEPA for a PSD permit that regulates PHPP emissions of NO_2, CO and PM2.5, complying with Rule 1300. **Rule 1302 –** Procedure. Requires certification of compliance with the Federal Clean Air Act, applicable implementation plans, and all applicable AVAQMD rules and regulations. The Authority to Construct application package for the proposed project includes sufficient documentation to comply with Rule 1302(D)(5)(b)(iii). Permit conditions for the proposed project will require compliance with Rule 1302(D)(5)(b)(iv). **Rule 1303 –** Requirements. Requires BACT and offsets for selected large new sources. Permit conditions will limit the emissions from the proposed project to a level which has been defined as BACT for the proposed project, bringing the proposed project into compliance with Rule 1302(A). Prior to the commencement of construction the proposed project shall have obtained sufficient offsets to comply with Rule 1303(B)(1). **Rule 1305 –** Emissions Offsets. Provides the procedures and formulas to determine the eligibility, calculations and use of offsets required pursuant to the provisions of District Rile 1303 (B). Fugitive Emissions, as defined in Rule 1301 (HH), must be included when calculating the base quantity of offsets as required by Rule 1305.
Regulation XXX – Federal Operating Permits	**Regulation XII** contains requirements for sources which must have a federal operating permit and an acid rain permit. The proposed project will be required to submit applications for a federal operating permit and an acid rain permit. The federal operating permit application is required to be submitted within one year after the PHPP commences operation. An acid rain permit application is required by 40 CFR Part 72 to be submitted at least 24 months prior to the date when the affected unit commences commercial operation.
Maximum Achievable Control Technology Standards	Health & Safety Code §39658(b)(1) states that when USEPA adopts a standard for a toxic air contaminant pursuant to §112 of the Federal Clean Air Act (42 USC §7412), such standard becomes the Airborne Toxic Control Measure (ATCM) for the toxic air contaminant. Once an ATCM has been adopted it becomes enforceable by the AVAQMD 120 days after adoption or implementation (Health & Safety Code §39666(d)). USEPA has not to date adopted a Maximum Achievable Control Technology (MACT) standard that is applicable to the proposed project. Should USEPA adopt an applicable MACT standard in the future, the AVAQMD will be required to enforce said MACT as an ATCM on the proposed project. MACT is also required for each major source of toxic air contaminants. However, PHPP will not emit more than ten tons per year of any individual toxic air contaminant, and will not collectively emit more than 25 tons per year of all toxic air contaminants, so MACT is not required.

SETTING

The project site is located in the city of Palmdale, California at the southwestern edge of the Mojave Desert at an average elevation of 2,505 feet above mean sea level (msl). The Tehachapi Mountains, located to southwest of the project site, reach elevations

above 5,000 msl within 10 miles of the site. The approximately 377-acre site is undeveloped and appears not to be disturbed by previous agricultural use or construction of any kind. The site is bounded by East Avenue M on the north side, a private road, Site 1 Road, on the east side, East Avenue M-12 on the south side, and will develop a new site boundary on the west. Palmdale Air Force Plant 42 facility is located directly across Site 1 Road and East Avenue M-12 on the east and south sides, respectively.

Land uses in the immediate area of the plant site, in addition to aviation-related activities at Air Force Plant 42, range from unused parcels to light industry, e.g., automobile wrecking yards, trucking companies, and automobile/heavy truck repair facilities. These land uses are confined predominately to the area to the north to northwest of the project site. The closest residential land uses to the project site are located west of State Route 14, approximately 2.5 miles west of the plant site and to the north of East Avenue L.

CLIMATE AND METEOROLOGY

Climate

The project site is located in the Mojave Desert which is classified as a “high desert.” It is a transition between the “hot” Sonoran Desert to the south and the “cold” Great Basin Desert to the north. Characteristic of a desert climate, the Mojave Desert has extreme daily temperature changes, low annual precipitation, strong seasonal winds, and mostly clear skies.

The area is characterized by very hot summer temperatures, with the mean maximum temperatures in June through August exceeding 80 degrees Fahrenheit (°F). Winter temperatures are more moderate, with mean maximum temperatures between 46°F and 56°F, and with lows between 39°F and 42°F during November through January. Minimum temperatures below freezing (32°F) occur on an average of about 80 days per year.

The average annual precipitation is 7.90 inches for the period from 1931 through 2006, with approximately 74% of the precipitation each year occurring between December and March. There is, however, a summer thunderstorm season from July to September with occasional violent heavy precipitation that can produce flash flooding. June and July are the driest months with an average combined annual rainfall of 0.09 inches.

Large-scale weather patterns in the area are generally influenced by moderately intense anti-cyclonic circulation (e.g., associated with high pressure systems). During the summer, a large subtropical high pressure system off the coast of California, in combination with the rain shadow produced by the coastal ranges and the mountain ranges that border the Mojave Desert to the west and south, keeps the Mojave Desert area sunny and dry. However, the presence of a thermal low pressure area above the Mojave Desert promotes atmospheric transport from the Los Angeles Basin. During the winter months, the strength of the Pacific High pressure area wanes, and 20 to 30 frontal systems may pass through the area each year. Some of these frontal systems are sufficiently strong to produce rain in the area.

The most significant large-scale phenomena affecting air quality in the project area are the transport winds from the northwest and southwest. These winds are responsible for bringing ozone and other pollutants through the mountain passes from the Los Angeles Basin (Cajon and Soledad Passes) and the San Joaquin Valley (Tehachapi Pass). As will be discussed later in this section, pollutant transport into the MDAB is the primary reason for the periods of Federal and California ozone standard violations.

Winds

The prevailing winds for Palmdale, California, range from southerly to westerly approximately 75% of the time with the majority from the southwest, based on the 2002 to 2004 wind data collected at the Palmdale Regional Airport. Calm periods occur 10.31% of the time, and the frequency of winds from north through south-southeast are each less than 4%.

The prevailing winds are the result of large scale circulation patterns, afternoon breezes that enter the Mojave Desert by way of the Tehachapi Pass from the California Central Valley and the Soledad Pass from the Los Angeles Basin, and nighttime drainage winds from the Tehachapi Mountains that are orientated northwest/southeast on the southwest side, approximately six miles from the Lancaster Division Street monitoring station, at the closest point. The highest wind speeds experienced at the monitoring site occur during spring afternoons due to increased heating of the land that far exceeds the heating of the ocean surface at that time of year. These high wind speeds are associated with southwesterly to westerly winds passing predominately through the Soledad Pass and to a lesser degree, the Tehachapi Pass. The development of the northeasterly Santa Ana Winds during the late fall and winter appears to have much less impact to the prevailing winds measured at the Lancaster Division Street Station when compared with the monitoring station located in the city of Mojave, approximately 30 miles to the north.

Temperature

Temperatures in the project area can be very hot during the summer months and cold during the winter months. **Air Quality Table 2** summarizes daily maximum and minimum temperatures, extreme high and low temperatures by month; the mean number of days the maximum temperature exceeds 90°F, the mean number of days the minimum temperature is less than 0°F per month, and the mean number of days the minimum temperature is less than 32°F and less than 0°F each month.

Precipitation

Average annual precipitation in the project area, based on Lancaster records, is 7.90 inches with approximately 74% of the precipitation occurring in the months between December and March. **Air Quality Table 3** summarizes mean, highest monthly and daily rainfall by month; mean number of days with rainfall of 0.10, 0.50, and 1.0 inches or more; and mean and one-day maximum snowfall.

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 (USEPA). The state and federal air quality standards are listed in **Air Quality Table 4**. As indicated in **Air Quality Table 4**, the averaging times for the various air quality standards, the times over which they are measured, range from one-hour to an annual average. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 or $\mu g/m^3$, respectively).

In general, an area is designated as attainment if the concentration of a particular air contaminant does not exceed the standard. Likewise, an area is designated as nonattainment for an air contaminant if that contaminant standard is violated. Where not enough ambient data are available to support designation as either attainment or nonattainment, the area can be designated as unclassified. The unclassified area is 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.

PHPP is located in the Mojave Desert Air Basin and is under the jurisdiction of the Antelope Valley Air Quality Management District. This area is designated as non-attainment for both the state and the federal (1-hour and 8-hour) ozone and the state 24-hour and annual PM10 standards. It is classified as attainment for the state's CO, NO_2, SO_2, PM2.5, SO4 and Lead (Pb) standards, and unclassified for the federal PM2.5, CO, NO_2 and SO_2 standards. **Air Quality Table 5** summarizes the area's attainment status for various applicable state and federal standards.

Air Quality Table 2
Temperature Data for Palmdale, California

Month	Monthly Temperatures			Extremes		Mean Number of Days			
						Maximum		Minimum	
	Daily Max	Daily Min	Mean	Highest Mean	Lowest Mean	90°F & Above	32°F & Below	32°F & Below	0°F & Below
Jan	58.4	32.4	45.4	81	6	0	0.1	16.4	0
Feb	62.1	35.6	48.9	84	15	0	0	9.3	0
Mar	67.4	39.2	53.3	91	14	0.1	0	5.1	0
Apr	74.0	44.0	59.0	98	20	1.6	0	1.1	0
May	81.9	51.0	66.5	107	28	7.2	0	0.1	0
Jun	90.2	57.9	74.0	112	35	17.1	0	0	0
Jul	97.6	65.2	81.4	113	43	28.1	0	0	0
Aug	96.9	63.8	80.4	112	38	27.6	0	0	0
Sep	91.3	57.5	74.4	111	34	19.3	0	0	0
Oct	80.2	48.0	64.1	105	23	4.6	0	0.4	0
Nov	67.4	38.1	52.7	93	14	0	0	6.9	0
Dec	58.7	32.7	45.7	84	9	0	0.1	15.9	0

Annual	77.2	47.1	62.1	113	6	105.6	0.2	55.1	0
Winter	59.8	33.6	46.7	84	6	0	0.2	41.6	0
Spring	74.4	44.7	59.6	107	14	8.9	0	6.2	0
Summer	94.9	62.3	78.6	113	35	72.8	0	0	0
Fall	79.6	47.8	63.7	111	14	23.9	0	7.3	0

Reference: WRCC 2009.

Air Quality Table 3
Precipitation Data for Palmdale, California

Month	Rainfall							Snowfall inches	
	Inches			Mean Number of Days					
	Mean	Highest Monthly	Highest Daily	0.01" or More	0.10" or More	0.50" or More	1.0" or More	Mean	One-Day Max.
Jan	1.45	7.5	2.44	4	3	1	0	0.9	19
Feb	1.53	7.24	2.43	4	3	1	0	0.2	4
Mar	1.25	5.22	2.39	4	3	1	0	0	2
Apr	0.48	2.47	1.05	2	1	0	0	0	0
May	0.14	1.66	1.1	1	1	0	0	0	0
Jun	0.04	0.71	0.6	0	0	0	0	0	0
Jul	0.04	0.57	0.38	0	0	0	0	0	0
Aug	0.16	1.46	1.46	1	0	0	0	0	0
Sep	0.19	2.12	1.63	1	0	0	0	0	0
Oct	0.31	3.53	1.78	1	1	0	0	0	0
Nov	0.68	5.62	1.89	2	1	0	0	0.1	10
Dec	1.33	7.55	3.43	4	3	1	0	0.2	4
Annual	7.6	18.42	3.43	25	16	5	2	1.5	19

Reference: WRCC 2009.

Air Quality Table 4
Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	8 Hour	0.075 ppm [a] (147 μg/m^3)	0.070 ppm (137 μg/m^3)
	1 Hour	—	0.09 ppm (180 μg/m^3)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 μg/m^3)	0.03 ppm (57 μg/m^3)
	1 Hour	0.100 ppm [b]	0.18 ppm (339 μg/m^3)
Sulfur Dioxide (SO_2)	Annual	0.030 ppm (80 μg/m^3)	—
	24 Hour	0.14 ppm (365 μg/m^3)	0.04 ppm (105 μg/m^3)
	3 Hour	0.5 ppm (1300 μg/m^3)	—

	1 Hour	0.075 ppm (196 μg/m^3)[c]	0.25 ppm (655 μg/m^3)
Particulate Matter (PM10)	Annual	—	20 μg/m^3
	24 Hour	150 μg/m^3	50 μg/m^3
Fine Particulate Matter (PM2.5)	Annual	15 μg/m^3	12 μg/m^3
	24 Hour	35 μg/m^3	—
Sulfates (SO_4)	24 Hour	—	25 μg/m^3
Lead	30 Day Average	—	1.5 μg/m^3
	Rolling 3-month Ave.	0.15 μg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 μg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 μg/m^3)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.

Source: ARB 2009.
Note:
[a] – The 2008 standard is shown above, but as of September 16, 2009 this standard is being reconsidered. The 1997 8-hour standard is 0.08 ppm.
[b] – The U.S. EPA and AVAQMD are in the process of implementing this new federal 1-hour NO_2 standard, which became effective April 12, 2010. The NO_2 NAAQS is based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations.
[c]– Effective June 2, 2010, the U.S. EPA established this standard as the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations.

Air Quality Table 5
Project Area Attainment Status

Pollutant	**Averaging Time**	***California Status***	**Federal Status**
Ozone (O_3)	8 Hour	*Non-attainment*	Moderate Non-attainment
	1 Hour	*Extreme Non-attainment*	N/A
Carbon Monoxide (CO)	8 Hour	*Attainment*	Unclassified/Attainment
Nitrogen Dioxide (NOx)	Annual	*Attainment*	*Attainment*[a]
	1 Hour	*Attainment*	*Attainment*
Sulfur Dioxide (SO_2)	Annual	*N/A*	Unclassified
	24 Hour	*Attainment*	Unclassified
	1 Hour	*Attainment*	N/A
PM10	Annual	*Non-attainment*	N/A
	24 Hour	*Non-attainment*	Unclassified
PM2.5	Annual	*Unclassified/Attainment*	Unclassified/Attainment
	24 Hour	*N/A*	Attainment

Notes:
[a]Nitrogen dioxide attainment status for the federal 1-hour NO_2 standard is scheduled to be determined by January 2012.
N/A= no standard applies or not applicable

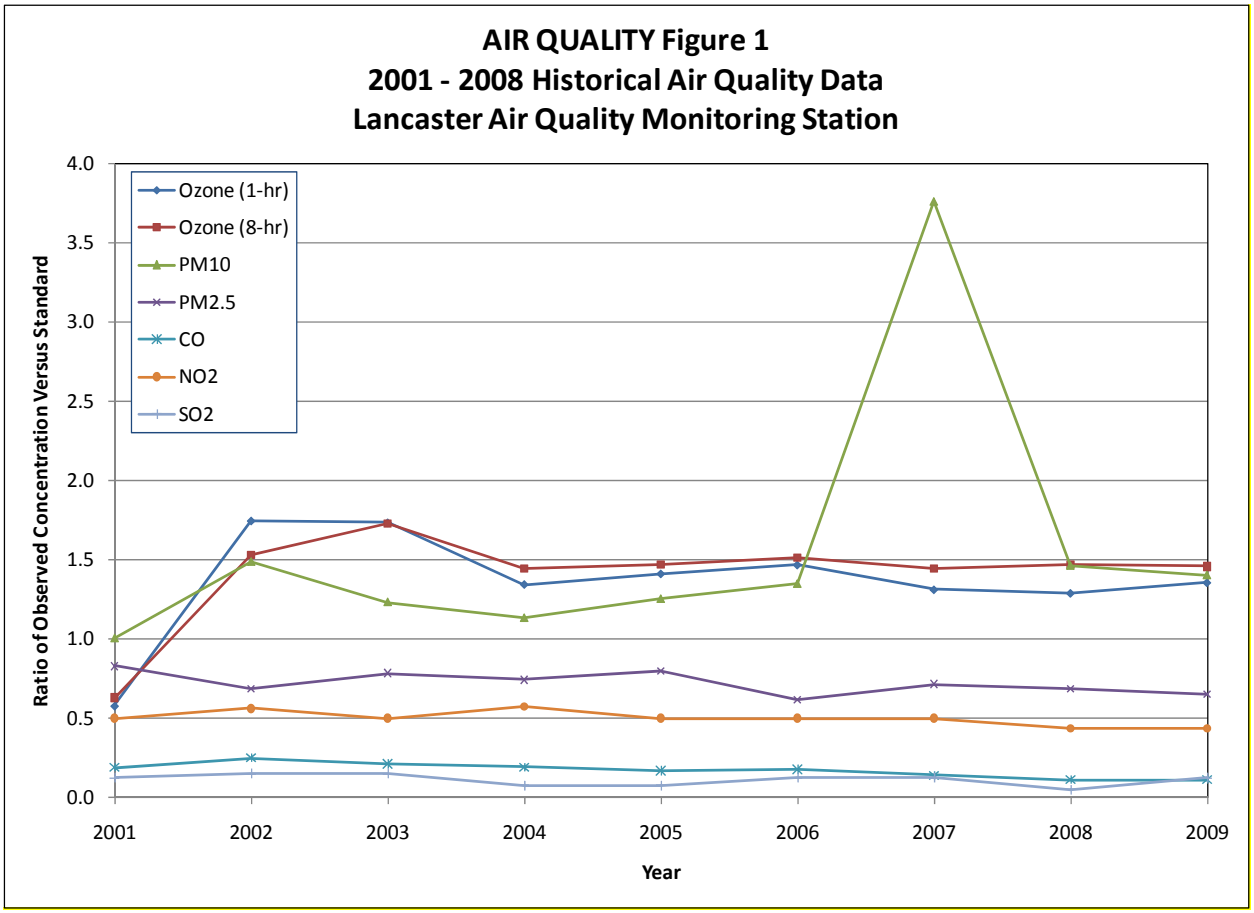
Ozone

Ozone is not directly emitted from stationary or mobile sources, but is formed as the

result of chemical reactions in the atmosphere between directly emitted nitrogen oxides (NOx) and hydrocarbons (Volatile Organic Compounds [VOC]) in the presence of sunlight to form ozone. **Air Quality Figure 1 and Table 6** show that the maximum 1-hour ozone concentrations are consistently well above the standard (except for 2001) and that violations of the state 1-hour ambient air quality standard for ozone occurred every year from 2002 to 2008. Peak ozone levels and numbers of violations of the state 1-hour ozone standard have remained relatively stable since 2002. The collected air quality data (not shown) indicate that the ozone violations occurred primarily during the sunny and hot period June through September. The maximum 8-hour ozone concentrations are similar to the 1-hour ozone levels.

The ARB report: "Second Triennial Review of the Assessment of the Impacts of Transported Pollutants on Ozone Concentrations in California" (ARB 1996, ARB 2001, AVAQMD 2008) provided the following observations regarding ozone violations in the Mojave Desert area:

- The ozone and ozone precursors from the South Coast air basin contribute overwhelmingly to ozone violations in the Mojave Desert air basin.
- There are days when a combination of local emissions and transported ozone or precursors contribute to the violations of 1-hour ozone standards, and
- There is a possibility that on at least one day of the year the violations of the 1-hour ozone standards are the direct result of local source emissions.



Nitrogen Dioxide

The entire air basin is classified as attainment for the state 1-hour nitrogen dioxide (NO_2) standard. The NO_2 levels in the area are no more than 57% of the most stringent NO_2 ambient air quality standards. Approximately 90% of the NOx emitted from combustion sources is nitric oxide (NO), while the balance is NO_2. NO is oxidized in the atmosphere to NO_2, but some level of photochemical activity is needed for this conversion. The highest concentrations of NO_2 typically occur during the fall. The winter atmospheric conditions can trap emissions near the ground level, but lacking significant 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 to levels approaching the one-hour ambient air quality standard.

The U.S. Environmental Protection Agency (US EPA) established a new, 1-hour NO_2 standard effective April 12, 2010. Although attainment status designations have not yet been established for this new standard, based upon preliminary data shown in **Air Quality Table 6**, the area in the vicinity of the project is likely to be classified attainment once the designations are made by January 2012.

Air Quality Table 6
Criteria Pollutant Summary
Maximum Ambient Concentrations (ppm or µg/m^3)

Pollutant	Averaging Period	Units	2004	2005	2006	2007	2008	2009	Limiting AAQS
Ozone	1 hour	ppm	0.121	0.127	0.132	0.118	0.116	.122	0.09
Ozone	8 hours	ppm	0.101	0.103	0.106	.101	.103	.102	0.07
PM10 [a]	24 hours	µg/m^3	56	53	63	188	73	60	50
PM10 [a]	Annual	µg/m^3	22.6	25	26.9	30.2	24.7	*	20
PM2.5 [a]	24 hours	µg/m^3	18	28	18	25	24	20	35
PM2.5 [a, b]	Annual	µg/m^3	8.5	8.9	7.4	8	*	7.8	12
CO	1 hour	ppm	2.9	2.9	3.2	2.5	2.2		20
CO	8 hours	ppm	1.72	1.54	1.6	1.25	1.04	1.00	9
NO_2	1 hour	ppm	0.103	0.074	0.066	0.064	0.062	.065	0.18
NO_2	98th[c]	ppm		.058	.058	.055	.054	0.054	0.10
NO_2	Annual	ppm	0.015	0.015	0.015	0.015	0.013		0.03
SO_2	1 hour	ppm	0.011	0.003	0.005	0.005	.002	.005	0.25
SO_2	24 hours	ppm	0.00	0.00	0.00	0.00	0.00	0.00	0.04
SO_2	Annual	ppm	0.001	0.001	0.001	0.001	0.001		0.03

Source: ARB 2009.
Notes:
[a] Exceptional PM concentration events, such as those caused by wind storms are not shown where excluded by U.S.EPA; however, some exceptions events may still be included in the data presented.
[b] Annual average PM2.5 data shown are National annual average, state annual average data are not available.
[c] 98th Percentile (typically, 8th highest reading each year. Based upon preliminary data.
* Insufficient data.

Carbon Monoxide

The AVAQMD is classified as attainment for the state 1-hour and 8-hour carbon monoxide (CO) standards. The CO concentration levels measured in the area have

never exceeded the standards (see **Air Quality Figure 1** and **Table 6**). The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level in what is known as the stable boundary layer. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise.

Particulate Matter (PM10)

The area is non-attainment for the state and unclassified for the federal PM10 standards. The area was formerly classified as nonattainment for the federal PM10 standards, but that was changed to unclassified when the area was separated from the Los Angeles desert portion of the South Coast Air Quality Management District. PM10 can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere. Gaseous emissions of pollutants like NOx, SOx and VOC from the turbines, and ammonia (NH_3) from human and animal wastes or combustion NOx control equipment can, given the right meteorological conditions, form particulate matter known as nitrates (NO_3), sulfates (SO_4), and organic compounds. These pollutants are known as secondary particulates, because they are not directly emitted but are formed through complex chemical reactions between directly emitted pollutants in the atmosphere.

Air Quality Figure 1 indicates that the state 24-hour ambient air quality standard for PM10 was exceeded every year from 2001 through 2009, with a high close to four times the state 24-hour PM10 standard in 2007. The available ambient PM10 data also indicate that violations of the state 24-hour PM10 standard tend to spread out over the entire year, with peaks occurring during different months for different years. Some violations can be attributed to frequent and severe dust storms that occur throughout the year. EPA regulations allow measured exceedances of the PM-10 NAAQS in an area to be discounted from decisions regarding nonattainment status if the data are shown to be influenced by uncontrollable events caused by natural sources of particulate matter. This has been done for some of the high PM10 events, but the AVAQMD remains in nonattainment of the state PM10 standard.

Fine Particulate Matter (PM2.5)

Fine particulate matter, or PM2.5 (particulate matter less than 2.5 microns in diameter), 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 U.S. EPA has promulgated a 35 $\mu g/m^3$ 24-hour PM2.5 standard and a 15 $\mu g/m^3$ annual PM2.5 standard, and has recently classified the district as unclassified (attainment) for both their annual and 24-hour PM2.5 standards. The California Air Resources Board (CARB) adopted an annual PM2.5 standard of 12 $\mu g/m^3$, but has not set a 24-hour PM2.5 standard. **Air Quality Figure 1** and **Table 6** shows that the PM2.5 concentrations, measured between 2002 through 2008, are below the applicable state and federal 24-hour PM2.5 standard and have been relatively stable over the period.

Nitrates and Sulfates

PM nitrate (mainly ammonium nitrate) comprises a portion of the PM2.5 and is formed in the atmosphere from the reaction of NOx and ammonia. NOx, as emitted from combustion sources, is mainly in the form of nitric oxide (NO). NO converts to NO_2 primarily by reacting with ozone in the ambient air. The formed NO_2 can convert back to NO, which sustains ozone formation. NO_2 can also form organic nitrates, or be oxidized to nitric acid by available hydroxyl (OH) radicals in the ambient air. Nitric acid reacts with ammonia in ambient air to form ammonium nitrate. Ammonium nitrate, in its particulate form, can remain suspended in the ambient air and/or be transported long distance downwind as PM2.5. Ammonium nitrate, under certain conditions of heat and humidity, breaks down to NOx and starts a new ozone cycle again.

PM sulfate (mainly ammonium sulfate) comprises another portion of the PM2.5 and is formed in the atmosphere from the oxidation of SO_2 and subsequent neutralization by ammonia in the atmosphere. The oxidation of SO_2 depends on many factors, which include: the availability of sulfur, hydroxyl (OH), hydroperoxy (HO_2) and methylperoxy (CH_3OH) radicals, and atmospheric humidity.

Summary

In summary, staff recommends the background ambient air concentrations in **Air Quality Table 7** for use in the modeling and impacts analysis. The maximum criteria pollutant concentrations from the past five years of available data collected at the monitoring stations within the Mojave Desert Air Basin, excluding known exceptional events, are used to determine the recommended background values.

Air Quality Table 7
Staff Recommended Background Concentrations (µg/m^3)

Pollutant	Averaging Time	Recommended Background	Limiting Standard	Percent of Standard
NO_2	1 hour	139.2	339	41%
	Annual	28.2	57	49%
CO	1 hour	3,680	23,000	16%
	8 hour	1,978	10,000	20%
PM10	24 hour	181.0	50	**362%**
	Annual	30.2	20	**151%**
PM2.5	24 hour [a]	28.0	35	80%
	Annual	8.9	12	74%
SO_2	1 hour	28.8	655	4%
	3 hour	23.6	1,300	2%
	24 hour	13.1	105	12%
	Annual	2.6	80	3%

Source: ARB 2009 and Energy Commission Staff Analysis
Note:
[a] PM 2.5 24-hour data shown in **Air Quality Table 6** are 98th percentile values which is the basis of the ambient air quality standard and the basis for determination of the recommended background concentration.

Where possible, staff prefers that the recommended background concentrations come from nearby monitoring stations with similar characteristics. For this project the Lancaster (ozone, PM10, PM2.5, CO, NOx) and Victorville (SO_2) monitoring stations are

the closest monitoring stations to the project site. The Lancaster site is located approximately 2.5 miles northwest of the project site and the Victorville monitoring station is located approximately 43 miles east southeast of the project site. The Victorville monitoring station provides more conservative air quality data due to the influence of SO_2 emission sources near Victorville.

The background concentrations for PM10 are shown in bold in Air Quality Table 7 because they are at or above the most restrictive existing ambient air quality standards, while the background concentrations for the other pollutants are shown in normal font because they 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 7**; therefore, recommended background concentrations were not determined for the other criteria pollutants (ozone, lead, visibility, etc.).

PROJECT DESCRIPTION AND EMISSIONS

The city of Palmdale (City) proposes to construct, own, and operate the PHPP, which consists of a hybrid facility comprised of a natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment to be developed on an approximately 333-acre site in the northern portions of the City. The combined-cycle equipment utilizes two natural gas-fired combustion turbine generators (CTG), two heat recovery steam generators (HRSG), and one steam turbine generator (STG). The solar thermal equipment utilizes arrays of parabolic collectors to heat a high-temperature working fluid that is used to boil water to generate steam. The combined-cycle equipment is integrated thermally with the solar equipment at the HRSG and both utilize the single STG that is part of the project.

The project will have a nominal electrical output of 570 MW and commercial operation is planned for early 2013. The solar thermal input will provide approximately 10% of the peak power generated by the project during the daily periods of highest energy demand. The project will be fueled with natural gas delivered via a new natural gas pipeline. The Southern California Gas Company (SCG) will design and construct the approximately 8.7-mile pipeline in existing street rights-of-way (ROW) within the City of Palmdale.

CONSTRUCTION

During the construction of the PHPP, there will be emissions similar to those associated with any large industrial construction project. On-site emissions will arise primarily from heavy-duty vehicles and equipment. On-site fugitive dust emissions will also be generated during site preparation and during construction. Off-site emissions will occur from construction worker vehicles and material delivery trucks. The construction-related emissions are transient in nature and would cause some unavoidable but minor localized short-term impacts.

The Project would include construction of the combined-cycle power block, a solar array, a 7.4-mile reclaimed water supply pipeline, a 8.7-mile natural gas supply pipeline, a 1.0-mile sanitary waste water line, a 1.0-mile potable water supply line, and the Project's electric transmission line, comprised of two segments, totaling approximately 35.6 miles.

Construction of the combined-cycle power plant and the solar array would require approximately 27 months and 24 months, respectively. Construction of the reclaimed water supply line would require approximately nine months, construction of the natural gas pipeline would require approximately 15 months, construction of the sanitary wastewater line would require approximately five months, and construction of the potable water supply line would require approximately two months. Transmission line construction would occur over a 26-month period. Construction of Project elements would occur concurrently.

Estimates for the highest daily emissions and total annual emissions over the 27-month construction period are shown in **Air Quality Table 8**.

Air Quality Table 8
Estimated Maximum Construction Emissions

Activity	NOx	VOC	SOx	CO	PM10	PM2.5
Peak Hourly Emissions (lb/hr)						
Combined-Cycle Facility	22.5	3.8	< 0.05	41.6	23.0	5.3
Solar Array	20.0	3.9	< 0.05	51.2	10.5	3.2
Peak Daily Emissions (lb/day)						
Combined-Cycle Facility	105.8	20.2	0.1	254.1	63.6	18.6
Reclaimed Water Pipeline	90.6	27.5	0.1	164.6	41.9	13.8
Natural Gas Pipeline	90.6	27.5	0.1	164.6	41.9	13.8
Sanitary Wastewater Line	24.2	7.8	0.1	51.0	10.1	3.4
Potable Water Pipeline	24.2	7.8	0.1	51.0	10.1	3.4
Transmission Line Segment 1	*219.7*	*30.0*	*0.2*	*156.1*	*84.1*	*23.6*
Transmission Line Segment 2	*255.6*	*33.8*	*0.3*	*195.4*	*309.7*	*72.4*
Total Transmission Line	475.3	63.8	0.5	351.5	393.8	96.0
Annual Emissions (t/y)						
Combined-Cycle Facility	12.3	2.4	< 0.05	32.0	7.9	2.3
Solar Array	14.4	2.7	< 0.05	36.9	4.3	1.5
Total Emissions (tons)						
Reclaimed Water Pipeline	9.1	2.8	<0.05	18.0	6.5	1.9
Natural Gas Pipeline	16.8	5.1	<0.05	32.2	13.0	3.6
Sanitary Wastewater Line	1.8	0.6	<0.05	3.8	0.9	0.3
Potable Water Pipeline	0.7	0.2	<0.05	1.5	0.3	0.1
Transmission Line Segment 1	*48.6*	*6.6*	*0.1*	*35.1*	*31.1*	*8.1*
Transmission Line Segment 2	*75.1*	*9.5*	*0.1*	*50.0*	*75.7*	*18.3*
Total Transmission Line	123.7	16.1	0.2	85.1	106.8	24.4

Sources: AFC Section 5.2.4.1 (PHPP 2008), 5/1/09 Data Response (PHPP 2009) and AVAQMD FDOC (AVAQMD 2010).

INITIAL COMMISSIONING

Initial commissioning refers to a period of approximately 60 days prior to beginning commercial operation when the combustion turbines undergo initial test firing. During this commissioning phase, the project may operate at a low-load for a period of time for fine-tuning. In addition, the HRSGs, steam piping, condensers, and other equipment handling steam and condensate would be cleaned of dirt, oil, mill scale and debris. This cleaning is usually accomplished with steam blows.

All of these commissioning operations would require operation of the combustion turbines at loads from 0% to 100% of full load. During much of this period, the emissions from the plant would be higher than the normal operating and startup emissions because the combustion turbine burners may not yet be tuned for optimal emissions and the post-combustion emissions control equipment (e.g., SCR and oxidation catalyst) will not yet be in operation.

The emission levels during plant commissioning were estimated by considering the types of tests that would be conducted, combustion turbine loads during the tests, and operability of the SCR and oxidation catalyst systems during the tests. Using this information combined with estimated partial-load emissions information for the combustion turbines obtained from the combustion turbine manufacturer, and known SCR and oxidation catalyst control efficiency, emissions for each test were estimated. Since the combustion turbine combustors will not have been tuned prior to the start of commissioning, and SCR and oxidation catalyst will not be installed until after DLN tuning is complete, a factor was applied to the calculated emissions to account for additional combustion turbine emissions above those predicted by the combustion turbine manufacturer for normal tuned partial-load operation. Since it is not possible to precisely predict the emissions of the combustion turbines prior to tuning or the load conditions required to facilitate tuning of the combustors, the emissions are only estimates from the turbine manufacturer. During commissioning, the combustion turbines will normally be run intermittently.

The District typically requires that each activity of the commissioning period be planned and that all NOx and CO emissions and the time of commissioning be minimized to lessen the impacts from the turbines and duct burners. It should also be noted that the NOx and CO emissions during the commissioning period are not higher than emissions during normal start-up or operation of the facility; therefore, staff expects no adverse impacts from the NOx and CO emissions during the commissioning period, beyond those expected for normal start-up or operation. All criteria air contaminant emissions during the commissioning period will be counted toward the annual emission limits; thus there is an incentive for the applicant to limit the commissioning period to the shortest time possible.

Maximum emissions associated with commissioning activities are shown in **Air Quality Table 9** and limited by **AQ-SC20**.

Air Quality Table 9
Estimated Maximum Commissioning Emissions

Emissions	NOX	CO	VOC
Maximum hourly emissions during steam blows (lb/hr) (one combustion turbine)	242	1,337	55
Maximum hourly emissions during commissioning (lb/hr) (one combustion turbine)	197	467	17
Total for two combustion turbines (tons)	32	118	11

Sources: AFC Section 5.2.4.1 (PHPP 2008), 5/1/09 Data Response (PHPP 2009) and AVAQMD FDOC (AVAQMD 2010).

OPERATIONAL PHASE

The project would have twin General Electric 7FA combustion turbine generators (CTGs) with dry low NOx combustors driving dedicated duct burner-equipped heat recovery steam generators (HRSGs). Each gas turbine will have a maximum heat input rating of 1,736.4 million Btu per hour (MMBtu/hr), and each duct burner will have a maximum heat input rating of 424.3 MMBtu/hr. The (two) CTGs and (two) HRSG duct burners will be exclusively fueled by pipeline-quality natural gas, without back-up liquid fuel firing capability. The CTG power blocks will each include a turbine air compressor section, gas combustion system combustors, power turbine, and a 60-hertz generator. Inlet air will be filtered and conditioned, with inlet cooling provided by an evaporative type cooling system. Ambient air will be filtered and compressed in a multiple-stage axial flow compressor. Compressed air and natural gas will be mixed and combusted in the turbine combustion chamber. Lean pre-mix low NOx combustors will be used to minimize NOx formation during combustion. Exhaust gas from the combustion chamber will then expand through a multi-stage power turbine which drives both the air compressor and the electric power generator. Heat from the exhaust gas will then be recovered in a HRSG.

Each HRSG is a horizontal, natural circulation type unit with three pressure levels of steam generation. A duct burner in each HRSG will provide supplementary firing (limited to 2000 hours per year) during high ambient temperatures to maintain constant steam production to the condensing STG. A selective catalytic reduction (SCR) system and high temperature oxidation catalyst will be located within each HRSG. Steam will be produced in each HRSG and flow to the single STG. The STG will drive an electric generator to produce electricity. STG exhaust steam will be condensed in a surface condenser with water from a mechanical draft wet cooling tower.

The PHPP will employ a “Rapid Start Process” (RSP) to shorten startup durations through the use of a modified steam drum complex. In support of this process, the project includes a limited use (500 hour per year) natural gas-fired auxiliary boiler equipped with low NOx burners (9 ppmvd) with a maximum heat input rating of 110 MMBtu/hr. The auxiliary boiler will provide sealing steam to minimize HRSG and STG startup thermal limitations.

The hybrid nature of the project is based on 250 acres of parabolic sun-tracking mirrors focused on and heating a heat transfer fluid (HTF) to provide up to 10% of heat input. The heated fluid circulates through a dedicated steam boiler that provides supplemental steam to each HRSG high pressure steam drum. The applicant estimates that the solar side will include a limited use (1000 hour per year) natural gas-fired HTF heater equipped with low NOx burners (9 ppmvd) with a maximum heat input rating of 40 MMBtu/hr. The AVAQMD has also limited operation of the HTF heater to 1,000 hours per rolling 12-month period. The HTF heater will ensure the HTF circulation system remains above a minimum system temperature (the freeze or solidification temperature of the HTF) of approximately 54 degrees Fahrenheit (°F) when needed during off-line periods.

The AVAQMD determined that a maximum NOx concentration of 9 ppmvd at 3% oxygen is acceptable as NOx LAER for the PHPP limited use auxiliary boiler and HTF

heater, achieved with low-NOx burners.

Power plant cooling will be provided by a 10-cell, mechanical draft wet cooling tower. The cooling tower will employ drift eliminators to reduce drift and resulting particulate emissions from the tower. The cooling tower will have a recirculation rate of 130,000 gallons per minute of reclaimed water and is expected to have a maximum of 5,000 ppm of total dissolved solids (TDS).

A small amount of emergency electrical power would be provided on site by a (2,000 kW) 2683 horsepower (hp) diesel-fired internal combustion engine and shaft generator. Emergency fire suppression water pressure would be provided on site by a 182 hp (135 kW) diesel-fired internal combustion engine and shaft water pump.

The City proposes that the facility would operate with 50 cold starts, 260 hot (or warm) starts, and 310 shut down events per unit per year, and that the duct burner would be operated approximately 2,000 hours per year (Palmdale 2008, pp. 5.2-48). However, the City requests that the project be analyzed with the maximum potential emissions resulting from each turbine continuously operating for the full 8,760 hours per year. Using the potential operating hours and starting and stopping emissions, staff estimated the facility's maximum hourly, daily and annual emissions for NOx, VOC, PM10, SOx and CO, and tabulated them in **Air Quality Table 10** below. Note that while PM10 and PM2.5 are used interchangeably, particulate emissions from natural gas combustion are almost exclusively PM2.5, but contribute to both PM2.5 and PM10 inventories and impacts.

Air Quality Table 10
Facility's Maximum Hourly, Daily and Annual Emissions

Equipment	NOx	VOC	SOx	CO	PM10[1]
Maximum Start-up/Hourly Emissions[2]					
Turbine (lbs per start-up event)	96	31	--	410	--
Turbines (2) normal operation (lb/hr)	27.3	9.5	2.12	25.0	36.0
Cooling Towers (lb/hr)	-	-	-	-	1.63
Auxiliary Boiler (lb/hr)	1.10	0.54	0.06	3.68	0.74
Heater (lb/hr)	0.44	0.22	0.02	1.47	0.30
Solar Array Maintenance (lb/hr)	0.07	0.01	0.00	0.05	11.00
Maximum Daily Emissions (lb/day)					
PHPP (all sources)	1,359	577	64	4,853	931
Total Daily	**1,359**	**577**	**64**	**4,853**	**931**
Maximum Annual (tons/year)					
Two Turbines5	113.7	39.6	8.8	252.6	117.1
Cooling Towers	-	-	-	-	7.1
Auxiliary Boiler	0.28	0.13	0.01	0.92	0.19
Heater	0.22	0.11	0.01	0.74	0.15
Emrgy Generator/ Fire Pump Engines	0.7	0.04	0.001	0.42	0.02
HTF Fugitive Emissions	-	0.20	-	-	-
Solar Array Maintenance	0.01	0.001	0.001	0.12	2.86
Total Annual Emissions (tons/year)	**115**	**40**	**9**	**255**	**127**

Notes:
1. All PM10 emissions from natural gas-fired turbines are treated as PM2.5 (California Emission Inventory and Reporting System, CARB).
2. Commissioning and shutdown emission rates are equal to or less than start-up emission rates. Therefore, start-up emissions rates are used in evaluating emissions impacts and cumulative emissions analyses scenarios for both start-up and commissioning activities.

Sources: AFC Section 5.2.4.1 (PHPP 2008), 5/1/09 Data Response (PHPP 2009) and AVAQMD FDOC (AVAQMD 2010).

CLOSURE

Eventually the facility will close, either as a result of the end of its useful life or through 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 all impacts associated with those emissions will no longer occur. The only other expected emissions would be fugitive particulate emissions from any dismantling activities. These activities will be short term and will create fugitive dust emissions levels much lower than those created during the construction of the project.

AMMONIA EMISSIONS

Due to the large combustion turbines used in this project and the need to control NOx emissions, significant amounts of ammonia will be injected into the flue gas stream as part of the SCR system. Not all of this ammonia will mix with the flue gases to reduce NOx; a portion of the ammonia will pass through the SCR and will be emitted unaltered, out of the stacks. These ammonia emissions are known as ammonia slip. The applicant has committed to an ammonia slip no greater than 5 ppm, which is among the lowest permitted ammonia emission rates for power plants with SCR systems.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

There are two criteria that staff uses to determine whether project emissions would be significant. Both are based upon the extensive federal and state regulatory programs designed to protect against adverse effects from air contaminants. The first is the status of the ambient air quality standards in the area. Staff finds that the release of all nonattainment air contaminants and their precursors caused by the construction and operation of this facility are significant and must be mitigated. For example, the area is currently non-attainment for ozone and PM10; therefore, all directly emitted PM10, and PM10 and ozone precursors (NOx, POC and SOx) that the facility releases during construction and operation would potentially cause significant impacts through their contribution to the existing violations of the standards.

The second criterion is whether the project's construction and operational emissions would cause a new violation to the ambient air quality standards. Staff relies on air dispersion modeling in conducting this assessment. Air dispersion models provide a means of predicting the location and ground level magnitude of the impacts of a new emissions source. In general, the inputs for the modeling include stack information (exhaust flow rate, temperature, and stack dimensions), specific source (e.g., combustion turbine) emissions data, meteorological data, such as wind speed, atmospheric conditions, and site elevation. The model results are often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$). Staff adds the modeled impacts to the available highest ambient background concentrations recorded during the previous three years from nearby monitoring stations. Staff compares the results with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or if the emissions would contribute to an existing violation.

The ambient air quality standards that staff uses as a basis for determining project significance are health-based standards. They are set at levels to adequately protect the health of all members of the public, including those most sensitive to adverse air quality such as the aged, people with existing illnesses, and infants and children, while providing a margin of safety.

DIRECT/SECONDARY IMPACTS AND MITIGATION

Staff assessed three kinds of primary and secondary[1] air pollution impacts: construction, operational, and cumulative. Construction impacts result from the emissions occurring during site preparation and construction of the project. Operational impacts result from the emissions of the proposed project during normal operation, which include maintenance, start-ups and shutdowns. Cumulative impacts result from the proposed project's incremental effect viewed over time, together with other closely

[1] 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.

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, and15355.)

Construction Impacts

The construction of the proposed project will last approximately 27 months (Palmdale 2008a), and generally consists of two major activities; site preparation, and construction and installation of major equipment and structures. In addition to fugitive dust emissions resulting from the site preparation, emissions from construction equipment exhausts, such as vehicles and internal combustion engines, are also expected during the project construction phase. Also, a small amount of hydrocarbon emissions may occur as a result of the temporary storage of petroleum fuel at the site.

Using estimated peak hourly, daily and annual construction equipment exhaust emissions, the City performed a modeling analysis. The results are presented in **Air Quality Table 11**. The modeling analysis included both the fugitive dust and vehicle exhaust emissions, which include PM10, NOx, and CO. In **Air Quality Table 11**, the first and second columns list the air contaminant, i.e., NO_2, SO_2, PM10, and CO, and the averaging time for each air contaminant analyzed. The third column presents the project emission impacts, and the fourth column presents the highest measured concentration of the criteria air contaminants in the ambient air (background). The fifth column presents the total impact, i.e., the sum of project emission impact and background measured concentration, even though these may not occur at the same time.

Air Quality Table 11
Maximum Project Construction Impacts

Pollutant	Averaging Period	Concentrations ($\mu g/m^3$)					Percent of Limiting Standard
		AERMOD Result	Ambient Background[2]	Total[3]	CAAQS	NAAQS	
NO_2[1]	1-hr	296.5	---	296.5	339	--	87%
	Annual	7.9	28.2	36.1	57	100	63%
CO	1-hr	3,349.8	4,010.0	7,030.0	23,000	40,000	31%
	8-hr	548.4	1,978.0	2,526.0	10,000	10,000	25%
PM10	24-hr	37.0	181.0	218.0	50	150	**436%**
	Annual	3.6	30.2	33.8	20	--	**169%**
PM2.5	24-hr	6.6	28.0	34.6	--	35	99%
	Annual	1.0	8.9	9.9	12	15	83%
SO_2	1-hr	2.5	28.8	31.3	665	--	5%
	3-hr	1.0	23.6	24.6	--	1,300	2%
	24-hr	0.2	13.1	13.3	105	365	13%
	Annual	0.01	2.6	2.6	--	80	33%

1 Modeled NO_2 concentrations as determined with the OLM.
2 From AFC Table 5.2-29; data were collected at the Lancaster Division Street monitor for all pollutants except SO2 which was collected at the Victorville monitoring station. These values correspond to the highest monitored values from 2005 – 2007, except for PM2.5, which is the 98th percentile value over three years.
3 Modeled concentration plus ambient background.
4 Result reflects 10-hour day from March through October and 8-hour day from November 5 through February 15. 5. Provided for reference only. Total impact includes modeled impact plus time-matched ambient background.

Construction Impacts Mitigation

To mitigate the impacts due to construction of the facility, the PHPP has proposed the following mitigation measures.

NOx

During the Victorville II siting case (07-AFC-01), staff reviewed the construction modeling analysis and found that the very high NO_2 impacts only occur during the hours close to sunrise and sunset when the atmosphere is stable and winds are light. Further review indicated that when sunlight is present (outside of the hours close to sunrise and sunset), the NO_2 impacts are reduced to levels below the applicable standards. Because of this, the City proposed that it will limit the construction activities to the period one hour after sunrise to one hour before sunset of each and every day of the construction of the facility **(Victorville 2007c, Data Response 1**). The applicant has proposed the same limitation for the PHPP, with the same results, and this requirement is included as Condition of Certification **AQ-SC6**. Therefore, the project construction emissions would not cause a new violation of the NO_2 air quality standard, and the project NO_2 construction impact would be less than significant.

PM10/PM2.5

In addition to the proposed construction NOx mitigation, the City has proposed the following measures to mitigate the project's PM10/PM2.5 construction emission impacts (PHPP 2008):

A. All unpaved roads and disturbed areas in the Project and linear construction sites shall be watered as frequently as necessary to comply with the dust mitigation objectives of **AQ-SC4**. The frequency of watering can be reduced or eliminated during periods of precipitation.

B. Vehicle speeds will be limited to 10 miles per hour within the construction site.

C. The construction site entrances shall be posted with visible speed limit signs.

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

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

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

G. 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.

H. Construction areas adjacent to any paved roadway shall be provided with sandbags or other measures as specified in the Storm Water Pollution Prevention Plan (SWPPP) to prevent run-off to roadways.

I. All paved roads within the construction site shall be swept at least twice daily (or less during periods of precipitation or on other days with the concurrence of the CPM) on days when construction activity occurs to prevent the accumulation of dirt and debris.

J. At least the first 500 feet of any public roadway exiting from the construction site shall be swept at least twice daily (or less during periods of precipitation or on other days with the concurrence of the CPM) on days when construction activity occurs or

on any other day when dirt or runoff from the construction site is visible on the public roadways.

K. 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.

L. 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.

M. 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.

To reduce the impacts from the construction of the proposed project, staff recommends the implementation of mitigation measures contained in Conditions of Certification **AQ-SC1 to AQ-SC6**. These conditions include all of the City's proposed mitigation measures and staff suggested modifications. Staff's proposed Condition of Certification **AQ-SC5** requires the use of low emission diesel engines and, if appropriate, soot filters on diesel-fueled construction equipment during construction.

The construction of the project will cause particulate matter emissions that will add to the existing violations of the ambient PM10 air quality standards. Therefore, the project PM10 emission impacts due to construction of the project are significant. Staff believes that the implementation of proposed specific mitigation measures during construction of the facility as identified in the Conditions of Certification will reduce, but not eliminate, the short-term impacts of PM10 to a level of less than significant.

Commissioning Impacts

Maximum emissions associated with commissioning activities are shown in **Air Quality Table 9** and limited by **AQ-SC20**. NO_2 were found to be below the CAAQS prior to adding in the ambient background. When background was added to the maximum modeled 1-hour NO_2 concentration under simultaneous commissioning of both turbines, the impacts were shown to exceed the standard. This analysis is conservative since it is unlikely that the combustion turbines would both be undergoing commissioning activities at the same time, at peak emissions levels and at the time of day when background level is at its peak. However, Condition of Certification **AQ-SC20** would prevent the simultaneous commissioning of the two combustion turbines at emission levels that would cause a violation of the 1-hour NO2 standard as shown in **Air Quality Table 12**.

Air Quality Table 12
Maximum Modeled Concentrations for Commissioning

Pollutant	Averaging Period	Concentrations (µg/m^3)					Percent of Limiting Standard
		AERMOD Result	Ambient Background	Total	CAAQS	NAAQS	
NO_2	1-hour (2 turbines)	331.67	139.2	470.9	339	--	139%
	1-hour (1 turbine)	199.00	139.2	338.2	339	--	99.8%
CO	1-hour	856.01	3,680.0	4,010.0	23,000	40,000	20%
	8-hour	650.42	1,978.0	2,628.0	10,000	10,000	26%

Source: PHPP 2009, PHPP 2010, ARB 2009.

Operation Impacts

The PHPP has provided a modeling analysis using the EPA-approved AERMOD model to estimate the impacts of the project's NOx, PM10, CO, and SOx emissions resulting from project operation (PHPP 2008, PHPP 2009). Similar to the assessment of construction impacts, staff added the modeled impacts to the available highest ambient background concentrations recorded during the previous three years from nearby monitoring stations to assess the project operational impacts.

Staff tabulated the maximum results of the modeling analysis for the turbines, diesel-fueled fire water pump, emergency generator and cooling tower, including steady state operation, and start-up and shut down events in **Air Quality Tables 13** and **14**. Concentrations of CO were found to be below the CAAQS, and concentrations of 1-hour. The modeling analysis shows that the project does not cause any new violations of NO_2, CO or SO_2 air quality standards during normal operations or during startup, even with worst case ambient concentrations recorded. The project, however, would contribute to existing violations of the state 24-hour and annual PM10 air quality standards, and the state 1-hour and the state/federal 8-hour ozone standards. Therefore, staff recommends that mitigation in the form of emission reduction credits for particulate matter and its precursors and ozone and its precursors be identified and provided.

Operation Impacts and Mitigation

The Antelope Valley Air Quality Management District (AVAQMD) determined in its Final Determination of Compliance (AVAQMD 2010) that the project would meet their emissions offset requirements by obtaining NOx offsets in the amount of 150 tons per year and VOC offsets in the amount of 52 tons per year, using an emissions to offset ratio of 1.3:1. They also required 128 tons per year of PM10 offsets using a 1:1 offset ratio. However, as discussed more fully below, staff concludes that for CEQA purposes the AVAQMD did not use an appropriate offset ratio for NOx and VOC and for both LORS and CEQA purposes and AVAQMD did not conduct rule-making to ensure availability of the PM10 offsets. Without proper emission reduction mitigation, this project could contribute to existing violations of the state and federal ambient air quality standards.

Air Quality Table 13
Maximum Modeled Concentrations for PHPP Normal Operations

Pollutant	Averaging Period	Concentrations (µg/m^3)					Percent of Limiting Standard
		AERMOD Result	Ambient Background	Total	CAAQS	NAAQS	
NO_2[1]	1-hour State	203.1	---	203.1	339	--	60%
	1-hr Federal	175.3	---	175.3	---	188	93%
	Annual	1.0	28.2	29.2	57	100	51%
CO	1-hour	367	3,680.0	4,047.0	23,000	40,000	18%
	8-hour	20.4	1,978.0	1,998.4	10,000	10,000	20%
PM10	24-hour	18	181.0	199.0	50	150	**398%**
	Annual	1.8	30.2	32.0	20	--	**160%**
PM2.5	24-hour	11.6	28.0	39.6	--	35	**113%**
	Annual	1.2	8.9	10.1	12	15	84%
SO_2	1-hour	1.6	28.8	30.4	665	--	5%
	3-hour	1.3	23.6	24.9	--	1,300	2%
	24-hour	0.9	13.1	14.0	105	365	13%
	Annual	0.1	2.6	2.7	--	80	3%

1 Modeled NO_2 concentrations as determined with the OLM. Maximum AERMOD concentration given is modeled impact plus time-matched ambient background.
2 Background data were collected at the Lancaster Division Street monitor for all pollutants except SO_2 which was collected at the Victorville monitoring station. These values correspond to the highest monitored values from 2004 – 2008, except for PM2.5, which is the 98th percentile value over three years.
Sources: PHPP 2009, PHPP, 2010, ARB 2009.

Air Quality Table 14
Maximum Modeled Concentrations for Startup/Shutdown Operations

Pollutant	Averaging Period	Concentrations (µg/m^3)					Percent of Limiting Standard
		AERMOD Result	Ambient Background	Total	CAAQS	NAAQS	
NO_2[1]	1-hour	314.3	---	314.3	339	--	93%
CO	1-hour	713.8	3,680.0	4,373.3	23,000	40,000	19%
	8-hour	482.0	1,978.0	2,460.0	10,000	10,000	25%

1 Modeled NO_2 concentrations as determined with the OLM. Maximum AERMOD concentration given is modeled impact plus time-matched ambient background.
Source: PHPP 2009, PHPP 2010, ARB 2009.

Ozone precursor emissions offsets are generally of limited availability within the district. The City is still investigating their availability (AVAQMD 2010). The applicant originally had proposed to secure local PM offsets and utilize the South Coast Air Quality Management District (SCAQMD) Rule 1309.1 Priority Reserve to obtain ozone precursor offsets (VOCs for their NOx liability) for the PHPP. Due to a court decision in 2008, emission offsets from the SCAQMD Rule 1309.1 Priority Reserve are not currently available for PHPP emission offsets.

Given the lack of readily available emission offsets in the district, staff is recommending several measures to be taken in order to minimize potential project-related emissions and impacts. Specifically, Condition of Certification **AQ-SC7** would minimize operational emissions associated with solar facility maintenance by requiring dedicated vehicles that meet California on-road emission standards. Condition of Certification **AQ-SC8** would minimize emissions fugitive dust emissions.

The hybrid nature of the project is based on 250 acres of parabolic sun-tracking mirrors focused on and heating a heat transfer fluid (HTF). The heated fluid circulates through a dedicated steam boiler that provides supplemental steam to each HRSG high pressure steam drum. The HTF system has the potential to leak, especially at pipe system connections, and thus emit VOCs (less than 0.2 tons per year), which would contribute to ozone formation and exacerbate existing non-attainment conditions. Therefore, staff has included Conditions of Certification **AQ-SC9** through **AQ-SC16** to minimize VOC emissions associated with the HTF system.

The applicant is currently proposing to mitigate the project's contribution to ambient ozone, PM10 and PM2.5 by providing NO_X and VOC emission reduction credits (for ozone precursors), obtained from sources in the upwind neighboring San Joaquin Valley Air Pollution Control District (SJVAPCD), and paving roads in the Palmdale area for PM10/PM2.5 and its precursors. Details of the applicant-proposed mitigation plan include the following:

Ozone precursors (NOx and VOC) ERCs from Outside the MDAB

Due to the limited availability of ozone precursor Emission Reduction Credits (ERCs) in the Mojave Desert Air Basin, for purposes of meeting the ERC requirements of the AVAQMD rules, the City proposes to secure ozone precursor ERCs from the SJVAPCD. This type of emission offsetting is referred to as inter-basin emission trading. Both Districts' regulations and state and federal laws allow such an approach. As discussed in the Setting section of this analysis, there are meteorological circumstances where ozone and ozone precursor (NOx and VOC) emissions from the SJVAPCD result in significant contributions to ozone violations in the AVAQMD. Therefore, the use of ERCs from the SCAQMD to mitigate the facility NOx and VOC emissions contribution to existing violations of ozone air quality standards would comply with LORS, if approved by both air agencies.

Obtaining ERCs from the SJVAB would place additional requirements on the AVAQMD that would not be necessary for ERCs obtained within the MDAB. Specifically, AVAQMD Rule 1305 requires that ERCs obtained from another air district comply with the requirements of Health & Safety Code §40709.6, which states:

(a) Increases in emissions of air pollutants at a stationary source located in a district may be offset by emission reductions credited to a stationary source located in another district if both stationary sources are located in the same air basin or, if not located in the same air basin, if both of the following requirements are met:

(1) The stationary source to which the emission reductions are credited is located in an upwind district that is classified as being in a worse nonattainment status than the downwind district pursuant to Chapter 10 (commencing with Section §40910).

(2) The stationary source at which there are emission increases to be offset is located in a downwind district that is overwhelmingly impacted by emissions transported from the upwind district, as determined by the state board pursuant to Section §39610.

(b) The district, in which the stationary source to which emission reductions are credited is located, shall determine the type and quantity of the emission

reductions to be credited.

(c) The district, in which the stationary source at which there are emission increases to be offset is located, shall do both of the following:

(1) Determine the impact of those emission reductions in mitigation of the emission increases in the same manner and to the same extent as the district would do so for fully credited emission reductions from sources located within its boundaries.

(2) Adopt a rule or regulation to discount the emission reductions credited to the stationary source in the other district. The discount shall not be less than the emission reduction for offsets from comparable sources located within the district boundaries.

(d) Any offset credited pursuant to subdivision (a) shall be approved by a resolution adopted by the governing board of the upwind district and the governing board of the downwind district, after taking into consideration the impact of the offset on air quality, public health, and the regional economy. Each district governing board may delegate to its air pollution control officer the board's authority to approve offsets credited pursuant to subdivision (a).

ERCs from SJVAPCD would meet the requirements of §40709.6 in terms of ERC/Source upwind and downwind designations, as required in §40709.6(a). The AVAQMD has stated that their current rules comply with §40709.6(c) and (d). However, the rules require both AVAQMD and SJVAPCD Boards to approve these offsets. The Applicant's responses to Energy Commission data requests and the AVAQMD PDOC have stated that ERCs obtained from the SJVAPCD will meet the requirements of §40709.6 (and thus Rule 1305), and that the SJVAPCD is amenable to providing ERCs for the PHPP, as they have done for other projects in the past. However, to meet the offset requirements of AVAQMD rules for LORS purposes, these approvals must be obtained before the facility could begin construction and these have not been approved by both Boards.

The California Air Resources Board (ARB 2001) has identified that ozone levels in the MDAB are significantly impacted by transport from the SJVAB. The AVAQMD federal 8-Hour Ozone Attainment Plan also reflects the finding that SJVAB transport is a significant contributor to MDAB ozone nonattainment. The results of the ARB study and the AVAQMD ozone attainment plan would support the AVAQMD inter-basin mitigation at a ratio of 1.3 pounds of NOx/VOC for every pound of new NOx/VOC emitted. As a result, the PHPP would have to provide at least 150 tons per year of NOx ERCs and 52 tons per year of VOC ERCs obtained from the SJVAB or MDAB prior to starting construction of the project. The AVAQMD has required 150 tons per year of NOx emissions offsets in their FDOC, using an offset ratio of 1.3:1.

ERCs that originate in the SJVAPCD are subject to the governing requirements of the SJVAPCD. Since the SJVAPCD ERCs are adjusted to reflect Reasonably Available Control Technology (RACT) when they are banked, surplus adjustments are not generally required when these ERCs are withdrawn from the bank. However, the discounting of ERCs at time of use is a federal requirement, per CAA §173(c) and related EPA guidance. The SJVAPCD uses a tracking system to annually demonstrate

that ERCs provided for their actions in the aggregate would be equivalent to federal non-attainment NSR program requirements. Thus, their ERC system is not set up to adjust ERCs during individual transactions. It is unclear whether the proposed ERCs from SJVAPCD would need to be adjusted at the time of use (USEPA 2010). During the PSD review of this project, US EPA must conclude that the project meets all requirements, including ERC adequacy.

In a December 15, 2010 letter to US EPA, the Antelope Valley AQMD indicated that San Joaquin Valley APCD's Rule 2201annually tracks ERCS and makes adjustments as necessary so that their banked emissions reductions meet federal NSR offsetting requirements on an ongoing basis. These are called "RACT adjustments." Thus, it is not possible to know at this time whether or not RACT adjustments will reduce the amount of offsets in **Air Quality Table 15** at the time they are allocated to the project. The applicant should identify additional offsets that could be substituted if RACT adjustments reduce the available ERCs because the table does not include any ERCs over the minimum amount deemed to be needed.

The AVAQMD is a very small district that does not have any distance ratios noted in their rules and regulations. Federal guidance on the requirement for a positive net air quality benefit is present in Appendix S of 40 CFR 51, which requires a demonstration of a positive net air quality benefit that can require modeling if emission offset ratios are insufficient and/or the location of the offsets are significantly different than the emissions being offset. Therefore, the SJVAPCD limitations on the distance between the ERC and new emission source should be considered as a guide in determining the relative effectiveness of the proposed ERCs. SJVAPCD Rule 2201 requires that an offset ratio of 1.5 to 1 be used for all ERCs that are more than 15 miles from the source. In addition, SJVAPCD Rule 2201 states that offsets from another district may be used only if the source of the offsets is within 50 miles of the proposed emissions increases and the APCO has reviewed the permit conditions issued by the district in which the proposed offsets are obtained and certifies that such offsets meet the requirements of this rule and California Health & Safety Code Section 40709.6. Since the project site is almost 50 miles from the AVAQMD/SJVAPCD border, potential sources of SJVAB emission reduction credits meeting these requirements might be very limited.

Staff reviewed the proposed mitigation plan and recognizes that the proposed offsets are intended to provide emission reductions to mitigate the impacts on ambient ozone levels from emissions caused by the PHPP. Staff acknowledges that the ozone air quality standard violations in the Mojave Desert area are overwhelmingly caused by emissions from SCAQMD (ARB, 1996), SJVAQMD (ARB 2001) and AVAQMD (2008).

The Applicant provided a term sheet for their proposed ERCs. All ERCs contained in the applicant's term sheet are located in the San Joaquin Valley as shown in **Air Quality Table 15**. The term sheet is a portfolio of potential offsets, and not yet a complete list of offsets proposed by the Applicant (i.e., the anticipated ERC swaps have not been identified). Staff concludes that all ERCs should be obtained from as far south as possible for them to be nearest the PHPP, and that ERCs from the Northern and Central Regions are not sufficiently near the proposed project site to mitigate the project's air quality impacts.

The use of ERCs from the SJVAPCD is a reasonable approach and has been done in the past. Pollutant transport from the San Joaquin Valley and the impact on Antelope Valley Air Quality has been well established and is addressed in the AVAQMD's Air Quality Attainment Plan. Under AVAQMD Rule 1305 and as required by the AVAQMD's FDOC, the Applicant will be required to obtain NOX and VOC ERCs at a ratio of 1.3:1 for those sources in the San Joaquin Valley (Rule 1305(C)(1)). As currently proposed in Air Quality Table 15, NOx ERCs are located up to 116 miles upwind of the project site and VOC ERCs are located up to 285 miles upwind of the project site. However, given the distance of most of these ERCs, the level of benefit that these ERCs would provide in offsetting PHPP emissions is questionable, and staff concludes that higher offset ratios would be needed to demonstrate a net air quality benefit for compliance with CEQA. In the PSA, while under the assumption that all ERCs would be located in the southern San Joaquin Valley, Condition of Certification AQ-SC-18 required an offset ration of 1.5:1 for all ERCs located more than 15 miles from the MDAB.

Air Quality Table 15
Applicant's Proposed VOC and NOx ERCs

Certificate #	ERC Type	Total (lb/yr)	Total (t/y)	SJVAPCD Region	Distance from PHPP (mi)
S-3298-2	NOx	30,391	15.20	Southern	116
S-3114-2	NOx	269,609	**134.80**	Southern	89
Total	**NOx**	**300,000**	**150.00**		
S-3368-1	VOC	6,000	**3.00**	Southern	78
S-3261-1	VOC	17,471	**8.736**	Southern	69
S-3283-1	VOC	321	**0.161**	Southern	128
N-882-1	VOC	575	**0.288**	Northern (anticipated ERC Swap)	285
Formerly C-I027-1	VOC	8,759	**4.38**	Central	169
N-710-1	VOC	24,840	**12.42**	Northern (anticipated ERC Swap)	282
S-3300-1	VOC	18,886	**9.443**	Southern	80
S-3116-1	VOC	6,228	**3.114**	Southern	78
S-3292-1	VOC	20,920	**10.46**	Southern	104
Total	**VOC**	**104,000**	**52.00**		

An emissions offset ratio of 1.5:1 was selected by staff based on SJVAPCD Rule 2201, Table 4.2, which required a 1.5:1 for ERCs located "15 miles or more from the new or modified emissions unit's Stationary Source." The SJVAPCD also allows ERCs from another district as follows:

> *Offsets from another district may be used only if the source of the offsets is within 50 miles of the proposed emissions increases and the APCO has reviewed the permit conditions issued by the district in which the proposed offsets are obtained and certifies that such offsets meet the requirements of this rule and CH&SC Section 40709.6. (Rule 2201, 4.13.2)*

None of the PHPP ERCs would meet this requirement, and only 11.7 tons/year of the VOC ERCs would be within 50 miles of the upwind boundary of the MDAB. This results in the closest proposed ERC source to be located more than 60 miles from the PHPP, with the weighted average ERC distance being more than 100 miles from the PHPP site. At these distances, it is unlikely that emissions reductions from the ERC source locations beneficially impact just the MDAB, but more likely beneficially impact surrounding air basins such as shown in **Air Quality Table 16**.

Air Quality Table 16
Interbasin Ozone Transport

Transport Coupling	**Transport Characterization**
San Joaquin Valley *to* Broader Sacramento Area	S, I
San Joaquin Valley *to* Great Basin Valleys	O
San Joaquin Valley *to* Mountain Counties	O
San Joaquin Valley *to* Mojave Desert	O
San Joaquin Valley *to* North Central Coast	S
San Joaquin Valley *to* South Central Coast	S, I
O = Overwhelming, S = Significant, I = Inconsequential Reference: California Air Resources Board, 2001. Assessment of the Impacts of Transported Pollutants on Ozone Concentrations in California. March, 2001.	

The AVAQMD has not developed offset distance ratio guidance for either in-district or inter-district ERCs. Thus, Staff does not have guidance available from AVAQMD for evaluation of long-distance ERCs. While the AVAQMD is not bound by the SJVAPCD Rules and Regulations, staff recommends that the Commission use the SJVAPCD Rules and Regulations as guidance for evaluating inter-district and inter-basin ERC transfers that involve large distances between the emission source and ERCs.

In addition to the issues associated with the distance of the ERCs from the project site, neither the Applicant nor the AVAQMD identified how or if the proposed ERCs will need to be discounted at the time of use. As noted by the US EPA (TN 58861 10-26-10) in their comment letter to the AVAQMD on the FDOC:

> *After reviewing the package, we note that the District has attempted to respond to EPA concerns regarding the ERCs being real, permanent, quantifiable, surplus and enforceable as a practical matter. However, we are concerned that the material provided does not make clear whether the proposed inter-district, inter-basin ERCs from San Joaquin Valley Air Pollution Control District (SJVAPCD) will be adjusted at the time of use. The discounting of ERCs at time of use is a federal requirement, per CAA §173(c) and related EPA guidance. As you may know, the SJVAPCD uses a tracking system to annually demonstrate that ERCs provided for their actions in the aggregate would be equivalent to federal non-attainment NSR program requirements. Thus, their ERC system is not set up to adjust ERCs during individual transactions. EPA requests that this information be provided to facilitate our*

complete review of the FDOC.

The project will be subject to review by the US EPA for purposes of determining compliance with the federal PSD program and staff expects US EPA to review all aspects of PHPP, including offsets. Based on the large distance between the project site and ERC sources, the need for offset ratios that are based on these distances and the lack of information on offset ratios needed for adequate abatement, Staff concludes that the proposed VOC and NOx ERCs are not adequate to fully offset PHPP emissions, result in a net air quality benefit or meet the requirements of AVAQMD Rule 1305. Therefore, Staff would recommend the adoption of Condition of Certification **AQ-SC18** to ensure timely purchase of the NOx and VOC emission reduction credits that will adequately and fully offset PHPP emissions of ozone precursors.

PM10 and their precursors:

That applicant proposed to obtain PM10/PM2.5 ERCs by paving roads following the procedures that would be defined in a new rule that would be passed by the AVAQMD. The new rule would be modeled after Mojave Desert AQMD Rule 1406, which provides a detailed approach to estimating and banking PM10 ERCs through road paving. The new rule would provide a reasonable approach to generating the PM10 offsets that are needed by the project. The Applicant provided a detailed discussion on the methodology that would be used to estimate PM10 ERCs, and also provided a list of roads that <u>may</u> be paved. The Applicant has also provided preliminary data on vehicle miles traveled for each road segment (which is explicitly required by the proposed methodology as outlined in Mojave Desert AQMD Rule 1406).

The City proposes to pave some local roadways to generate emission reduction credits to mitigate the project's PM10 and PM10 precursor (SOx) emission impacts. They have submitted a list of candidate roads from Palmdale, Lancaster, and unincorporated areas of Los Angeles County. The locations of specific roads will be provided and a traffic count will be conducted prior to the decision being made to pave the identified road.

The AVAQMD stated in the FDOC that they support use of road paving to offset natural gas combustion PM emissions and they also concluded that adequate existing unpaved roads exist within their district boundaries to offset PHPP (AVAQMD 2010). The AVAQMD also stated in the FDOC that they and the applicant would work to develop a rule to allow use of ERCs from road paving, if this is required by the US EPA. Pursuant to this approach, the AVAQMD would follow the process outlined in Mojave Desert AQMD Rule 1406 in conjunction with AVAQMD Rule 1309. There are two areas where this approach is problematic and subject to rejection by ARB or EPA:

1. Rule 1305(B)(3)(i) explicitly states that “The applicant demonstrates sufficient control over the Mobile Sources to ensure the claimed reductions are real, enforceable, surplus, permanent and quantifiable;” It has not been demonstrated that the Applicant has sufficient control over the mobile sources, especially for those roads located outside of the City of Palmdale. Road paving activities outside of the City of Palmdale would require the approval of the entity that owns the roadway, such as Los Angeles County, the City of Lancaster, Caltrans, etc.
2. Rule 1304(D)(2)(c)(i) specifies the methodology to be used to estimate ERCs for

mobile, area or indirect sources as “Any calculation formula and protocol as approved by the District, ARB and USEPA.” It is unclear whether or not ARB or EPA would approve this approach to generating PM10 ERCs under the existing rules, and whether or not this would occur before constructing the facility.

When it becomes possible to demonstrate that emissions (increases and reductions) are real, permanent, quantifiable, enforceable, and surplus, ERCs may be granted. A program to allow this would have to include a regulation that is approved by EPA and incorporated into the State Implementation Plan (SIP). Such regulations specify appropriate quantification methodologies, and other provisions that ensure the reductions meet all the applicable tests, and the regulatory process allows for public review and comment (CAPCOA 2004).

To date, California air districts have not succeeded in gaining EPA approval to issue ERCs for road paving activities. Therefore, ERCs will not be granted until the local district has adopted the needed regulations, and EPA has approved those regulations and incorporated them into the SIP. This requirement could lead to EPA not being able to approve this project during their PSD review.

Prior to adopting the needed regulation to allow for road paving ERCs, the AVAQMD would be required to develop a comprehensive PM10 emissions inventory and prepare and submit an Attainment Demonstration and Maintenance Plan. A maintenance plan is required since the AVAQMD region was classified as non-attainment for PM10 when it was part of the SCAQMD. Following the passage of AB 2666, which created the AVAQMD from the Los Angeles County desert portion of the SCAQMD, the new AVAQMD voted to adopt the SCAQMD Rules and Regulations as the AVAQMD rules. Since that time, the AVAQMD has not adopted a rule that would allow for road paving ERCs, nor has it adopted the associated PM10 emissions inventory and Attainment Demonstration and Maintenance Plan.

In order to address potential concerns regarding the use of road paving, the quantification of ERCs generated and the potential approvals, staff provides the following implementation plan. Staff recommends that the road (to be paved) be identified at least a year prior to start of construction of the facility, to allow the actual paving to be done at least thirty (30) days before the start of construction of the facility. This will ensure that emission reduction credits have been provided prior to starting construction of the project, and that road paving activities will not coincide with the construction of the facility. Staff also recommends that actual accounting for emission reduction credits from paving these roads be submitted to the District and the Commission verify that the credits would be enough to mitigate the project's 137 tons of PM10/PM2.5 and their precursors (128 tons PM10/PM2.5 and 9 tons of SOx) prior to paving of these roads. The calculations of the PM10 emission reduction credits will be consistent with the provisions and requirements specified in the proposed Rule 1309.2 (MDAQMD Rule 1406 methodology). These requirements include the selection of roads that are not scheduled to be paved as part of the AVAQMD attainment plan (i.e., the potential emission reductions must be surplus), conducting silt test to find the fine particulate matter content of road dust, and conducting traffic surveys to ensure quantification of the emission reductions. The rule also requires an applicant to submit an application for emission reduction credits in association with paving a segment of the

road. Upon receiving these credits, an applicant may use them as an offset in a manner consistent with the AVAQMD NSR program to mitigate new emissions from a new or modified project. Staff has incorporated these requirements into Condition of Certification **AQ-SC19**.

The EPA has also noted that the AVAQMD would need to pass Rule 1309.2 before an emission source could use ERCs from road paving. As noted by the EPA in an e-mail message between Laura Yannayon and Shirley Rivera, both staff at US EPA Region IX (TN 58938 06-03-10):

> *'Before EPA could approve this rule, the local District must submit to EPA a PM10 attainment plan, including a detailed PM10 emission inventory. My understanding is that the District has been working on this for a couple of years, and this issue is the major stumbling block for any future action by EPA on this proposed rule. A source could not rely on credits generated by this rule, until the rule is approved by EPA into the SIP."*

The AVAQMD is required to develop a rule allowing for the generation of ERCs for all non-traditional emission sources. The California PM10 State Implementation Plan (SIP) includes the existing AVAQMD rules and regulations, but no rule allowing for the banking of road paving ERCs. An EPA-approved SIP is federal law and does not change unless and until EPA approves a revision requested by a state. Once "a SIP is adopted by a state and approved by the EPA, it becomes controlling and must be carried out by the state" and the SIP's "requirements and commitments become binding upon the state as a matter of federal law." (United States District Court, Eastern District of California 2007). Therefore, EPA has requested that the AVAQMD develop Rule 1309.2 in order to allow for the banking of Road Paving ERCs.

Given the lack of progress on developing a firm PM10 ERC package, and the lack of an AVAQMD rule that would allow for the use of emission reductions from "non-traditional" sources such as roadway paving as offsets, Staff cannot conclude that the PHPP has demonstrated compliance with AVAQMD PM10 offset requirements.

While staff believes that the project could comply with current applicable LORS at a future date, the rule underlying the PHPP's use of PM10/PM2.5 emission reduction credits that is necessary for this determination is being legally challenged in court[2] and staff cannot determine if PM credits generated via road paving will mitigate project PM impacts. If revisions to the rule limit the availability of the emission reductions, the applicant should consider obtaining their emission reductions from other sources.

Staff also recommends the adoption of Condition of Certification **AQ-SC8**, which is designed to prohibit non-maintenance vehicles from traveling on any unpaved portion of road ways within the facility. In addition, this condition would also limit the vehicle speed to no more than ten (10) miles per hour on the unpaved portion of roadways within the

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[2] A lawsuit was filed by Center for Biological Diversity and labor unions challenges CEQA analysis of the rule and its impacts. The California Court of Appeals for the Fourth Appellate District recently ruled in favor of the plaintiffs.

facility.

PM2.5 and their precursors:

Since PM2.5 is an attainment pollutant for both the State and Federal standards, PM2.5 offsets are not required for PHPP under AVAQMD Rule 1303. The AVAQMD did not require offsets for PM2.5 in their FDOC. The AFC indicated that the road paving would also be used to partially offset the PM2.5 emissions, but only to the extent that there would be reductions in this size category from the miles of roads needed to offset PM10. No additional roads were proposed to provide a total offset of PM2.5 emissions. PHPP PM2.5 emissions and PM2.5 precursor emissions of SOx will not cause a violation of the federal 24-hour PM2.5 or the state annual PM2.5 air quality standard.

Similar to mitigation for ozone precursors, the City proposes the use of PM10/PM2.5 emission reduction credits that are generated by implementation of the MDAQMD's Rule 1406 (see discussion above for PM10) that is being legally challenged. Thus, staff believes that the project would only be in compliance with CEQA requirements for PM2.5 if these emission reduction credits are ultimately generated under the rule and to the degree that they will be valid for the quantities specified. As is the case for PM10, if the revisions to the rule limit the availability of the emission reductions, the applicant should consider obtaining their emission reductions from other sources.

CUMULATIVE IMPACTS AND MITIGATION

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

This analysis is concerned with criteria air pollutants, which are usually (though not always) cumulative by nature. Rarely will a project alone 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.

Much of the preceding discussion is concerned with cumulative impacts. **Existing Ambient Air Quality** describes the background air quality in the Mojave Desert Area, followed by discussions of historic ambient levels for each of the significant criteria pollutants. **Construction Activities** discusses the project's contribution to the local existing background caused by project construction, and **Operation Impacts and Mitigations** discusses the project's contribution to the local background air quality and whether the measures proposed are adequate to mitigate project impacts to less than significant for either LORS or CEQA purposes. This section includes three additional analyses:

- A summary of projections for criteria pollutants in the air district and the air district's programmatic efforts to abate such pollution. 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 for new sources of emissions, and restrictions of emissions from existing sources of air pollution;
- An analysis of the project's localized cumulative impacts -- impacts locally when project emissions are combined with emissions from other local major sources (i.e., other Mojave Desert electric generation facilities); and
- A discussion of secondary pollution impacts, particularly ozone and particulate matter.

SUMMARY OF PROJECTIONS OF ATTAINMENT AND EMISSION INVENTORIES

To evaluate the project emission impacts along with other probable future projects, staff needs specific information that is included when project applicants file an application with the District for a permit. Projects located up to six miles from the proposed facility usually need to be included in the analysis. The PHPP, in consultation with the AVAQMD, has conducted a search of current and probable construction and operation of facilities within six miles radius of the project, and indicated that Plant 42 projects at the Lockheed Martin Aeronautics and Northrop Grumman facilities could potentially be included in the cumulative impact analysis.

Ozone

The air district is currently classified as not in attainment (or "nonattainment") of the state 1-hour and 8-hour ozone standards and the federal 8-hour ozone air quality standard. The air district is required to prepare and adopt an ozone attainment plan for submittal to the U.S. EPA describing how the air district will achieve attainment with the federal 8-hour standard. On April 20, 2004, the air district adopted its 2004 Ozone Attainment Plan (OAP), which was submitted to the California Air Resources Board (CARB) for consideration and forwarded to the U.S.EPA for incorporation into the State Implementation Plan (SIP). This public document, which has been adopted by the agency's Board of Directors, provides a detailed description of ozone levels within the air district and the district's programs to achieve compliance with the state and federal standards.

The OAP states that "(t)he AVAQMD is downwind of the Los Angeles basin, and to a lesser extent, is downwind of the San Joaquin Valley. Prevailing winds transport ozone and ozone precursors from both regions into and through the MDAB during the summer ozone season. These transport couplings have been officially recognized by CARB.

Local AVAQMD emissions contribute to exceedances of both the NAAQS and CAAQS for ozone, but the MDAB would be in attainment of both standards without the influence of this transported air pollution from upwind regions.

Particulate Matter

The District is currently classified as nonattainment for the state 24-hour and Annual

Average PM10 air quality standards. California has adopted far more stringent standards for PM10 than the EPA. Currently, virtually all air districts in the state (the lone exception being Lake County) are designated nonattainment of the state PM10 standard. 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.

In 1997 the federal government adopted PM2.5 standards, as did the state in 2003. The EPA has determined that the area is unclassified or attainment for both the annual and the 24-hour federal PM2.5 standard. In addition, the ARB classified the area as unclassified/attainment for the annual state PM2.5 air quality standard (there is no state 24-hour standard).

It is unlikely that the project emissions, fully mitigated, combined with emissions from the Lockheed Martin Aeronautics and Northrop Grumman facilities will lessen the overwhelming contributions from fugitive and windblown dust. Therefore, the cumulative impacts of PHPP and the Lockheed Martin Aeronautics and Northrop Grumman facilities on the existing air quality would be insignificant.

LOCALIZED CUMULATIVE IMPACTS

Since most of the PHPP air quality impacts (excluding ozone and secondary PM) can be reasonably estimated through air dispersion modeling (see the "Operational Modeling Analysis" subsection) the 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 "Environmental Setting" 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 site[3]. Based on staff's modeling experience, beyond six miles there is no statistically considerable 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 site. As opposed to point sources, area sources include sources like agricultural fields, residential developments or other such sources that do not have a distinct point of emission. New area sources are typically identified through draft or final Environmental Impact Reports (EIRs) that are prepared for those sources. The initiation of the EIR process is a reasonable basis on which to determine what is "reasonably foreseeable" for new area sources.

[3] Staff assumes that impacts from projects beyond six miles would not affect the modeling analysis on a cumulative basis.

- 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.

Once the modeling results are interpreted, they are added to the background ambient air quality monitoring data and thus the modeling portion of the cumulative assessment is complete. Due to the use of air dispersion modeling programs in staff's cumulative impacts analysis, the applicant must submit a modeling protocol, based on information requirements for an application, prior to beginning the investigation of the sources to be modeled in the cumulative analysis. The modeling protocol is typically reviewed, commented on, and eventually approved in the Data Adequacy phase of the licensing procedure. Staff typically assists the applicant in finding sources (as described above), characterizing those sources, and interpreting the results of the modeling. However, the actual modeling runs are usually left to the applicant to complete. There are several reasons for this: modeling analyses take time to perform and require considerable expertise, the applicant has already performed a modeling analysis of the project alone (see the "Operational Modeling Analysis" subsection), and the applicant can act on its own to reduce stipulated emission rates and/or increase emission control requirements as the results warrant. Once the cumulative project emission impacts are determined, the necessity to mitigate the project emissions can be evaluated, and the mitigation itself can be proposed by staff and/or the applicant (see the "Mitigation" subsection).

The applicant, in consultation with the District, has conducted a survey of new development projects and stationary sources that have the potential for emissions of criteria air contaminants within six miles of the project site that are either under construction, or have received permits to be built or operate in the foreseeable future. The only nearby background sources that the AVAQMD required be included in the cumulative modeling analysis were the nearby Lockheed Martin Aeronautics and Northrop Grumman facilities, both located within five miles of the Project site at or around the Palmdale Regional Airport. These are existing sources and the potential cumulative impacts are related to operational emissions. A cumulative modeling analysis is presented below.

In addition to the existing projects, reasonably foreseeable future projects within a three-mile radius around the plant site were examined in this analysis. The future projects are listed below; a brief description of each of these projects is provided in Section 5.1 of this AFC, Projects Considered in Cumulative Impacts Analysis. The four future projects, along with the approximate distance from PHPP are:

- Fairway Business Park, 1.3 miles southwest;
- Palmdale Transit Village Specific Plan, 2.5 miles southwest;
- Amargosa Creek Specific Plan, 2 miles northwest; and
- 30th St. W and Avenue K Projects, 3 miles northwest.

Cumulative Impacts During Construction

Construction of the four future projects listed above may involve some activities similar to those required for PHPP, including grading, soil handling, and delivery truck traffic. Construction impacts for these projects, including the PHPP, are expected to be temporary. Of the four projects listed above, none have identified construction schedules that would overlap PHPP construction, although several of the projects currently do not have defined construction schedules. In addition, construction equipment and soil disturbing activities tend to have low release heights of air emissions leading to localized impacts, i.e., impacts that would not influence air quality several miles away. Finally, PHPP will provide mitigation to minimize impacts during construction. Cumulative impacts from construction are not considered to be significant because of the limited horizontal extent of impacts from construction activities and temporary nature of the activities.

Cumulative Impacts During Operations

In order to perform the cumulative analysis for all pollutants, an inventory of background sources was requested from the AVAQMD. The letter requesting the inventory from AVAQMD is provided in AFC, Appendix G.4 (PHPP 2008). The only nearby background sources that the agency required be included in the cumulative modeling analysis were the nearby Lockheed Martin Aeronautics and Northrop Grumman facilities, both located at or around the Palmdale Regional Airport and within five miles of the Project site.

The cumulative modeling analysis is summarized in **Air Quality Table 17**. The maximum modeled concentrations for all pollutants are summed with ambient background concentrations for comparison to the air standards. The cumulative modeled concentrations are summed with ambient concentrations for comparison with the applicable limiting standard.

Air Quality Table 17
NAAQS/CAAQS Cumulative Modeling Results for Project Normal Operations

Pollutant	Averaging Period	Concentrations ($\mu g/m^3$)					Percent of Limiting Standard
		AERMOD Result	Ambient Background	Total	CAAQS	NAAQS	
NO_2[1]	1-hour (State)	291.1	---	291.1	339	--	86%
	1-hour (Federal)	184..4	---	184.4	--	188	98%
	Annual	6.1	28.2	34.8	57	100	61%
CO	1-hour	367	3680	3,931.8	23,000	40,000	17%
	8-hour	20.4	1978	1,880.6	10,000	10,000	19%
PM10	24-hour	18.5	181	99.3	50	150	199%
	Annual	1.8	30.2	26.6	20	--	133%

PM2.5	24-hour	11.6	28	30.3	--	35	87%
	Annual	1.3	8.9	10.4	12	15	87%
SO_2	1-hour	1.7	28.8	35.7	665	--	5%
	3-hour	1.3	23.6	24.9	--	1,300	2%
	24-hour	0.9	15.7	16.6	105	365	16%
	Annual	0.2	5.2	5.4	--	80	7%

1 Modeled NO_2 concentrations as determined with the OLM. Maximum AERMOD concentration given is modeled impact plus time-matched ambient background.

2 Background data were collected at the Lancaster Division Street monitor for all pollutants except SO2 which was collected at the Victorville monitoring station. These values correspond to the highest monitored values from 2004 – 2008, except for PM2.5, which is the 98th percentile value over three years.

Source: PHPP 2009, PHPP, 2010, ARB 2009.

As shown in **Air Quality Table 17**, the total concentrations comprised of maximum modeled plus maximum background are below the NAAQS and CAAQS for all pollutants with the exception of the 24-hour and annual PM10 CAAQS, for which the ambient background already exceeds the standard and Project contributions are relatively small (27% and 8% of the 24-hour and annual PM10 CAAQS, respectively). Since the Project exceeds the AVAQMD offset thresholds, and will be required to secure emission offsets in order to obtain an operating permit, the Project will not significantly contribute to PM10 standard violations in the region.

Based on the activities planned during operation of the four future projects identified in the area of the plant site, there appears to be a very low probability for a cumulatively significant air quality impact to occur.

The future commercial and industrial uses of the Fairway Business Park are not known at this time, and it is possible that one or more businesses could locate in the development that could have large emission sources, or an existing business could expand with the addition of a large emission source. However, if such emission sources were to be installed in the development, those sources would have to be permitted through the AVAQMD and cumulative impacts will be assessed at that time. AVAQMD rules and regulations have been developed to maintain air quality for attainment pollutants, and make progress towards attainment for those pollutants that are not currently in attainment. Compliance with AVAQMD rules and regulations would ensure that new emission sources in this development would not contribute to a cumulatively significant impact.

Palmdale Transit Village Specific Plan, Amargosa Creek Specific Plan, and 30th St. W and Avenue K Projects allow for the development of housing, retail, offices and mixed use (i.e., housing with retail) spaces. These property uses do not typically have large emission sources, and the EIRs for these projects do not describe the development of large emission sources. These projects may cause increases in motor vehicle traffic (and emissions) and combustion emissions from space heating and other similar uses. Emissions from these types of sources tend to have low release heights which lead to localized impacts. It is unlikely, therefore, that these future developments could have a cumulatively significant impact with the PHPP several miles away.

COMPLIANCE WITH LORS

The District issued its Preliminary Determination of Compliance (PDOC) (AVAQMD-

2009a) for the project on February 12, 2009. The PDOC, or determination of compliance with District rules and regulations, included a set of air quality conditions that are drafted to ensure continuous compliance during construction and operation of the facility. The AVAQMD issued a revised PDOC on June 22, 2009 and a Final Determination of Compliance (FDOC) on May 13, 2010. Staff has incorporated the District conditions in this Final Staff Assessment. Compliance with all District rules and regulations was demonstrated to the District's satisfaction in the FDOC. The District's FDOC conditions are presented in the Conditions of Certification section.

FEDERAL

The District is responsible for issuing the Federal New Source Review (NSR) permit but is not currently delegated enforcement for the Prevention of Significant Deterioration (PSD) permitting process. The EPA PSD program applies to a new major facility that will emit 250 tons per year (tpy) or more, or if it is one of the listed PSD source categories in the Federal Clean Air Act that has a potential to emit 100 tpy or more of an attainment pollutant. The Project is one of the listed categories (fossil fuel fired steam electric generating facility) and will emit more than 100 tpy of NOx, CO, and PM/PM10/PM2.5 The Project will comply with this PSD requirement by applying for a PSD permit from EPA Region IX. The District's FDOC permit conditions have been designed to ensure that the project would comply with the applicable NSPS Subparts KKKK and IIIII that are delegated to the District for enforcement as part of its Title V permit responsibility.

However, new PSD requirements for greenhouse gas emissions (GHG) become effective January 2, 2011 for facilities which exceed emissions thresholds for traditional PSD emissions categories and with the potential to emit GHG emissions in excess of 75,000 tons of carbon dioxide-equivalent emissions per year (new sources). After July 1, 2011, PSD requirements apply to facilities with the potential to emit in excess of 100,000 tons of carbon dioxide-equivalent emissions per year (new sources) regardless of applicability of PSD for criteria pollutants. As shown in Greenhouse Gas Table 3 in Air Quality Appendix Air-1, PHPP GHG emissions are greater than 75,000 or 100,000 tons of CO2E per year, such that if PHPP is not permitted and under construction by January 1, 2011, PHPP would be required to get a PSD permit for GHG emissions from the EPA Region IX.

STATE

The applicant would demonstrate that the project would comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause nuisance or injury, with the issuance of the District's Final Determination of Compliance and the Energy Commission's affirmative finding for the project.

The District has evaluated compliance of the emergency diesel fire pump engine with Air Toxic Control Measure (ATCM) requirements under Title 17 of the California Code of Regulations. The District has determined, with their FDOC permit conditions, that the engine will comply with the ATCM requirements

LOCAL

The applicant provided an air quality permit application to the AVAQMD in 2008. The

District issued its PDOC (AVAQMD-2009a) for the project on February 12, 2009. The PDOC included a set of air quality conditions that were drafted to ensure continuous compliance during construction and operation of the facility. The AVAQMD issued a revised PDOC on June 22, 2009 and a final DOC on May 13, 2010. Staff has incorporated the District conditions in this Final Staff Assessment. Compliance with all District rules and regulations was demonstrated to the District's satisfaction in the FDOC. The District's FDOC indicates that the proposed project is expected to comply with all applicable District rules and regulations.

Regulation II Permits

AVAQMD Rule 201 Permits Required - Any person building, altering or replacing any equipment, the use of which may cause the issuance of air contaminants or the use of which may eliminate or reduce or control the issuance of air contaminants, must first obtain authorization for such construction from the AVAQMD. A PTC shall remain in effect until the PTO for the equipment for which the application was filed is granted, denied, or canceled. This applicant's AFC serves as an application for a PTC.

AVAQMD Rule 202 Temporary Permit to Operate - A person shall notify the AVAQMD before operating or using equipment granted a PTC. Upon such notification, the PTC shall serve as a temporary PTO for the equipment until the PTO is granted or denied. The equipment shall not be operated contrary to conditions specified in the PTC, and testing requirements must be satisfied. The Project would comply with this rule by applying for a permit from the AVAQMD in a timely manner.

AVAQMD Rule 203 Permit to Operate - A person shall not operate or use any equipment, the use of which may cause the issuance of air contaminants, or the use of which may reduce or control the issuance of air contaminants, without first obtaining a written PTO from AVAQMD, or except as provided in Rule 202. The equipment shall not be operated contrary to the conditions specified in the permit to operate. The Project would comply with this rule by obtaining a permit from the AVAQMD in a timely manner and complying with the stated conditions.

AVAQMD Rule 217 Provision for Sampling and Testing Facilities - The permittee may be required to provide and maintain such facilities as are necessary for sampling and testing. In the event of such requirements, the AVAQMD shall notify the applicant in writing of the required size, number and location of sampling ports; the size and location of the sampling platform; the access to the sampling platform, and the utilities for operating the sampling and testing equipment. The platform and access shall be constructed in accordance with the General Industry Safety Orders of the State of California. The Project would provide such facilities for the combustion turbines and other equipment for which source testing is required.

AVAQMD Rule 218 Stack Monitoring - The owner or operator shall provide, install, and maintain continuous monitoring systems to measure the specific pollutants from fossil fuel-fired steam generators with heat input of 250 MMBtu or more per hour. The combustion turbines are subject to this rule and the facility will be required to have Continuous Emissions Monitoring Equipment (CEMS). The boiler proposed for this Project is rated at 100 MMBtu per hour and, therefore, is not subject to the requirements

of this rule. The HTF heater does not produce steam and is not subject to the rule.

AVAQMD Rule 219 Equipment not Requiring a Written Permit Pursuant to Regulation II - The Project would employ a number of devices that emit air pollutants, but are exempt from permit pursuant to one or more exemptions listed in Rule 219, including two diesel fuel storage tanks piped exclusively to emergency engines, water trucks used for mirror washing, HTF piping fugitive emissions, lube oil reservoir(s) (storage tanks), heating ventilation and air conditioning (HVAC) systems, a water heater, water treatment systems, and storage tanks for water treatment chemicals.

AVAQMD Rule 226 Limitations on Potential to Emit - The Project is a major source and would comply with Regulation XXX requirements rather than limit its potential to emit. Thus, this rule is not applicable.

Regulation III Fees

AVAQMD Rule 301 Permit Fees - Permit application fees were paid to the AVAQMD with the air permit application.

Regulation IV Prohibitions

AVAQMD Rule 401 Visible Emissions - A person shall not discharge into the atmosphere, from any single source of emissions whatsoever, any air contaminant for a period or periods aggregating more than three (3) minutes in any one hour which is as dark or darker in shade as that designated as No. 1 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke which is as dark or darker in shade as that designated as No. 1 on the Ringelmann Chart. The Project emission sources would be equipped with BACT and combust clean fuels and, consequently, compliance with this rule is expected.

AVAQMD Rule 402 Nuisance - A person shall not 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. Due to the application of BACT on each emission source and the distance from the emission sources to any potential receptors, compliance with this rule is expected.

AVAQMD Rule 403 Fugitive Dust - The purpose of this rule is to reduce the amount of PM10 emitted from significant man-made fugitive dust sources and in an amount sufficient to maintain the NAAQS. The provisions of this rule apply to specified bulk storage, earthmoving, construction and demolition, and man-made conditions resulting in wind erosion.

Project construction would involve bulk storage of soils, earthmoving, construction and demolition, and manmade conditions that have the potential for fugitive dust emissions. The Project operator, or its contractors, would follow the fugitive dust control strategy outlined in a Dust Control Plan that would be prepared for the Project.

Project operations would involve routine vehicle travel within the solar collector field in order to wash the mirrors and earthmoving during contaminated soil management associated with the bioremediation facility. These operations have the potential for fugitive dust emissions. The owner, or its contractors, would follow the fugitive dust control strategy outlined in the Dust Control Plan that would be prepared for the Project.

AVAQMD Rule 404 Particulate Matter Concentration - Rule 404 applies to any person who discharges PM emissions into the atmosphere from any single source operation. The rule limits PM emissions based upon the exhaust flow rate. The provisions of this rule do not apply to emissions resulting from the combustion of liquid or gaseous fuels in steam generators or combustion turbines. The Project HTF heater would comply with this rule by using only natural gas fuel. The fire water pump and emergency generator engines are subject to and would comply with this rule by using only ultra-low sulfur diesel fuel. The cooling tower would comply by utilizing a high-efficiency drift eliminator.

AVAQMD Rule 405 Particulate Matter, Emission Rate - A person shall not discharge into the atmosphere from any source operation, particulate matter in excess of the limits shown in the rule. This rule is generally applied to processes that handle bulk dry materials, and is not generally applied to combustion processes, as there is not "process weight" on which to base the emissions limit. Therefore, this rule does not apply to this facility.

AVAQMD Rule 407 Liquid and Gaseous Contaminants - A person shall not discharge into the atmosphere from any equipment: 1) CO exceeding 2,000 ppm by volume measured on a dry basis, averaged over 15 consecutive minutes; or 2) sulfur compounds which would exist as liquid or gas at standard conditions, calculated as SO_2 and averaged over 15 consecutive minutes, exceeding 500 ppm by volume. The use of pipeline quality natural gas fuel and good combustion practice for the combustion turbines, duct burners, auxiliary boiler and HTF heater and ultra-low sulfur diesel fuel in the fire water pump engine and emergency electrical generator engine would ensure compliance with this rule. As shown in AFC Section 5.2.3, CO emissions from the combustion turbines would meet the BACT requirement of 2.0 ppm, and the auxiliary boiler and HTF heater would both meet emission limits of 50 ppm. The SO_2 concentration from each combustion source is less than 1 ppmv.

AVAQMD Rule 409 Combustion Contaminants - A person shall not discharge into the atmosphere from the burning of fuel, combustion contaminants exceeding 0.1 grain per cubic foot of gas calculated to 12% of CO_2 at standard conditions averaged over a minimum of 15 consecutive minutes. The use of pipeline natural gas fuel for the duct burners, auxiliary boiler and HTF heater ensures compliance with this rule. This rule does not apply to emissions from internal combustion engines, such as the combustion turbines, fire water pump or emergency generator engines.

AVAQMD Rule 430 Breakdown Provisions - The owner or operator shall notify the AVAQMD of any occurrence which constitutes a breakdown condition. The owner or operator shall demonstrate the nature and extent of the breakdown by providing to the AVAQMD signed contemporaneous operating logs and/or other relevant evidence which shows that:

a) The breakdown occurred and that the owner/operator can identify the cause of the breakdown; and

b) The equipment was, at the time of the breakdown, being properly operated; and

c) During the period of the breakdown, the owner/operator took all reasonable steps to minimize levels of emissions and to correct the condition that lead to the breakdown.

Such relevant evidence shall be submitted to the AVAQMD within 60 days of the date the breakdown was reported to the AVAQMD. The Project would make such notifications and reports, as may become necessary.

AVAQMD Rule 442 Usage of Solvents - A person shall not discharge VOCs into the atmosphere from all VOC containing materials, emissions units, equipment or processes subject to this rule, in excess of 1,190 pounds per month for the entire facility. All VOC-containing materials subject to this rule, whether in its form for intended use or as a waste or used product, shall be stored in nonabsorbent, non-leaking containers which shall be kept closed at all times, except when filling or emptying, and disposed of in a manner to prevent evaporation of VOCs into the atmosphere from the facility. Usage records for all VOC-containing materials subject to this rule shall be maintained pursuant to Rule 109. Usage of solvents will be limited to maintenance clean-up; usage and emissions are not expected to exceed 1,190 pounds per month. Should the Project use any materials subject to this rule, it would document usage accordingly to ensure the emissions do not exceed the allowable monthly limit.

AVAQMD Rule 463 Storage of Organic Liquids - This rule applies to any above-ground stationary tank with a capacity of 19,815 gallons or greater used for storage of organic liquids, and any above-ground tank with a capacity between 251 gallons and 19,815 gallons used for storage of gasoline. The Project will have HTF (solar array), insulating mineral oil (transformers), hydraulic oil (combustion turbine, steam turbine and other equipment), and lubricating oil on site, as well as diesel fuel stored at the facility. However, none of the containers would exceed the threshold limit of 19,815 gallons and, therefore, this rule would not apply to the Project.

AVAQMD Rule 466 Pumps and Compressors - This rule applies to any pump or compressor handling a ROC, where a ROC is any chemical compound which contains the element carbon, which has a Reid vapor pressure (RVP) greater than 80 millimeters mercury (mmHg) (1.55 pounds per square inch [psi]), or an absolute vapor pressure (AVP) greater than 36 mmHg (0.7 psi) at 20 degrees Centigrade (ºC), excluding CO, CO_2, carbonic acid, carbonates and metallic carbides and excluding methane, 1,1,1-trichloroethane, methylene chloride, trifluoromethane, and chlorinated-fluorinated hydrocarbons. The Project will have HTF (solar array), insulating mineral oil (transformers), hydraulic oil (combustion turbine, steam turbine and other equipment), and lubricating oil on site, as well as diesel fuel stored at the facility. However, none of these materials will exceed the threshold vapor pressure limits and gasoline will not be stored in tanks at the facility and, therefore, this rule would not apply to the Project.

AVAQMD Rule 466.1 Valves and Flanges - This rule applies to any valve or flange handling a ROC, where a ROC is any chemical compound which contains the element carbon, which has a RVP greater than 80 mmHg (1.55psi), or an AVP greater than 36

mmHg (0.7 psi) at 20ºC, excluding CO, CO_2, carbonic acid, carbonates and metallic carbides and excluding methane, 1,1,1 - trichloroethane, methylene chloride, trifluoromethane, and chlorinated-fluorinated hydrocarbons. The Project will have HTF (solar array), insulating mineral oil (transformers), hydraulic oil (combustion turbine, steam turbine and other equipment), and lubricating oil on site, as well as diesel fuel stored at the facility. However, none of these materials will exceed the threshold vapor pressure limits and, therefore, this rule would not apply to the Project.

AVAQMD Rule 474 Fuel Burning Equipment, Oxides of Nitrogen - This rule applies to non-mobile fuel burning equipment with a heat input of at least 555 MMBtu per hour. The auxiliary boiler proposed for this Project is rated at 100 MMBtu per hour, and the HTF heater is rated at 40 MMBtu per hour. Thus, neither unit is subject to the requirements of this rule.

AVAQMD Rule 475 Electric Power Generating Equipment - A person shall not discharge into the atmosphere from any equipment having a maximum rating of more than 10 net MW used to produce electric power, combustion contaminants that exceed both of the following two limits:

a) 11 pounds per hour;

b) 0.01 grains per standard cubic foot (gr/scf) calculated at 3% O_2 on a dry basis averaged over 15 consecutive minutes or any other averaging time specified by the AVAQMD.

The emission rate of combustion contaminants (i.e., PM10, as defined in AVAQMD Rule 102) exceeds 11 pounds per hour from each combustion turbine. However, the stack concentration is approximately 0.0022 gr/dscf at full fire with duct burners on and the project will comply with this rule.

AVAQMD Rule 476 Steam Generating Equipment - This rule applies to equipment with a heat input of at least 50 MMBtu per hour. The auxiliary boiler proposed for this Project is rated at 100 MMBtu per hour, and the heater is rated at 40 MMBtu per hour. The proposed project will have specific permit conditions requiring compliance with these provisions.

Regulation IX Standards of Performance for New Stationary Sources

AVAQMD Rule 900 Standards of Performance for New Stationary Sources (NSPS) - As stated in Section 5.2.1.1, the Project will be subject to 40 CFR 60, Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, and it will comply by purchasing equipment that meets the applicable emission standards. The Project will also be subject to 40 CFR 60 Subpart KKKK, Standards of Performance for Stationary Combustion Turbines. Operation of the turbines with current BACT would ensure that the Project complies with the Part KKKK emission limits.

Regulation X National Emission Standards for Hazardous Air Pollutants

AVAQMD Rule 1000 National Emission Standards for Hazardous Air Pollutants (NESHAP) - As stated in Section 5.2.1.1.2, the Project will not be a major source of hazardous air pollutants (HAPs), and thus these standards are not applicable to the

Project.

Regulation XI Source Specific Standards

AVAQMD Rule 1113 Architectural Coatings - The purpose of this rule is to limit VOC emissions from architectural coatings. This rule specifies architectural coatings, storage, cleanup and labeling requirements. With limited exceptions, no person shall: 1) manufacture, blend or repackage for sale within the District; 2) supply, sell or offer for sale within the District; or 3) solicit for application or apply within the District any architectural coating with a VOC content in excess of the corresponding limit specified in the Table 1 of the rule. The Project would comply with the requirements of this rule if architectural coatings are applied at the Project during construction or subsequent maintenance activities.

AVAQMD Rule 1121 Control of Nitrogen Oxides from Residential-Type, Natural-Gas-Fired Water Heaters - A person shall not distribute, sell, offer for sale, or install within the District gas-fired water heaters with heat input rates less than 75,000 Btu per hour that:

a) Emit NOX in excess of 93 pounds of NOX (calculated as NO2) per billion Btu of heat output; or

b) Are not certified in accordance with the requirements of the rule.

The Project would comply with this rule by purchasing only compliant equipment.

AVAQMD Rule 1122 Solvent Degreasers - This rule applies to all persons who own or operate remote reservoir cold cleaners, batch-loaded cold cleaners, open-top vapor degreasers, and all types of conveyorized degreasers that carry out solvent cleaning operations with a solvent containing VOCs. Solvent cleaning operations that are regulated by this rule include, but are not limited to, the removal of uncured coatings, adhesives, inks, and contaminants such as dirt, soil, oil, and grease from parts, products, tools, machinery, and equipment. The Project would comply with the requirements of this rule if such equipment is used at the facility.

AVAQMD Rule 1135 Emissions of Oxides of Nitrogen from Electric Power Generating Systems - This rule is applicable only to units existing on July 19, 1991, which are owned or operated by any one of the following: Southern California Edison, Los Angeles Department of Water and Power, City of Burbank, City of Glendale, and City of Pasadena, or any of their successors. The Project would be constructed after 1991 and is not owned by any entity listed in the rule; therefore, this rule is not applicable to the Project.

AVAQMD Rule 1146 Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters - This rule applies to boilers, steam generators, and process heaters of equal to or greater than 5 MMBtu per hour rated heat input capacity used in any industrial, institutional, or commercial operations with the exception of boilers used by electric utilities to generate electricity. Thus the rule specifically exempts the proposed 100 MMBtu per hour boiler used to generate electricity, but it is applicable to the proposed 40 MMBtu per hour

heater. The heater would comply with the limitations of the rule by operating with ultra-low-NOX burners meeting a BACT limit of nine (9) ppmv NOX and 50 ppmv CO.

AVAQMD Rule 1171 Solvent Cleaning Operations - This rule applies to all persons who use VOC-containing materials in solvent cleaning operations during the production, repair, maintenance, or servicing of parts, products, tools, machinery, equipment, or general work areas, and to all persons who store and dispose of VOC-containing materials used in solvent cleaning. The Project would comply with the requirements of this rule if solvent cleaning occurs at the facility during construction or subsequent maintenance activities.

Regulation XIII New Source Review

AVAQMD Regulation XIII New Source Review - This rule provides for preconstruction review of new and modified stationary sources of affected pollutants to insure emissions will not interfere with attainment of ambient air quality standards (AAQS); ensures appropriate new and modified sources of affected pollutants are constructed with BACT; and provides for no significant net increase in emissions from new and modified stationary sources for all non-attainment pollutants and their precursors. Rule 1303 addresses the specific requirements of BACT and offsets.

BACT: An applicant shall provide BACT for all affected pollutants expected to be emitted from a new emissions unit and for all affected pollutants expected to increase from a modified existing emissions unit. Each of the permitted devices proposed for the Project will employ current BACT. The manner in which the Project would comply with BACT is addressed in more detail in AFC Section 5.2.3.

Offsets: An applicant must provide offsets for new or modified stationary source of PM10, SOX, NOX or VOC for the source's potential to emit when the source's potential to emit equals or exceeds the offset trigger levels identified in the rule. If offsets are required, they must be provided at specified ratios. Offsets are required for the Project because the emissions of PM10, NOX and VOC do exceed the applicable thresholds.

Under Federal and California law, the AVAQMD is required to implement a NSR program that attains, or makes reasonable progress toward attaining, the AAQS within the District. If the pollutant concentrations in ambient air exceed the standards, then the area is designated nonattainment, and offsets must be provided for major new sources or modifications to existing sources. The District is required to develop an Air Quality Management Plan (also referred to as a State Implementation Plan or SIP), which identifies rules and other measures that must be adopted to attain or maintain compliance with the AAQS. AVAQMD Regulation XIII, New Source Review program, is the cornerstone of this process within the District. This regulation provides the requirements, such as how offset calculations must be done and thresholds over which emissions must be offset. It also defines which pollutants must be offset, what ratios must be used, and the criteria of what can be used as an emission reduction credit (ERC). If a project meets the requirements of these rules, then the mitigation (i.e., ERC) can be considered to be completely effective since the program has been developed to ensure eventual attainment of the AAQS. Currently, no specific emission reductions

credits have been identified and not all appropriate air agencies have approved the proposed inter-district emission reduction transfers. Therefore, Staff cannot conclude that the project would comply with NSR requirements at this time. However, if the applicant can obtain an additional quantity of NOx and VOC ERCs to meet a 1.5:1 ratio and if these could be located sufficiently near the project location, staff could conclude that the ozone precursor NSR requirements are met. In addition, if the district completes several steps to develop a rule allowing road paving for PM offsets, this portion of the NSR requirements would be met.

Additional Procedural Requirements Specified in Rule 1302:
Alternative siting: For sources requiring an analysis of alternative sites, sizes, and production processes and environmental control techniques, pursuant to Section 173 of the Federal CAA, the applicant must prepare an analysis functionally equivalent to requirements of Division 13, section 21000 et. seq. of the Public Resources Code. An alternatives analysis is contained in Section 4.0 of the AFC.

Visibility impacts analysis: Any new major source or major modification shall be subject to review of its impact on visibility in any mandatory Class I area in accordance with 40 CFR 51.307(b)(2). The Project is a major source; thus, a visibility impacts analysis is provided in Section 5.2.4.2 of the AFC.

Modeling: Emissions from a new or modified stationary source shall not make worse an exceedance of an AAQS. In making this determination, the AVAQMD will take into account increases in cargo carrier and secondary emissions and offsets provided pursuant to this rule. The Project emissions exceed the offset trigger levels and, therefore, modeling is required for the Project. A modeling analysis is presented in AFC Section 5.2.4.2.

Compliance certification: The owner or operator of a proposed new major source or major modification shall certify in writing that all major stationary sources owned or operated by such person (or by any entity controlling, controlled by, or under common control with such person) in California, and subject to emission limitations, are in compliance, or on a schedule for compliance, with all applicable emission limitations and standards. Because the Project is a major source of air pollutants, the compliance certification is required and will be provided to the AVAQMD.

AVAQMD Rule 1306 Electric Energy Generating Facilities - The AVAQMD will consider the AFC to be equivalent to an application pursuant to District Rule 1302(B) during the Determination of Compliance review, and will apply all applicable provisions of District Rule 1302 to the application. If the information contained in the AFC does not meet the requirements which would otherwise comprise a complete application pursuant to District Rule 1302(B)(1), the AVAQMD will, within 20 calendar days of receipt of the AFC, specify the information needed to render the application complete and so inform the CEC. The AFC meets the application requirements of Rule 1302.

AVAQMD Rule 1310 Federal Major Facilities and Federal Major Modifications - The provisions of this Rule apply to:

a) Any Federal Major Modification.

b) Any Presumptive Federal Major Modification or

c) Any Federal Major Facility which requests a Plant Wide Applicability Limit pursuant to the rule.

The Project is a new source, not a modification, and does not plan to request a Plant Wide Applicability Limit. Thus, this rule is not applicable.

Regulation XIV Toxics and Other Non-Criteria Pollutants

AVAQMD Rule 1401 New Source Review for Toxic Air Contaminants - The AVAQMD shall analyze the application and Comprehensive Emission Inventory Report for the emission units, determine what rules are applicable, calculate prioritization scores for carcinogenic effects, noncarcinogenic acute and chronic effects, require the preparation of a Health Risk Assessment (HRA), if needed, and then analyze the HRA to calculate the risk to the exposed population. Requirements for the installation of Best Available Control Technology for Toxics (T-BACT) can be imposed if the calculated risk exceeds the standards in the rule. If the calculated risk is considered significant, the permit will be denied. Compliance with Rule 1401 and a HRA are provided in AFC Section 5.10, Public Health, as well as in the Public Health section of this PSA.

Regulation XVII Prevention of Significant Deterioration

Regulation XVII would implement the federal PSD program, upon delegation by the EPA to the district. Because delegation has not occurred, the PSD permit for PHPP will be processed by the EPA and not the local air district under Regulation XVII.

Regulation XXX Title V Permits

Any new facility which is subject to this regulation shall submit an application for a federal operating permit no later than 12 months after commencing operations. As the Project will be a major source, subject to the federal operating permit program, it would apply for a Title V permit in a timely manner.

NOTEWORTHY PUBLIC BENEFITS

Projects that include renewable energy generation such as the PHPP are needed to meet California's mandated renewable energy goals. Projects that include dispatchable generation, such as PHPP, are needed support the California electricity grid as it moves to a high renewable, low GHG-emitting system.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments have been received for this project.

RESPONSE TO APPLICANT COMMENTS

The applicant provided comments on Volume 2 of the PHPP Preliminary Staff Assessment on March 9, 2010, and this staff assessment incorporates the necessary revisions. The applicant's comments and staff responses are provided below:

- **1a. Term Sheet for VOC and NOx ERCs Will Be Provided Under Confidential Cover (see page 2 of Applicant comments).** Staff Response: The Applicant provided a term sheet for their proposed ERCs. All ERCs contained in the applicant's term sheet are located in the San Joaquin Valley as shown in **Air Quality Table 15**.

  This term sheet is no longer confidential because it has been docketed it to this project. Staff's evaluation of ozone precursor emission ERCs is discussed fully under Operation Impacts and Mitigation.

- **1b. The PSA discussion raised concerns related to the basis of use of road paving ERCs in the AVAQMD (comment on page 2).** Staff Response: The Applicant proposes to obtain PM10 ERCs through a new AVAQMD Rule that would be modeled on the Mojave Desert Air Quality Management District (MDAQMD) Rule 1406. Staff evaluation of road paving ERCs is discussed fully under Operation Impacts and Mitigation.

- **2. The NOx discussion on page 4.1-24 indicates that the construction impacts analysis for PHPP results in high impacts in the hours close to sunrise and sunset, and hence mitigation similar to the Victorville 2 (VV2) Hybrid Power Project is needed to reduce the impacts to less than significant. The COC proposed for PHPP is more restrictive than the one approved for VV2, and hence we are requesting that the COC be consistent with the VV2 requirement (AQ-SC6) (comment on page 3).** Staff Response: The Applicant is correct in the assertion that COC **AQ-SC6** is more restrictive than the same condition for the VV2 project. However, the applicant in their comment requests that the dates for this measure be restricted to July 15 through August 30. In determining the dates where potential violations of the NO_2 standard could occur due to construction emissions, the Applicant provided a dispersion modeling analysis that showed potential NO_2 standard violations during the period of November 5 through February 15. Therefore, in response to Applicant's request, COC **AQ-SC6** has been modified to show the appropriate portion of the year for limiting constructions after sunrise and before sunset.

- **3. Comments on AQ-SC-9 and AQ-SC-10 (comment on page 3).** The Applicant has noted how the PHPP solar heat transfer system differs from the larger solar projects that have been reviewed by the Commission. Under the Applicant's preliminary design, the heat transfer fluid (HTF) system would not vent to the atmosphere, except through a pressure relief valve (PRV) during an emergency condition. AQ-SC-9 and AQ-SC-10 have been revised to make it clear that VOC emission controls would only be required in the event that the Applicant changes their preliminary design, with the HTF system having the potential to vent to the atmosphere.

- **4. Comments on AQ-SC-11, AQ-SC-14, AQ-SC-15 (comment on page 5).** The Applicant notes that their expected VOC emissions from their proposed closed loop HTF system would be extremely small, thus not necessitating the requirement of an enhanced leak detection and repair (LDAR) program. While the Commission has

generally required LDAR programs for large solar projects, differences in the PHPP design may be sufficient to limit VOC fugitive emissions. Therefore, these conditions were modified to only require the enhanced LDAR program if fugitive emissions, as measured by annual HTF fluid loss and replacement, exceed the Applicants estimate of 0.2 tons per year VOC.

- **5. Comments on AQ-SC-16 (comment pn page 6).** Staff concurs with the Applicant's editorial changes to this COC. The rewording clarifies requirements for reporting of annual heat-transfer fluid replacement volumes.

- **6. Comments on AQ-SC-18 (comment on page 7).** The Applicant disagrees with staff's use of SJVAPCD Rules and Regulations to develop a reasonable offset distance ratio. Staff recognizes that the AVAQMD does not utilize any distance ratios in Rule 1305, mainly due to the very small geographical extent of the district. However, the Applicant has proposed obtaining their NOx and VOC ERCs from the SJVAPCD. As noted in the response to Comment 1a above, staff believes that most of the proposed ERCs are too far away from the PHPP site to result in a net air quality benefit in the absence of the application of a reasonable ERC distance ratio, such as the ratio currently codified in SJVAPCD Rule 2201 and CH&SC Section 40709.6.

- **7. Comments on AQ-SC-19 (comment on page 7).** The Applicant notes that this condition incorrectly lists PM2.5 instead of PM10 in several locations. The references to PM2.5 have been corrected to list PM10.

- **8. Comments Regarding Timing of Conditions of Certification (comment on page 8).** The Applicant makes a reasonable case for changing the timing requirements for several Conditions of Certification, which would also be consistent with the timing for the Victorville 2 Project. In each case the timing was reduced to 60 days from 120 days prior to construction.

CONCLUSIONS

Staff concludes that the proposed Palmdale Hybrid Power Project (PHPP) would not comply with all applicable Laws, Ordinances, Regulations and Standards (LORS), nor would emissions from the proposed facility comply with California Environmental Quality Act (CEQA) requirements. In their final Determination of Compliance, the Antelope Valley Air Quality Management District (AVAQMD) determined that the project would comply with their applicable LORS, but staff does not agree. The rules needed to generate particulate matter offsets (PM10) are not yet adopted by AVAQMD nor are they approved by the Air Resources Board or the US Environmental Protection agency. In addition, staff concludes that a higher ozone precursor offset ratio is needed for CEQA purposes. Staff offers some additional Conditions of Certification which would overcome both of these problems. If all staff-recommended conditions are adopted by the Energy Commission, then staff concludes that both LORS and CEQA requirements would be met and staff would find:

- The project would comply with applicable Antelope Valley Air Quality Management District Rules and Regulations, including New Source Review requirements

(AVAQMD 2010).

- The project would not cause new violations of any NO_2, SO_2, or CO ambient air quality standards, and therefore, the project direct NOx, SOx and CO emission impacts are less than significant.
- Without proper mitigation, the project NOx and VOC emissions would potentially contribute to existing violations of the state 1-hour and the federal 8-hour ozone air quality standards. Staff has determined that emission offset credits from the Mojave Desert Air Basin (MDAB) and San Joaquin Valley Air Basin (SJVAB) could mitigate the project's ozone impact to a level that is less than significant, if the transfer credits are available and approved by the appropriate air agencies (**AQ-SC8**).
- The project PM10 emissions and PM10 precursor emissions of SOx would contribute to existing violations of the state's annual and 24-hour PM10 ambient air quality standards. However, staff has determined that emission reductions from paving of local roads (**AQ-SC9** could mitigate the project's PM10 and PM10 precursor emissions impacts to a level that is less than significant.

Global climate change and greenhouse gas (GHG) emissions from the project are discussed and analyzed in AIR QUALITY APPENDIX AIR-1. Because the project has not entered into a contract to sell electricity under prescribed conditions, staff cannot conclude whether the project would operate as a baseload facility requiring the purchaser of the electricity to demonstrate that the PHPP project could meet the limits of SB 1368 and the Emission Performance Standard (EPS). However, the PHPP project would meet the EPS under all reasonable operating scenarios. Mandatory reporting of the GHG emissions is required as part of the Air Resources Board's greenhouse gas regulations. The project may be subject to additional reporting requirements and other GHG reduction requirements as GHG regulations become more fully developed and implemented.

No Conditions of Certification related to greenhouse gas emissions are proposed. The project owner would comply with mandatory ARB GHG emissions reporting regulations (California Code of Regulations, tit. 17, section 95100 et. seq.). See Air Quality Appendix Air-1 for details.

PROPOSED CONDITIONS OF CERTIFICATION

STAFF-RECOMMENDED CONDITIONS OF CERTIFICATION

Listed below are staff's recommended Conditions of Certification (COC). The applicant has also proposed COCs similar to staff. However, staff has augmented these COCs, where necessary, and has also included additional COCs to address several potential impacts that are unique to solar facilities.

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 AQ-SC3, AQ-SC4 and AQ-SC5 for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and

AQCMM Delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the Compliance Project Manager (CPM).

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit to the 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 AQ-SC3, AQ-SC4, AQ-SC5, AQ-SC6, AQ-SC7 and AQ-SC8.

Verification: At least 60 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the CPM for approval. The District will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt.

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the CPM in each Monthly Compliance Report that demonstrates compliance with the following mitigation measures for the purposes of minimizing fugitive dust emissions created from construction activities and preventing all fugitive dust plumes from leaving the project. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

A. The main access road through the facility to the Main Services Complex will be paved prior to initiating construction in the Main Services Complex, 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, with or without the use of geotextiles, that can be determined to be both as efficient or more efficient for fugitive dust control as ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control. All other disturbed areas in the project and linear construction sites shall be watered as frequently as necessary during grading and stabilized with a non-toxic soil stabilizer or soil weighting agent to comply with the dust mitigation objectives of Condition of Certification **AQ-SC4**. The frequency of watering can be reduced or eliminated during periods of precipitation.

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

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

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

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

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

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

I. Construction areas adjacent to any paved roadway 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 at least twice daily (or 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 at least twice daily (or 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 (MCR) to include:

1. A summary of all actions taken to maintain compliance with this condition;
2. Copies of any complaints filed with the District in relation to project construction; and
3. Any other documentation deemed necessary by the CPM, District or AQCMM to

verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC4 Dust Plume Response Requirement: The AQCMM or an AQCMM Delegate shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (1) off the project site or (2) 200 feet beyond the centerline of the construction of linear facilities or (3) within 100 feet upwind of any regularly occupied structures not owned by the project owner indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMP shall include a section detailing how the additional mitigation measures will be accomplished within the time limits specified. The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

Step 1: The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if step 1 specified above fails to result in adequate mitigation within 30 minutes of the original determination.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if step 2, specified above, fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The owner/operator may appeal to the CPM or District any directive from the AQCMM or Delegate to shut down an activity, provided that the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM or District before that time.

Verification: The AQCMM shall provide the CPM a MCR to include:

1. A summary of all actions taken to maintain compliance with this condition;
2. Copies of any complaints filed with the District in relation to project construction; and
3. Any other documentation deemed necessary by the CPM or AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM, in the MCR, a construction mitigation report that demonstrates compliance with the following mitigation measures for purposes of controlling diesel construction-related emissions. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

A. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine

meets the conditions set forth herein.

B. All construction diesel engines with a rating of 50 hp or higher shall meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good faith effort to the satisfaction of the CPM that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. This good faith effort shall be documented with signed written correspondence by the appropriate construction contractors along with documented correspondence with at least two construction equipment rental firms. In the event that a Tier 3 engine is not available for any off-road equipment larger than 50 hp, that equipment shall be equipped with a Tier 2 engine, or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 2 levels unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is “not practical” for the following, as well as other, reasons.

   1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier 2 equivalent emission levels and the highest level of available control using retrofit or Tier 1 engines is being used for the engine in question; or
   2. The construction equipment is intended to be on site for 5 days or less.
   3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not practical.

C. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and that a replacement for the equipment item in question meeting the controls required in item “B” occurs within 10 days of termination of the use, if the equipment would be needed to continue working at this site for more than 15 days after the use of the retrofit control device is terminated, if one of the following conditions exists :

   1. The use of the retrofit control device is excessively reducing the normal availability of the construction equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.
   2. The retrofit control device is causing or is reasonably expected to cause engine damage.
   3. The retrofit control device is causing or is reasonably expected to cause a substantial risk to workers or the public.
   4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.

D. All heavy earth-moving equipment and heavy duty construction-related trucks with engines meeting the requirements of (B) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

E. All diesel heavy construction equipment shall not idle for more than five minutes. Vehicles that need to idle as part of their normal operation (such as concrete trucks) are exempted from this requirement.

F. Construction equipment will employ electric motors when feasible.

Verification*:* The AQCMM shall include in the MCR:

1. A summary of all actions taken to maintain compliance with this condition,
2. A list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained, and
3. Any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC6 Except for minor activities as allowed by the AQCMM, such as cement pours, construction activities shall be limited to the hours between one hour after sunrise and one hour before sunset from November 5 through February 15. Construction activities taking place from February 16 through November 4 shall be limited to the hours between one hour after sunrise and thirty (30) minutes before sunset.

Verification: The project owner shall include in the MCR a summary of all actions taken to maintain compliance with this condition.

AQ-SC7 The project owner, when obtaining dedicated vehicles for mirror washing activities and other facility maintenance activities, shall only obtain vehicles that meet California on-road vehicle emission standards or appropriate U.S. EPA/California off-road engine emission standards for the latest model year available when obtained. The plan required in AQ-SC 2 shall describe the approach the facility owner will use to meet this condition.

Other vehicle/fuel types may be allowed assuming that the emission profile for those vehicles, including fugitive dust generation emissions, is comparable to the vehicles types identified in this condition.

Verification: At least 30 days prior to the start of commercial production, the project owner shall submit to the CPM a copy of the plan that identifies the size and type of the on-site vehicle and equipment fleet and the vehicle and equipment purchase orders and contracts and/or purchase schedule. The plan shall be updated every other year and submitted in the Annual Compliance Report.

AQ-SC8 The project owner shall provide a site operations dust control plan, including all applicable fugitive dust control measures identified in **AQ-SC3** that would be applicable to reducing fugitive dust from ongoing operations; that:

A. describes the active operations and wind erosion control techniques such as windbreaks and chemical dust suppressants, including their ongoing maintenance procedures, that shall be used on areas that could be disturbed by vehicles or wind anywhere within the project boundaries; and

B. identifies the location of signs throughout the facility that will limit traveling on unpaved portion of roadways to solar equipment maintenance vehicles only. In addition, vehicle speed shall be limited to no more than 10 miles per hour on these unpaved roadways, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

The site operations fugitive dust control plan shall include the use of durable non-toxic soil stabilizers on all regularly used unpaved roads and disturbed off-road areas 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, with or without the use of geotextiles, that can be determined to be both as or more efficient for fugitive dust control than ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control.

The performance and application of the fugitive dust controls shall also be measured against and meet the performance requirements of condition **AQ-SC4**. The performance requirements of **AQ-SC4** shall also be included in the operations dust control plan.

Verification: At least 30 days prior to start of commercial operation, the project owner shall submit to the CPM and the District for review and approval a copy of the 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-SC9 Except for emergency pressure relief valves (PRV), each HTF tank shall be connected to a volatile organic compound (VOC) vapor control system at any point where the system can vent to the atmosphere.

Verification: At least 60 days prior to HTF system construction, the project owner shall provide the CPM drawings signed by a registered mechanical engineer showing compliance with this condition and shall also make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-SC10 HTF expansion vessel shall be gas tight and vent to a vapor control system

with a 99% control efficiency for any non-PRV location.

Verification: At least 60 days prior to HTF system construction, the project owner shall provide the CPM drawings signed by a registered mechanical engineer showing compliance with this condition and shall also make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission

AQ-SC11 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 period.

B. The project owner shall maintain record of the amount of HTF replaced on a monthly basis for a period of five years. Should HTF loss exceed the Applicants estimate of 0.2 tons per year, the project owner shall implement the following leak detection and repair measures:

   a. 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.

   b. VOC leaks greater than 100-ppmv shall be tagged (with date and concentration) and repaired within seven calendar days of detection.

   c. VOC leaks greater than 10,000-ppmv shall be tagged and repaired within 24-hours of detection.

   d. The project owner shall maintain a log of all VOC leaks exceeding 10,000-ppmv, including location, component type, and repair made.

   e. Any detected leak exceeding 100-ppmv and not repaired in 7-days and 10,000-ppmv not repaired within 24-hours shall constitute a violation of the District's Authority to Construct (ATC)/Permit to Operate (PTO).

C. Pressure sensing equipment shall be installed that will be capable of sensing a major rupture or spill within the HTF network.

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-SC12 Each expansion tank shall have fixed roof without holes, tears, or other such openings, except pressure/vacuum (PV) valves, in the cover which allow the emission of VOC.

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-SC13 All expansion tank hatches shall be kept closed and gap-free, except during

maintenance, inspection, or repair.

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-SC14 Expansion tank roof appurtenances shall not exhibit emissions exceeding 10,000-ppmv as methane measured with an instrument calibrated with methane and conducted in accordance with U.S. Method 21.

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-SC15 Each expansion tank shall be maintained leak-free. A "leak" is defined as the dripping of liquid volatile organic compounds at a rate of three or more drops per minute, or vapor volatile organic compounds in excess of 10,000-ppm as equivalent methane as determined by EPA Test Method 21.

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-SC16 Project owner shall provide District with total HTF volume required for solar power plant and annual volume of HTF replaced at the facility.

Verification: As part of the Annual Compliance Report the project owner shall include information on HTF total volume and annual usage rates to demonstrate compliance with this condition.

AQ-SC17 The project owner shall provide the CPM copies of any District issued Authority-to-Construct (ATC) and Permit-to-Operate (PTO) 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 air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. EPA, and any revised permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any ATC, PTO, and any proposed air permit modification to the CPM within five working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

AQ-SC18 The project owner shall demonstrate to the satisfaction of the CPM that adequate emission reduction credits have been purchased prior to start of construction of the project. The project emissions of 115 and 40 tons per year of NOx and VOC, respectively, shall be offset at a ratio of 1.3 to one for ERC's within the MDAB or areas in the SJVAB that are within 15 miles of the AVAQMD western boundary (149.5 and 52 tons per year for NOx and VOC, respectively). If ERCs are obtained from locations greater than 15 miles from the western portion of the AVAQMD, an offset ratio of 1.5 to one shall be

utilized for those offsets.

Verification: The project owner shall submit to the CPM a copy of all ERCs to be surrendered to the District at least 60 days prior to start construction. Construction shall not begin until the CPM has approved all ERCS. This approval shall be done in consultation with the District.

AQ-SC19 Once the District has adopted one or more rules to bank PM offsets from roadpaving, the project owner shall pave, with asphalt concrete that meets the current county road standards, unpaved local roads to provide emission reductions of 137 tons per year of PM10, prior to start construction of the project. Calculations of PM10 emission reduction credits shall be performed in accordance with Sections 13.2.1 and 13.2.2 of the U.S. EPA's AP-42 "Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources", Fifth Edition.

Verification: At least one year prior to start construction, the project owner shall submit to the CPM plans and other documents to demonstrate compliance with this condition. Construction shall not begin until the CPM has approved all ERCS. This approval shall be done in consultation with the District. Documents shall include a list and pictures of candidate roads to be paved, their actual daily average traffic count including classifications of vehicles (ADT), and daily vehicle miles travel (DVMT), their actual road dust silt content, and calculations showing the appropriate amount of emissions reductions due to paving of each road segment. All paving of roads shall be complete at least 15 days prior to start construction of the project.

AQ-SC20 The project owner shall minimize emissions associated with the simultaneous commissioning of the combustion turbines and not exceed NOx emissions of 250 pounds per hour.

Verification: The project owner shall provide operating records in monthly compliance reports to document compliance with this condition.

DISTRICT'S PERMIT CONDITIONS

COMBUSTION TURBINE GENERATOR POWER BLOCK AUTHORITY TO CONSTRUCT CONDITIONS

[2 individual 1736.4 MMBtu/hr F Class Gas Combustion Turbine Generators, Application Numbers: 00010013 and 00010014]

AQT-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: Not necessary.

AQT-2. This equipment shall be exclusively fueled with pipeline quality natural gas with a sulfur content not exceeding 0.2 grains per 100 dscf on a rolling twelve month average basis, and shall be operated and maintained in strict accord with the recommendations of its manufacturer or supplier and/or sound

engineering principles. Compliance with this limit shall be demonstrated by providing evidence of a contract, tariff sheet or other approved documentation that shows that the fuel meets the definition of pipeline quality gas.

Verification: The project owner shall complete, on a monthly basis, a laboratory analysis showing the sulfur content of natural gas being burned at the facility. The sulfur analysis reports shall be incorporated into the quarterly compliance reports.

AQT-3. This equipment is subject to the Federal NSPS codified at 40 CFR Part 60, Subparts A (General Provisions) and KKKK (Standards of Performance for New Stationary Gas Turbines). This equipment is also subject to the Prevention of Significant Deterioration (40 CFR 51.166) and Federal Acid Rain (Title IV) programs. Compliance with all applicable provisions of these regulations is required.

Verification: The project owner shall provide the District, the ARB and the CPM copies of the federal PSD and Acid Rain permits no later than 30 days after their issuance.

AQT-4. Emissions from this equipment (including its associated duct burner) shall not exceed the following emission limits at any firing rate, except for CO, NOx and VOC during periods of startup, shutdown and malfunction:

a. Hourly rates, computed every 15 minutes, verified by CEMS and annual compliance tests:

   i. NOx as NO2 – 16.60 lb/hr (based on 2.0 ppmvd corrected to 15% O2 and averaged over one hour)

   ii. CO – 15.15 lb/hr (based on 2.0 ppmvd (3.0 ppmvd with duct firing) corrected to 15% O2 and averaged over one hour)

b. Hourly rates, verified by annual compliance tests or other compliance methods in the case of SOx:

   i. VOC as CH4 – 5.80 lb/hr (based on 1.4 ppmvd (2.0 ppmvd with duct firing) corrected to 15% O2)

   ii. SOx as SO2 – 1.29 lb/hr (based on 0.2 grains/100 dscf fuel sulfur)

   iii. PM10 – 18.0 lb/hr

Verification: The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQT-17**

AQT-5. Emissions of CO and NOx from this equipment shall only exceed the limits contained in Condition AQT-4 during startup and shutdown periods as follows:

a. Startup is defined as the period beginning with ignition and lasting until the equipment has reached operating permit limits, i.e., the applicable emission limits listed in Condition AQT-4. Cold startup is defined as a startup when the CTG has not been in operation during the preceding continuous 48 hours, although a startup after an aborted partial cold start is still considered a cold start. Other startup is defined as a startup that is

not a cold startup. Shutdown is defined as the period beginning with the lowering of equipment from base load and lasting until fuel flow is completely off and combustion has ceased.

b. Transient conditions shall not exceed the following durations:

   i. Cold startup – 110 minutes

   ii. Other startup – 80 minutes

   iii. Shutdown – 30 minutes

c. During a cold startup emissions shall not exceed the following, verified by CEMS:

   i. NOx – 96 lb

   ii. CO – 410 lb

d. During any other startup emissions shall not exceed the following, verified by CEMS:

   i. NOx – 40 lb

   ii. CO – 329 lb

e. During a shutdown emissions shall not exceed the following, verified by CEMS:

   i. NOx – 57 lb

   ii. CO – 337 lb

Verification: The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQT-17**.

AQT-6. Emissions from this facility, including the duct burner, auxiliary equipment, engines, cooling tower, shall not exceed the following emission limits, based on a calendar day summary:

a. NOx – 1359 lb/day, verified by CEMS

b. CO – 4833 lb/day, verified by CEMS

c. VOC as CH4 – 577 lb/day, verified by compliance tests and hours of operation in mode

d. SOx as SO2 – 64 lb/day, verified by fuel sulfur content and fuel use data

e. PM10 – 931 lb/day, verified by compliance tests and hours of operation

Verification: The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQT-17**.

AQT-7. Emissions from this facility, including the duct burner, auxiliary equipment, engines, cooling tower and fugitive dust for vehicle use in the solar field, shall not exceed the following emission limits, based on a rolling 12 month summary:

a. NOx – 115 tons/year, verified by CEMS

b. CO – 255 tons/year, verified by CEMS

c. VOC as CH4 – 40 tons/year, verified by compliance tests and hours of operation in mode

d. SOx as SO2 – 9 tons/year, verified by fuel sulfur content and fuel use data

e. PM10 – 128 tons/year, verified by compliance tests and hours of operation

f. PM2.5 – 125 tons/year, verified by compliance tests and hours of operation

Verification: The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQT-17**.

AQT-8. Particulate emissions from this equipment shall not exceed an opacity equal to or greater than 20% for a period aggregating more than three (3) minutes in any one (1) hour, excluding uncombined water vapor.

Verification: The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQT-17**.

AQT-9. This equipment shall exhaust through a stack at a minimum height of 145 feet.

Verification: At least 60 days prior to construction of the turbine stacks, the project owner shall provide the District and CPM an "approved for construction" drawing showing the appropriate stack height and location of sampling ports and platforms. The project owner shall make the site available to the District, EPA and the CPM for inspection.

AQT-10. The owner/operator (o/o) shall not operate this equipment after the initial commissioning period without the oxidation catalyst with valid District permit C00nnnn[4] and the selective catalytic reduction system with valid District permit C00nnnn[5] installed and fully functional, i.e., enables the combustion turbines to meet the emission limits listed in condition AQT-4.

Verification: As part of the quarterly and annual compliance reports, the project owner shall provide information on any major problem in the operation of the oxidizing catalyst and SCR Systems for the gas turbines and HRSGs. The information shall include, at a minimum, the date and description of the problem and the steps taken to resolve the problem.

AQT-11. The o/o shall provide stack sampling ports and platforms necessary to perform source tests required to verify compliance with District rules, regulations and permit conditions. The location of these ports and platforms shall be subject to District approval.

Verification: At least 60 days prior to construction of the turbine stacks, the project owner shall provide the District and CPM an "approved for construction" drawing

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[4] As shown in FDOC, permit number yet to be assigned.
[5] As shown in FDOC, permit number yet to be assigned.

showing the appropriate stack height and location of sampling ports and platforms. The project owner shall make the site available to the District, EPA and CEC staff for inspection.

AQT-12. Emissions of NOx, CO, oxygen and ammonia slip shall be monitored using a Continuous Emissions Monitoring System (CEMS). Turbine fuel consumption shall be monitored using a continuous monitoring system. Stack gas flow rate shall be monitored using either a Continuous Emission Rate Monitoring System (CERMS) meeting the requirements of 40 CFR 75 Appendix A or a stack flow rate calculation method. The o/o shall install, calibrate, maintain, and operate these monitoring systems according to a District-approved monitoring plan and AVAQMD Rule 218, and they shall be installed prior to initial equipment startup after initial steam blows are completed. Two (2) months prior to installation the operator shall submit a monitoring plan for District review and approval. The o/o shall notify the APCO and the USEPA of the date of first fire and the date of initial commercial operation of each affected unit.

Verification: The o/o shall install, calibrate, maintain, and operate these monitoring systems according to a District-approved monitoring plan and MDAQMD Rule 218, and they shall be installed prior to initial equipment startup after initial steam blows are completed. Two (2) months prior to installation the operator shall submit a monitoring plan for District review and approval.

AQT-13. The o/o shall conduct all required compliance/certification tests in accordance with a District-approved test plan. Thirty (30) days prior to the compliance/certification tests the operator shall provide a written test plan for District review and approval. Written notice of the compliance/certification test shall be provided to the District ten (10) days prior to the tests so that an observer may be present. A written report with the results of such compliance/certification tests shall be submitted to the District within forty-five (45) days after testing.

Verification: The project owner shall notify the District and the CPM within ten (10) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

AQT-14. The o/o shall perform the following annual compliance tests on this equipment in accordance with the AVAQMD 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. NOx as NO2 in ppmvd at 15% oxygen and lb/hr (measured per USEPA Reference Methods 19 and 20).

b. VOC as CH4 in ppmvd at 15% oxygen and lb/hr (measured per USEPA Reference Methods 25A and 18).

c. SOx as SO2 in ppmvd at 15% oxygen and lb/hr.

d. CO in ppmvd at 15% oxygen and lb/hr (measured per USEPA Reference

Method 10).

e. PM10 and PM2.5 in mg/m3 at 15% oxygen and lb/hr (measured per USEPA Reference Methods 5 and 202 or CARB Method 5).

f. Flue gas flow rate in dscf per minute.

g. Opacity (measured per USEPA reference Method 9).

h. Ammonia slip in ppmvd at 15% oxygen.

Verification: The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

AQT-15. The o/o shall, at least as often as once every five years (commencing with the initial compliance test), include the following supplemental source tests in the annual compliance testing:

a. Characterization of cold startup VOC emissions;

b. Characterization of other startup VOC emissions; and

c. Characterization of shutdown VOC emissions.

Verification: The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

AQT-16. Continuous monitoring systems shall meet the following acceptability testing requirements from 40 CFR 60 Appendix B (or otherwise District approved):

a. For NOx, Performance Specification 2.

b. For O2, Performance Specification 3.

c. For CO, Performance Specification 4.

d. For stack gas flow rate, Performance Specification 6 (if CERMS is installed).

e. For ammonia, a District approved procedure that is to be submitted by the o/o.

f. For stack gas flow rate (without CERMS), a District approved procedure that is to be submitted by the o/o.

Verification: At least 60 days prior to construction of the turbine stacks, the project owner shall provide the District and CPM, for approval, a detailed drawing and a plan on how the measurements and recordings, required by this condition, will be performed by the chosen monitoring system.

AQT-17. The o/o shall submit to the APCO and USEPA Region IX the following information for the preceding calendar quarter by January 30, April 30, July 30 and October 30 of each year this permit is in effect. Each January 30 submittal shall include a summary of the reported information for the previous

year. This information shall be maintained on site and current for a minimum of five (5) years and shall be provided to District personnel on request:

a. Operating parameters of emission control equipment, including but not limited to ammonia injection rate, NOx emission rate and ammonia slip.

b. Total plant operation time (hours), duct burner operation time (hours), number of startups, hours in cold startup, hours in other startup, and hours in shutdown.

c. Date and time of the beginning and end of each startup and shutdown period.

d. Average plant operation schedule (hours per day, days per week, weeks per year).

e. All continuous emissions data reduced and reported in accordance with the District approved CEMS protocol.

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

g. Fuel sulfur content (monthly laboratory analyses, monthly natural gas sulfur content reports from the natural gas supplier(s), or the results of a custom fuel monitoring schedule approved by USEPA for compliance with the fuel monitoring provisions of 40 CFR 60 Subpart KKKK and 40 CFR Part 72 as applicable)

h. A log of all excess emissions, including the information regarding malfunctions/breakdowns required by Rule 430.

i. Any permanent changes made in the plant process or production which would affect air pollutant emissions, and indicate when changes were made.

j. Any maintenance to any air pollutant control system (recorded on an as-performed basis).

Verification: The project owner shall prepare quarterly reports for the preceding calendar quarters by January 30, April 30, July 30 and October 30 with the January 30 report including an annual summary. The reports shall be submitted to the District, EPA and the CPM.

AQT-18. The o/o must surrender to the District sufficient valid Emission Reduction Credits for this equipment before the start of construction of any part of the project for which this equipment is intended to be used. In accordance with Regulation XIII the operator shall obtain 150 tons of NOx, 52 tons of VOC, and 128 tons of PM10 offsets.

Verification: The project owner shall submit to the CPM a copy of all ERCs to be surrendered to the District at least 60 days prior to start construction.

AQT-19. During an initial commissioning period of no more than 180 days, commencing with the first firing of fuel in this equipment, NOx, CO, VOC and ammonia concentration limits shall not apply. The o/o shall minimize emission

of NOx, CO, VOC and ammonia to the maximum extent possible during the initial commissioning period.

Verification: The project owner shall submit a MCR to the CPM specifying how this condition is being complied with. In addition, the project owner shall provide evidence of the District's approval of the emission monitoring system to the CPM prior to first firing of the gas turbines.

AQT-20. The o/o shall tune each CTG and HRSG to minimize emissions of criteria pollutants at the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor.

Verification: The project owner shall submit a MCR to the CPM specifying how this condition is being complied with. In addition, the project owner shall provide evidence of the District's approval of the emission monitoring system to the CPM prior to first firing of the gas turbines.

AQT-21. The o/o shall install, adjust and operate each SCR system to minimize emissions of NOx from the CTG and HRSG at the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor. The NOx and ammonia concentration limits shall apply coincident with the steady state operation of the SCR systems.

Verification: The project owner shall submit a MCR to the CPM specifying how this condition is being complied with. In addition, the project owner shall provide evidence of the District's approval of the emission monitoring system to the CPM prior to first firing of the gas turbines.

AQT-22. The o/o shall submit a commissioning plan to the District and the CEC at least four weeks prior to the first firing of fuel in this equipment. The commissioning plan shall describe the procedures to be followed during the commissioning of the CTGs, HRSGs and steam turbine. The commissioning plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the dry low NOx combustors, the installation and testing of the CEMS, and any activities requiring the firing of the CTGs and HRSGs without abatement by an SCR system.

Verification: The project owner shall submit a MCR to the CPM specifying how this condition is being complied with.

AQT-23. The total number of firing hours of each CTG and HRSG without abatement of NOx by the SCR shall not exceed 624 hours during the initial commissioning period. Such operation without NOx abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system in place and operating. Upon completion of these activities, the o/o shall provide written notice to the District and CEC and the unused balance of the unabated firing hours shall expire.

Verification: The project owner shall submit a MCR to the CPM specifying how this

condition is being complied with.

AQT-24. During the initial commissioning period, emissions from this facility shall not exceed the following emission limits (verified by CEMS):

a. NOx - 32 tons, and 242 pounds/hour/CTG

b. CO - 118 tons, and 1337 pounds/hour/CTG

Verification: The project owner shall submit a MCR to the CPM specifying how this condition is being complied with.

AQT-25. Within 60 days after achieving the maximum firing rate at which the facility will be operated, but not later than 180 days after initial startup, the operator shall perform an initial compliance test. This test shall demonstrate that this equipment is capable of operation at 100% load in compliance with the emission limits in Condition 4.

Verification: No later than 30 working days before the commencement of the source tests, the project owner shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. In addition, the source tests shall include a minimum of three start-up and three shutdown periods and shall include at least one cold start, and one hot or warm start. The project owner shall incorporate the District and CPM comments into the test plan. The project owner shall notify the District and the CPM at least seven (7) working days prior to the planned source testing date. Source test results shall be submitted to the District and the CPM within 60 days of the source testing date.

AQT-26. The initial compliance test shall include tests for the following. The results of the initial compliance test shall be used to prepare a supplemental health risk analysis if required by the District:

a. PAH;

b. Certification of CEMS and CERMS (or stack gas flow calculation method) at 100% load, startup modes and shutdown mode;

c. Characterization of cold startup VOC emissions;

d. Characterization of other startup VOC emissions; and

e. Characterization of shutdown VOC emissions.

Verification: No later than 30 working days before the commencement of the source tests, the project owner shall submit to the District and the CPM a detailed source test plan designed to satisfy the requirements of this condition. Source test results shall be submitted to the District and the CPM within 60 days of the source testing date.

HRSG DUCT BURNER AUTHORITY TO CONSTRUCT CONDITIONS

[2 individual 424.3 MMBtu/hr Natural Gas Duct Burners, Application Numbers: 00000000 and 00000000]

AQDB-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: Not necessary.

AQDB-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 complete, on a monthly basis, a laboratory analysis showing the sulfur content of natural gas being burned at the facility. The sulfur analysis reports shall be incorporated into the quarterly compliance reports.

AQDB-3. The duct burner shall not be operated unless the combustion turbine generator with valid District permit #, catalytic oxidation system with valid District permit #, and selective catalytic NOx reduction system with valid District permit # are in operation.[6]

Verification: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQDB-4. This equipment shall not be operated for more than 2000 hours per rolling twelve month period.

Verification: The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQT-17**.

AQDB-5. Monthly hours of operation for this equipment shall be recorded and maintained on site for a minimum of five (5) years and shall be provided to District personnel on request.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

OXIDATION CATALYST SYSTEM AUTHORITY TO CONSTRUCT CONDITIONS

[2 individual oxidation catalyst systems, Application Numbers: 0010011 and 0010012]

AQOC-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: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQOC-2. This equipment shall be operated and maintained in strict accord with the recommendations of its manufacturer or supplier and/or sound engineering principles.

Verification: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

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[6] As represented in FDOC; all permit numbers yet to be assigned.

AQOC-3. This equipment shall be operated concurrently with the combustion turbine generator with valid District permit B00nnnn.[7]

Verification: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

SELECTIVE CATALYTIC REDUCTION SYSTEM AUTHORITY TO CONSTRUCT CONDITIONS

[2 individual SCR systems, Application Numbers: 0010011 and 0010012]

AQSCR-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: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQSCR-2. This equipment shall be operated and maintained in strict accord with the recommendations of its manufacturer or supplier and/or sound engineering principles.

Verification: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQSCR-3. This equipment shall be operated concurrently with the combustion turbine generator with valid District permit B00nnnn.[8]

Verification: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQSCR-4. Ammonia shall be injected whenever the selective catalytic reduction system has reached or exceeded 550° Fahrenheit except for periods of equipment malfunction. Except during periods of startup, shutdown and malfunction, ammonia slip shall not exceed 5 ppmvd (corrected to 15% O2), averaged over three hours.

Verification: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQSCR-5. Ammonia injection by this equipment in pounds per hour shall be recorded and maintained on site for a minimum of five (5) years and shall be provided to AVAQMD personnel on request.

Verification: During site inspection, the project owner shall make all records and

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[7] As represented in FDOC; permit number to be assigned.
[8] As represented in FDOC; permit number to be assigned.

reports available to the District, ARB, EPA and CPM.

COOLING TOWER AUTHORITY TO CONSTRUCT CONDITIONS

[One Cooling Tower, Application Number: 0010019]

AQCT-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: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQCT-2. This equipment shall be operated and maintained in strict accord with the recommendations of its manufacturer or supplier and/or sound engineering principles.

Verification: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQCT-3. The drift rate shall not exceed 0.0005% with a maximum circulation rate of 130,000 gallons per minute. The maximum hourly PM10 emission rate shall not exceed 1.63 pounds per hour, as calculated per the written District-approved protocol.

Verification: The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQT-17**.

AQCT-4. The operator shall perform weekly tests of the blow-down water total dissolved solids (TDS). The TDS shall not exceed 5000 ppm on a calendar monthly basis. 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.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

AQCT-5. 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.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

AQCT-6. 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.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

AUXILIARY BOILER AUTHORITY TO CONSTRUCT CONDITIONS

[One 110 MMBtu/hr Gas Fired Auxiliary Boiler, Application Number: 0010018]

AQAB-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: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQAB-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: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQAB-3. This equipment is subject to the Federal NSPS codified at 40 CFR Part 60, Subparts A (General Provisions) and Db (Industrial-Commercial-Institutional Steam Generating Units).

Verification: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

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

a. NOx as NO2 – 1.21 lb/hr (based on 9.0 ppmvd corrected to 3% O2 and averaged over one hour)

b. CO – 4.05 lb/hr (based on 50 ppmvd corrected to 3% O2 and averaged over one hour)

c. VOC as CH4 – 0.59 lb/hr

d. SOx as SO2 – 0.06 lb/hr (based on 0.2 grains/100 dscf fuel sulfur)

e. PM10 – 0.82 lb/hr (front and back half)

Verification: The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQT-17**.

AQAB-5. This equipment shall not be operated for more than 500 hours per rolling twelve month period.

Verification: The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQT-17**.

AQAB-6. The o/o 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 per month, by month);

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

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

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

AQAB-7. The o/o shall perform the following annual compliance tests on this equipment in accordance with the AVAQMD 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. NOx as NO2 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 19 and 20).

b. VOC as CH4 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 25A and 18).

c. SOx as SO2 in ppmvd at 3% oxygen and lb/hr.

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

e. PM10 in mg/m3 at 3% oxygen and lb/hr (measured per USEPA Reference Methods 5 and 202 or CARB Method 5).

f. Flue gas flow rate in dscf per minute.

g. Opacity (measured per USEPA reference Method 9).

Verification: The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

HTF HEATER AUTHORITY TO CONSTRUCT CONDITIONS

[One 40 MMBtu/hr Gas Fired HTF Heater, Application Number: 0010017]

AQHH-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: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQHH-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: As part of the quarterly and annual compliance reports, the project

owner shall include information on the date, time, and duration of any violation of this permit condition.

AQHH-3. Emissions from this equipment shall not exceed the following hourly emission limits at any firing rate, verified by fuel use and annual compliance tests:

a. NOx as NO2 – 0.44 lb/hr (based on 9.0 ppmvd corrected to 3% O2 and averaged over one hour)

b. CO – 1.47 lb/hr (based on 50 ppmvd corrected to 3% O2 and averaged over one hour)

c. VOC as CH4 – 0.22 lb/hr

d. SOx as SO2 – 0.02 lb/hr (based on 0.2 grains/100 dscf fuel sulfur)

e. PM10 – 0.30 lb/hr (front and back half)

Verification: The project owner shall submit to the District and CPM the quarterly and annual compliance reports as required by **AQT-17**.

AQHH-4. This equipment shall not be operated for more than 1000 hours per rolling twelve month period.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

AQHH-5. The o/o 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 per month, by month);

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

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

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

AQHH-6. The o/o shall perform the following annual compliance tests on this equipment in accordance with the AVAQMD 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. NOx as NO2 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 19 and 20).

b. VOC as CH4 in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 25A and 18).

c. SOx as SO2 in ppmvd at 3% oxygen and lb/hr.

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

e. PM10 in mg/m3 at 3% oxygen and lb/hr (measured per USEPA Reference Methods 5 and 202 or CARB Method 5).

f. Flue gas flow rate in dscf per minute.

g. Opacity (measured per USEPA reference Method 9).

Verification: The project owner shall notify the District and the CPM within seven (7) working days before the execution of the source tests required in this condition. Source test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

EMERGENCY GENERATOR AUTHORITY TO CONSTRUCT CONDITIONS

[One 2683 hp emergency IC engine driving a generator, Application Number: 0010015]

AQEG-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: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQEG-2. 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.

Verification: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQEG-3. This unit shall be limited to use for emergency power, defined as when commercially available power has been interrupted. In addition, this unit may be operated as part of a testing program that does not exceed 50 hours of testing or maintenance per calendar year.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

AQEG-4. This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 15 ppm on a weight basis per CARB Diesel or equivalent requirements. Note, a fuel switch to an alternative liquid fuel may be subject to permit applicability and must be processed accordingly.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

AQEG-5. A non-resettable four digit hour timer shall be installed and maintained on this

unit to indicate elapsed engine operating time.

Verification: At least 60 days prior to installation, the project owner shall provide the District and CPM an "approved for construction" drawing showing the appropriate hour timer. The project owner shall make the site available to the District, EPA and CPM for inspection.

AQEG-6. The owner/operator shall maintain a log for this unit, which, at a minimum, contains the information specified below. This log shall be maintained current and on-site for a minimum of five (5) years and shall be provided to District personnel on request:

a. Date of each use or test;

b. Duration of each use or test in hours;

c. Reason for each use;

d. Cumulative calendar year use, in hours; and,

e. Fuel sulfur concentration (the o/o may use the supplier's certification of sulfur content if it is maintained as part of this log).

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

AQEG-7. This equipment shall comply with the applicable requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115).

Verification: At least 60 days prior to installation, the project owner shall provide the District and CPM an "approved for construction" drawing showing the engine specifications. The project owner shall make the site available to the District, EPA and CPM for inspection.

EMERGENCY FIRE SUPPRESSION WATER PUMP AUTHORITY TO CONSTRUCT CONDITIONS

[One 182 hp emergency IC engine driving a fire suppression water pump, Application Number: 0010016]

AQFS-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: As part of the quarterly and annual compliance reports, the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQFS-2. 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.

Verification: As part of the quarterly and annual compliance reports, the project

owner shall include information on the date, time, and duration of any violation of this permit condition.

AQFS-3. This unit shall be limited to use for emergency fire fighting. In addition, this unit may be operated as part of a testing program that does not exceed 50 hours of testing or maintenance per calendar year.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

AQFS-4. This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 15 ppm on a weight basis per CARB Diesel or equivalent requirements. Note, a fuel switch to an alternative liquid fuel may be subject to permit applicability and must be processed accordingly.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

AQFS-5. A non-resettable four digit hour timer shall be installed and maintained on this unit to indicate elapsed engine operating time.

Verification: At least 60 days prior to installation, the project owner shall provide the District and CPM an "approved for construction" drawing showing the appropriate hour timer. The project owner shall make the site available to the District, EPA and CPM for inspection.

AQFS-6. The owner/operator shall maintain a log for this unit, which, at a minimum, contains the information specified below. This log shall be maintained current and on-site for a minimum of five (5) years and shall be provided to District personnel on request:

a. Date of each use or test;

b. Duration of each use or test in hours;

c. Reason for each use;

d. Cumulative calendar year use, in hours; and,

e. Fuel sulfur concentration (the o/o may use the supplier's certification of sulfur content if it is maintained as part of this log).

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA and CPM.

AQFS-7. This equipment shall comply with the applicable requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115).

Verification: At least 60 days prior to installation, the project owner shall provide the District and CPM an "approved for construction" drawing showing the engine specifications. The project owner shall make the site available to the District, EPA and CPM for inspection.

ACRONYMS

AAQS	Ambient Air Quality Standard
AERMOD	ARMS/EPA Regulatory Model
AFC	Application for Certification
amsl	above mean sea level
APCD	Air Pollution Control District (SJVAPCD)
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
AQMD	Air Quality Management District (AVAQMD)
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
AVAQMD	Antelope Valley Air Quality Management District
BACT	Best Available Control Technology
bhp	brake horsepower
Btu	British thermal unit
CAAQS	California Ambient Air Quality Standard
CEC	California Energy Commission (or Energy Commission)
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon Monoxide
CO2	Carbon Dioxide
COC	Condition of Certification
CPM	(CEC) Compliance Project Manager
EIR	Environmental Impact Report
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
HTF	Heat Transfer Fluid (Therminol)
GHG	Greenhouse Gas
gr	Grains (1 gr ≅ 0.0648 grams, 7000 gr = 1 pound)
hp	horsepower
H_2S	Hydrogen Sulfide
lbs	Pounds
LORS	Laws, Ordinances, Regulations and Standards
LPG	Liquefied Petroleum Gas
MCR	Monthly Compliance Report
MDAB	Mojave Desert Air Basin
mg/m^3	milligrams per cubic meter
MMBtu	Million British thermal units
msl	Mean sea level
MW	Megawatts (1,000,000 Watts)
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standard

NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_3	Nitrates
NOx	Oxides of Nitrogen or Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
O_2	Oxygen
O_3	Ozone
OLM	Ozone Limiting Method
PDOC	Preliminary Determination Of Compliance
PHPP	Palmdale Hybrid Power Plant
PM	Particulate Matter
PM10	Particulate Matter less than 10 microns in diameter
PM2.5	Particulate Matter less than 2.5 microns in diameter
ppm	Parts Per Million
ppmv	Parts Per Million by Volume
ppmvd	Parts Per Million by Volume, Dry
ppmw	Parts Per Million by Weight
PSA	Preliminary Staff Assessment (this document)
PSD	Prevention of Significant Deterioration
PTO	Permit to Operate
scf	Standard Cubic Feet
SO_2	Sulfur Dioxide
SO_3	Sulfate
SOx	Oxides of Sulfur
SR	State Route
SVAB	San Joaquin Valley Air Basin
tpy	tons per year
U.S. EPA	United States Environmental Protection Agency
$\mu g/m^3$	Microgram per cubic meter
VOC	Volatile Organic Compounds

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AIR QUALITY APPENDIX AIR-1

Greenhouse Gas Emissions

Testimony of Steve Radis

SUMMARY OF CONCLUSIONS

The Palmdale Hybrid Power Project (PHPP) is a proposed addition to the state's electricity system that would produce greenhouse gas (GHG) emissions while generating electricity for California consumers. The PHPP consists of a hybrid of natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment. The combined-cycle equipment utilizes two natural gas-fired combustion turbine generators (CTG), two heat recovery steam generators (HRSG), and one steam turbine generator (STG). The solar thermal equipment utilizes arrays of parabolic collectors to use solar energy to heat a heat transfer working fluid. The heated working fluid is used to boil water to generate steam. The combined cycle equipment is integrated thermally with the solar equipment at the HRSG and both utilize the single STG that is part of the project. The solar thermal input will provide approximately 10% of the peak power generated by the facility during the time of day when electrical demand is highest.

Its addition to the system would displace other less efficient, higher GHG-emitting generation and facilitate the integration of renewable resources. Because the project's GHG emissions per megawatt-hour (MWh) would be lower than those of other power plants that the project would displace, the addition of PHPP would contribute to a reduction of the California and overall Western Electricity Coordinating Council system GHG[9] emissions and GHG emission rate average.

While PHPP would emit GHG emissions, the relative efficiency of PHPP and the system build-out of renewable resources in California would result in a net cumulative reduction of energy and GHG emissions from new and existing fossil resources. Electricity is produced by operation of an inter-connected system of generation resources. Operation of one power plant, like PHPP, affects all other power plants in the interconnected system. The operation of PHPP would affect the overall electricity system operation and GHG emissions in several ways:

- PHPP would provide flexible, dispatchable power necessary to integrate some of the growing generation from intermittent renewable sources, such as wind and solar generation.
- Approximately 10% of the total rated peak capacity and 3 to 5% of the total annual energy generation from the PHPP would come from renewable solar generation.
- PHPP would displace some less efficient local generation in the dispatch order of gas-fired facilities that are required to provide electricity.

[9] Fuel-use closely correlates to the efficiency of and carbon dioxide (CO_2) emissions from natural gas-fired power plants. And since CO_2 emissions from the fuel combustion dominate greenhouse gas (GHG) emissions from power plants, the terms CO_2 and GHG are used interchangeably in this section.

- PHPP would facilitate to some degree the replacement of high GHG emitting (e.g., out-of-state coal) electricity generation that must be phased out to meet the State's Emissions Performance Standard as required by SB 1368.
- PHPP could facilitate to some extent the replacement of generation provided by aging and once-through cooling power plants.
- The PHPP would utilize the General Electric Power Systems (GE) Rapid Start Process (RSP) to allow for fast startup capability.
- The PHPP, while located outside Big Creek/Ventura and the Los Angeles Local Reliability Areas (LRA), could help a load-serving entity (LSE) meet resource adequacy (RA) requirements in these areas.

The ability and magnitude to which PHPP would fulfill these roles are uncertain given that the project would have an annual availability in the range of 90 to 95% (PHPP 2008) but as of yet, does not have a power purchase contract that would specify how and when it would operate to achieve such a capacity factor. Additionally, since PHPP interconnects to the grid at the Vincent Substation (located outside the Big Creek/Ventura and Los Angeles LRAs), it is unclear how PHPP would operate in conjunction with generation used to address capacity and energy requirements in these LRAs. The PHPP's capacity factor will depend on the provisions of bilateral power sales contracts, as well as market prices for electricity, ancillary services, and natural gas. The energy displaced by the PHPP project would result in a reduction in GHG emissions from the electricity system. The project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from power plants, would not worsen, but does somewhat improve current conditions, and would not result in impacts that are cumulatively significant.

Staff concludes that the short-term minor emission of greenhouse gases during construction that are necessary to construct this new low GHG-emitting peaking resource would be sufficiently reduced by "best practices" and would, therefore, not be significant.

The project could meet the Greenhouse Gases Emission Performance Standard (EPS, as required by Title 20, California Code of Regulations, section 2900 et seq.) that applies to utility purchases of base load power from power plants. Any utility that enters into a long-term contract with PHPP would be required to seek a finding that the project meets the EPS based on the operation of the project at that time, under a proposed PPA, and any other conditions that dictate the operation of the PHPP.

INTRODUCTION

GHG emissions are not criteria pollutants, but are discussed in the context of cumulative impacts. In December 2009, the U.S. Environmental Protection Agency (EPA) declared that greenhouse gases (GHGs) threaten the public health and welfare of the American people (an "endangerment finding"). Regulating GHGs at the federal level will be required by the Prevention of Significant Deterioration Program (PSD) requirements beginning January 2, 2011 for sources otherwise subject to PSD

requirements for previously included criteria pollutants and also exceeding an annual emissions rate of 75,000 tons per year of carbon dioxide-equivalent emissions. On July 1, 2011, PSD for GHG emissions would apply to new facilities that would exceed an annual emissions rate of 100,000 tons per year of carbon dioxide-equivalent regardless of the facilities PSD applicability for criteria pollutants. PHPP will be required to obtain a PSD permit for GHG emissions after January 2, 2011.

Federal rules that became effective December 29, 2009 (40 CFR 98) already 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. The State has demonstrated a clear willingness to address global climate change though research, adaptation[10], and GHG inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

Generation of electricity using any fossil fuel, including natural gas, can produce greenhouse gases with the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. For fossil fuel-fired power plants, the GHG emissions include primarily carbon dioxide, with much smaller amounts of nitrous oxide (N_2O, not NO or NO_2, which are commonly known as NOx or oxides of nitrogen), and methane (CH_4 – often from unburned natural gas). Also included are sulfur hexafluoride (SF_6) from high voltage equipment and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled or reused or recycled, but are nevertheless documented here as some of the compounds have very high relative global warming potentials.

Global warming potential is a relative measure, compared to carbon dioxide, of a compound's residence time in the atmosphere and ability to warm the planet. Mass emissions of GHGs are also converted into carbon dioxide equivalent (CO2E) metric tonnes (MT) for ease of comparison.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies in **Greenhouse Gas Table 1** pertain to the control and mitigation of greenhouse gas emissions. Staff's analysis examines the project's compliance with these requirements.

[10] 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).

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.
40 CFR Part 98	This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO_2 equivalent emissions per year.
State	
California Global Warming Solutions Act of 2006, AB 32 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)	This act requires the California Air Resource Board (ARB) to enact standards that will reduce GHG emission to 1990 levels. Electricity production facilities will be regulated by the ARB.
California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et. seq.	These ARB regulations implement mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)
Title 20, California Code of Regulations, section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009	The regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tonnes carbon dioxide per megawatt-hour (0.5 $MTCO_2$/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lbs CO_2/MWh)

GLOBAL CLIMATE CHANGE AND ELECTRICITY PRODUCTION

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

In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC 1998, p.5). In 2003, the Energy Commission recommended that the state require reporting of greenhouse gases or global climate change[11] emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such reductions to be

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

achieved by 2020.[12] To achieve this, ARB has a mandate to define the 1990 emissions level and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB adopted early action GHG reduction measures in October 2007, adopted mandatory reporting requirements and the 2020 statewide target in December 2007, and adopted a statewide scoping plan in December 2008 to identify how emission reductions will be achieved from significant sources of GHG via regulations, market mechanisms, and other actions. The regulations must be effective by January 1, 2011 and mandatory compliance commences on January 1, 2012. The mandatory reporting requirements are effective for electric generating facilities over 1 megawatt (MW) capacity, and the due date for initial reports by existing facilities was June 1, 2009.

Examples of strategies that the state might pursue for managing GHG emissions in California, in addition to those recommended by the Energy Commission and the Public Utilities Commission, were identified in the California Climate Action Team's Report to the Governor (CalEPA 2006). The scoping plan approved by ARB in December 2008 builds upon the overall climate policies of the Climate Action Team report and show the recommended strategies to achieve the goals for 2020 and beyond. Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy) 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% Renewable Portfolio Standard (RPS), aggressive energy efficiency targets, and a cap-and-trade system that includes the electricity sector (ARB 2008).

It is possible 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 effect for the least cost). For example, the ARB proposes a 40% reduction in GHG from the electricity sector, even though that sector currently only produces about 25% of the state GHG emissions. In response, in September 2008 the Energy Commission and the Public Utilities Commission provided recommendations (CPUC 2008) to ARB on how to achieve such reductions through both programmatic and regulatory approaches and identified regulation points should ARB decide that a multi-sector cap and trade system is warranted.

The Energy Commission's *2007 Integrated Energy Policy Report* (IEPR) also addresses climate change within the electricity, natural gas, and transportation sectors (CEC 2007). For the electricity sector, it recommends such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor's stated goal of a 33% renewable portfolio standard. The Energy Commission's *2009 Integrated Energy Policy Report* continues to emphasize the importance of meeting greenhouse emissions reduction goals along with other important statewide issues such as backing out use of once-through cooling in coastal California power plants (CEC 2009c).

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[12] Governor Schwarzenegger has also issued Executive Order S-3-05 establishing a goal of 80% below 1990 levels by 2050. This goal is also contained in ARB's "Scoping Plan" being developed to meet AB 32 requirements.

SB 1368,[13] enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibits California utilities from entering into long-term commitments with any base load facilities that exceed the Emission Performance Standard of 0.500 metric tonnes CO_2 per megawatt-hour[14] (1,100 pounds CO_2/MWh). Specifically, the SB 1368 Emission Performance Standard (EPS) applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more, including contracts with power plants located outside of California.[15] If a project, instate or out of state, plans to sell base load electricity to California utilities, the utilities will have to demonstrate that the project meets the EPS. *Base load* units are defined as units that operate at a capacity factor higher than 60%. As a project applying for the flexibility to operate in base load scenarios, if PHPP enters into a contract with a California utility to sell base load electricity, PHPP would have to meet the SB 1368 EPS.

In addition to these programs, California is involved in the Western Climate Initiative, a multi-state and international effort to establish a cap and trade market to reduce greenhouse gas emissions in the Western United States and the Western Electricity Coordinating Council (WECC). The timelines for the implementation of this program are similar to those of AB 32, with full roll-out beginning in 2012. And as with AB 32, the electricity sector has been a major focus of attention.

ELECTRICITY PROJECT GREENHOUSE GAS EMISSIONS

Electricity use can be as simple as turning on a switch to operate a light or fan. However, the system to deliver adequate and reliable electricity supply is complex and variable. But it operates as an integrated whole to meet demand, such that the dispatch of a new source of generation generally curtails or displaces one or more less efficient or less competitive existing sources. Within the system, generation resources provide electricity, or energy, generating capacity, and ancillary services to stabilize the system and facilitate electricity delivery, or movement, over the grid. *Capacity* is the instantaneous output of a resource, in megawatts. *Energy* is the capacity output over a unit of time, for example an hour or year, generally reported as megawatt-hours or gigawatt-hours (GWh). Ancillary services[16] include regulation, spinning reserve, non-spinning reserve, voltage support, and black start capability. Individual generation resources can be built and operated to provide only one specific service. Alternatively, a resource may be able to provide one or all of these services, depending on its design and constantly changing system needs and operations.

California is actively pursuing policies to reduce GHG emissions that include adding non-GHG emitting renewable generation resources to the system mix. In this context, and because fossil-fueled resources produce GHG emissions, it is important to consider

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[13] Public Utilities Code § 8340 et seq.
[14] The Emission Performance Standard only applies to carbon dioxide and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.
[15] See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm
[16] See page CEC 2009b, page 95.

the role and necessity of also adding fossil-fuel resources. On October 8, 2008, the Energy Commission adopted an order initiating an informational (OII) proceeding (08-GHG OII-1) to solicit comments on how to assess the greenhouse gas impacts of proposed new power plants in accordance with the California Environmental Quality Act (CEQA). A report prepared as a response to the GHG OII (CEC 2009a) defines five roles that gas-fired power plants are likely to fulfill in a high-renewables, low-GHG system (CEC 2009b, pp 93 and 94):

1. Intermittent generation support
2. Local capacity requirements
3. Grid operations support
4. Extreme load and system emergency
5. General energy support.

The report reasonably assumes that non-renewable power plants added to the system would almost exclusively be natural gas-fueled. Nuclear, geothermal, and biomass plants are generally base load and not dispatchable. Solid fueled projects are also generally base load, not dispatchable, and carbon sequestration technologies needed to reduce the GHG emission rates to meet the EPS are not yet developed (CEC 2009b, p. 92). Further, California has almost no sites available to add highly dispatchable hydroelectric generation.

This analysis provides the staff's conclusions concerning greenhouse gas emissions for this siting case. Future power plant siting and amendment cases are likely to be reviewed with the benefit of new information and policy direction from the Energy Commission. This analysis recognizes that the "prudent use" of natural gas for electricity generation will serve to optimize the system (for integrating intermittent renewable generation and providing reliability), but, without further analysis and policy direction by the Commission to refine this general understanding, this analysis leaves the implications for optimizing the system to future cases (CEC 2009a).

The Energy Commission established a precedent decision in the Final Commission Decision for the Avenal Energy Project. This decision requires all new natural gas fired power plants certified by the Energy Commission to: (a) not increase the overall system heat rate for natural gas plants, (b) not interfere with generation from existing renewable facilities nor interfere with the integration of new renewable generation, and (c) take into account these factors to ensure a reduction of systemwide GHG emissions and support the goals and policies of AB 32 (CEC 2009d). The proposed project, with its low heat rate, rapid start and rapid ramping capabilities, and its solar hybrid design meets all these conditions.

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. Construction of PHPP would involve 27 months of activity. The project owner provided a GHG emission estimate for the entirety of the construction phase. The GHG emissions estimate, presented below in **Greenhouse Gas Table 2**, includes the total emissions for the 27 months of construction activity in terms of CO_2-equivalent.

Greenhouse Gas Table 2
PHPP, Estimated Potential Construction Greenhouse Gas Emissions

Construction Source	Construction-Phase GHG Emissions (MTCO2E) [a]
Combined Cycle Facility Construction	5,640
Solar Array Construction	6,084
Reclaimed Water Line Construction	1,919
Natural Gas Pipeline Construction	2,591
Sewer Line Construction	303
Potable Water Line Construction	121
Transmission Line Segment 1 Construction	3,014
Transmission Line Segment 2 Construction	944
Construction Total	**20,616**

Source: PHPP 2009.
Notes:
a. One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms

PROJECT OPERATIONS

The proposed PHPP would operate as a combined-cycle power plant up to 90-95% capacity annually. The two General Electric 7FA gas turbines are fired with natural gas. The project would increase the thermal efficiency of the two General Electric 7FA gas turbines because the new steam turbine generator (STG) would use thermal energy from the combustion turbine generators (CTGs) exhaust. This power plant configuration would be capable of achieving startups of less than two (2) hours under all conditions (PHPP 2008).

The primary sources of GHG would be the natural gas fired combustion turbines. There would also be a small amount of GHG emissions from maintenance vehicles required to wash mirror surfaces and otherwise maintain the facility as well as from diesel fuel consumed in the emergency fire pump engine, and sulfur hexafluoride emissions from electrical component equipment.

Greenhouse Gas Table 3 shows what the proposed project, as permitted, could potentially emit in greenhouse gases on an annual basis. All emissions are converted to metric tons of CO_2-equivalents 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, but are nevertheless documented here as some of the compounds have very high relative global warming potentials. A small amount of SF_6 containing equipment will be required for this project, and the leakage of SF_6 and its CO_2 equivalent emissions have been estimated.

The proposed project would be permitted, on an annual basis, to emit approximately 1,852,123 metric tonnes of CO_2-equivalent per year if operated at its maximum permitted level. However, if the use or efficiency of the solar array is less than expected, then the project's annual average efficiency would slightly decrease, which would cause the actual GHG emissions to increase slightly per MWh, but not to greater than the Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh. The proposed project would increase the available energy and capacity to the electricity system.

Greenhouse Gas Table 3
PHPP, Estimated Potential Greenhouse Gas (GHG) Emissions

Emissions Source	**Operational GHG Emissions (MTCO2E/yr)** [a]
Turbine 1	923,643
Turbine 2	923,643
Auxiliary Boiler	2,661
HTF Heater	2,129
Emergency Generator	25
Emergency Fire Pump	4
Sulfur Hexafluoride (SF6) Leakage	9
Vehicles (includes mirror washing)	10
Total Project GHG Emissions (MTCO2E/yr)	**1,852,123**
Estimated Annual Energy Output (MWh/yr) [b]	4,993,200
Estimated Annualized GHG Performance (MTCO2/MWh)	**0.370**
Estimated Annualized GHG Performance (MTCO2E/MWh)	**0.371**

Sources: PHPP 2008, including methane (CH_4) and nitrous oxide (N_2O); independent Energy Commission staff analysis for estimated energy output.
Notes:
a. One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
b. Annualized basis uses the project owner's assumed maximum operating basis.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses the cumulative effects of GHG emissions caused by both construction and operation. As the name implies, construction impacts result from the emissions occurring during the construction of the project. The operation impacts result from the emissions of the proposed project during operation. Staff is continuing to monitor development of AB 32 Scoping Plan implementation efforts and general trends and developments affecting GHG regulation in the construction and electricity sectors.

The impact of GHG emissions caused by this hybrid solar and natural gas-fired facility is characterized by considering how the power plant would affect the overall electricity system. The integrated electricity system depends on fossil-fueled generation resources to provide energy and satisfy local capacity needs. As directed by the OII (CEC 2009a),

staff is refining and implementing the concept of a "blueprint" that describes the long-term role of fossil-fueled power plants in California's electricity system. The five separate roles that gas-fired power plants are most likely to fulfill in the future of a high-renewables, low-GHG system include: 1) Intermittent generation support; 2) Local capacity requirements; 3) Grid operations support; 4) Extreme load and system emergencies support; and 5) General energy support (CEC 2009b, p. 93). PHPP is analyzed here for its role in providing local capacity and generation and general energy support for expected generation retirements or replacements.

CONSTRUCTION IMPACTS

Staff does not believe that the small GHG emission increases from construction activities would be significant for several reasons. First, the period of construction will be short-term and the emissions intermittent during that period, not ongoing during the life of the project. Additionally, control measures that staff recommends to address criteria pollutant emission, such as limiting idling times and requiring, as appropriate, equipment that meets the latest criteria pollutant emissions standards would further minimize greenhouse gas emissions to the extent feasible. The use of newer equipment will increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment.

DIRECT/INDIRECT OPERATION IMPACTS AND MITIGATION

New, efficient, natural gas-fired generation promotes the state's efforts to improve GHG electrical generation efficiencies and, therefore, reduce greenhouse gas emissions and the amount of natural gas used by electricity generation. As the *2007 Integrated Energy Policy Report* (CEC 2007, p. 184) noted:

> New natural gas-fueled electricity generation technologies offer efficiency, environmental, and other benefits to California, specifically by reducing the amount of natural gas used—and with less natural gas burned, fewer greenhouse gas emissions. Older combustion and steam turbines use outdated technology that makes them less fuel- and cost-efficient than newer, cleaner plants… The 2003 and 2005 IEPRs noted that the state could help reduce natural gas consumption for electric generation by taking steps to retire older, less efficient natural gas power plants and replace or repower them with new, more efficient power plants.

Thus, in the context of the Energy Commission's *Integrated Energy Policy Report*, the PHPP's likely replacement of older existing plant capacity and higher GHG-emitting energy furthers the state's strategy to promote efficiency and reduce fuel use and GHG emissions. As stated in the 2009 *Framework for Evaluating Greenhouse Gas Implications of Natural Gas-Fired Power Plants in California* (CEC 2009b, p.20):

> When one resource is added to the system, all else being held equal, another resource will generate less power. If the new resource has a lower cost or fewer emissions than the existing resource mix, the aggregate system characteristics will change to reflect the cheaper power and lower GHG emissions rate.

Net GHG emissions for the integrated electric system will decline when new gas-fired

power plants are added to: 1) permit the penetration of renewable generation to the 33% target; 2) improve the overall efficiency of the electric system; or 3) serve load growth or capacity needs more efficiently than the existing fleet (CEC 2009b, p. 98). PHPP, with its lower heat rate than most other gas-fired generation in the two adjacent LRAs, would be more efficient and lower GHG-emitting than the existing fleet.

The Role of PHPP in Generation Displacement

The proposed PHPP project would have a net heat rate of 6,285 Btu/kWh[17] in combined-cycle mode with maximum solar input and a net heat rate of 6,970 Btu/kWh when the solar facilities are not in operation. The heat rate, energy output and GHG emissions of some local generation resources near the PHPP are listed in **Greenhouse Gas Tables 4** and **5**. Compared to most other new and existing units in the Los Angeles and Big Creek/Ventura LSAs, PHPP would be more efficient, and emit fewer GHG emissions per MWh of generation. Generating units with the best (lowest) heat rate or lowest GHG performance factor generally operate more than other units with higher heat rates, as shown by the relative amount of energy (GWh) produced in 2008 from the local units. However, dispatch order can change, or deviate from economic or efficiency dispatch, in any one year or due to other concerns such as permit limits, contractual obligations, local reliability needs or emergencies.

The Role of PHPP in the Renewable Goals/Load Growth

As California moves towards an increased reliance on renewable energy, the bulk of renewable generation available to and used in California in the near to intermediate future will be intermittent wind generation with some intermittent solar (CEC 2009b, p.3). To accommodate the increased variability in generation due to increasing renewable penetration, compounded by increasing load variability, control authorities such as the California Independent System Operator (CAISO) need increased flexibility from other generation resources such as hydro generation, dispatchable pump loads, energy storage systems, and fast ramping and fast starting fossil fuel generation resources (CAISO 2007, p. 14).

PHPP would provide flexible, dispatchable and fast ramping[18] power that would not obstruct penetration of renewable energy. In general, combustion turbines can ramp up quickly, but the ramp rate of a large-scale combined cycle facility can be limited by the steam turbine to about 15 MW per minute.[19] The PHPP would also realize 10% of its output from renewable solar power during peak demand periods.

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[17] Based on the High Heating Value (HHV) of the fuel(s) used. HHV is used for all heat rate and fuel conversions to GHG mass emissions that are discussed in this document.

[18] The CAISO categorizes *fast-ramping* as a generator capable of going from lowest power to highest in under 20 minutes, or greater than 10 MW per minute.

[19] Of the 2,821 MW of thermal resources providing Ancillary Services to the CAISO, most (2,441 MW) have ramp rates between 10 and 31 MW/min. The bulk of the resources providing Ancillary Services with ramp rates greater than 10 MW/min (7,141 MW) are hydroelectric facilities (ISO 2007).

Greenhouse Gas Table 4
Los Angeles Basin Local Capacity Requirements Area, Local Generation Heat Rates and 2008 Energy Outputs

Plant Name	Heat Rate (Btu/kWh)[a]	2008 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
Watson Cogeneration Co	8,512	3,017	0.452
Corona Cogen	9,430	274	0.500
Civic Center	9,447	467	0.501
San Gabriel	9,859	155	0.523
THUMS	10,123	379	0.537
ARCO Products Co	10,140	477	0.538
Harbor Cogeneration Co	10,649	44	0.565
Alamitos	10,782	2,533	0.572
Huntington Beach (AES)	10,927	1,536	0.580
El Segundo Power	11,044	508	0.586
Carson Cogeneration Co	11,513	540	0.611
Redondo Beach LLC (AES)	11,726	317	0.622
Total Energy Facilities	12,281	137	0.652
Torrance Refinery	12,370	161	0.656
Long Beach Generation LLC	15,323	27	0.813
UCLA Energy Systems Facility	15,418	206	0.818
BP West Coast Wilmington Calciner	16,953	201	0.900
Proposed Palmdale Hybrid Power Project (PHPP)	6,970	4,993 [c]	0.370

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER); with independent Energy Commission staff analysis for PHPP based on maximum utilization.
Notes:
a. Based on the Higher Heating Value or HHV of the fuel.
b. Peaker facilities
c. Based on continuous operation at peak capacity.

The amount of dispatchable fossil fuel generation used as regulation resources, fast ramping resources, or load following or supplemental energy dispatches will have to be significantly increased due to the planned intermittent resources needed to meet the 20% RPS (CAISO 2007, p.113); the 33% RPS will require even more dispatchable generation to integrate the renewables. However, this does not suggest the existing and new fossil fuel capacity will operate more in terms of total generation, but will need to operate more in a supplementary rather than base load role. **Greenhouse Gas Table 6** shows how the build-out of either the 20% or the 33% Renewable Portfolio Standards will affect generation from new and existing non-renewable resources. Should California reach its goal of meeting 33% of its retail demand in 2020 with renewable energy, non-renewable, most likely fossil-fueled, energy needs will fall by more than 36,000 GWh/year. In other words, all growth will need to come from renewable resources to achieve the 33% RPS, and some existing and new fossil units will generate less energy than they currently do, given the expected growth rate in retail sales.

Greenhouse Gas Table 5
Big Creek/Ventura LSA, Generation Heat Rates and 2008 Energy Outputs

Plant Name	Heat Rate (Btu/kWh)[a]	2008 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
La Paloma Generating	7,172	6,185	0.392
Pastoria Energy Facility L.L.C.	7,025	4,905	0.384

Sunrise Power	7,266	3,605	0.397
Elk Hills Power, LLC	7,048	3,552	0.374
Sycamore Cogeneration Co	12,398	2,096	0.677
Midway-Sunset Cogeneration	11,805	1,941	0.645
Kern River Cogeneration Co	13,934	1,258	0.761
Ormond Beach Generating Station	10,656	783	0.582
Mandalay Generating Station	10,082	597	0.551
McKittrick Cogeneration Plant	7,732	592	0.422
Mt Poso Cogeneration (coal/pet. coke)	9,934	410	0.930
South Belridge Cogen Facility	11,452	409	0.625
McKittrick Cogeneration	9,037	378	0.494
KRCD Malaga Peaking Plant [b]	9,957	151	0.528
Henrietta Peaker [b]	10,351	48	0.549
CalPeak Power – Panoche	10,376	7	0.550
Wellhead Power Gates, LLC [b]	12,305	5	0.652
Wellhead Power Panoche, LLC [b]	13,716	3	0.727
MMC Mid-Sun, LLC [b]	12,738	1.4	0.675
Fresno Cogen Partners, LP PKR [b]	16,898	0.8	0.896
Proposed Palmdale Hybrid Power Project (PHPP)	6,970	4,993 [c]	0.370

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER); with independent Energy Commission staff analysis for PHPP based on maximum utilization.
Notes:
a. Based on the Higher Heating Value or HHV of the fuel.
b. Peaker facilities
c. Based on continuous operation at peak capacity.

These assumptions are conservative in that the forecasted growth in retail sales assumes that the impacts of planned increases in expenditures on (uncommitted) energy efficiency are already embodied in the current retail sales forecast.[20] If, for example, forecasted retail sales in 2020 were lowered by 10,000 GWh due to the success of increased energy efficiency expenditures, non-renewable energy needs fall by an additional 8,000 to 6,700 GWh/year, totaling as much as 45,000 GWh per year of reduced non-renewable energy, depending on the RPS assumed.

Greenhouse Gas Table 6
Estimated Changes in Non-Renewable Energy Potentially Needed to Meet California Loads, 2008-2020

California Electricity Supply	**Annual GWh**	
Statewide Retail Sales, 2008, estimated [a]	264,794	
Statewide Retail Sales, 2020, forecast [a]	289,697	
Growth in Retail Sales, 2008-20	24,903	
Growth in Net Energy for Load [b]	29,840	
California Renewable Electricity	**GWh @ 20% RPS**	**GWh @ 33% RPS**
Renewable Energy Requirements, 2020 [c]	57,939	95,600
Current Renewable Energy, 2008	29,174	

[20] Energy efficiency savings are already represented in the current Energy Commission demand forecast adopted December 2009 (CEC2009c).

Change in Renewable Energy-2008 to 2020 [c]	28,765	66,426
Resulting Change in Non-Renewable Energy	176	-36,586

Source: Energy Commission staff 2010.
Notes:
a. 2009 IEPR Demand Forecast, Form 1.1c. Excludes pumping loads for entities that do not have an RPS..
b. 2009 IEPR Demand Forecast, Form 1.5a.
c. RPS requirements are a percentage of retail sales.

The Role of PHPP in Retirements/Replacements

PHPP would be capable of annually providing 4,993 GWh of natural gas-fired and solar generation energy to replace resources that are or will likely be precluded from serving California loads. State policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in high GHG-emitting generation, such as coal-fired generation, that relies on water for once-through cooling, and aging power plants (CEC 2007). Some of the existing plants that are likely to require significant capital investments to continue operation in light of these policies may be unlikely to undertake the investments and will retire or be replaced.

Replacement of High GHG-Emitting Generation

High GHG-emitting resources, such as coal, are effectively prohibited from entering into new long-term contracts for California electricity deliveries as a result of the Emissions Performance Standard adopted in 2007 pursuant to SB 1368. Between now and 2020, more than 18,000 GWh of energy procured by California utilities under these contracts will have to reduce GHG emissions or be replaced; these contracts are presented in **Greenhouse Gas Table 7**.

Greenhouse Gas Table 7
Expiring Long-term Contracts with Coal-fired Generation 2009 – 2020

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

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.
Notes:
a. All facilities are located out-of-state except for the Miscellaneous In-state Qualifying Facilities.
b. Estimated annual reduction in energy provided to LADWP by Utah utilities from their entitlement by 2013.
c. Contract not subject to Emission Performance Standard, but the Department of Water Resources has stated its intention not to renew or extend.

This represents almost half of the energy associated with California utility contracts with

coal-fired resources that will expire by 2030. If the State enacts a carbon adder[21], all the coal contracts (including those in **Greenhouse Gas Table 7**, which expire by 2020, and other contracts that expire beyond 2020 and are not shown in the table) may be retired at an accelerated rate as coal-fired energy becomes uncompetitive due to the carbon adder or the capital needed to capture and sequester the carbon emissions. Also shown are the approximate 500 MW of in-state coal and petroleum coke-fired capacity that may not be able to contract with California utilities for baseload energy due to the SB1368 Emission Performance Standard. As these contracts expire, new and existing generation resources will replace the lost energy and capacity. Some will come from renewable generation; some will come from new and existing natural gas fired generation. All will emit significantly less GHG than the coal and petroleum coke-fired generation, which average about 1.0 MTCO2/MWh without carbon capture and sequestration, or almost three times more than a natural gas-fired combined-cycle/solar hybrid project like PHPP, resulting in a significant net reduction in GHG emissions from the California electricity sector.

Retirement of Generation Using Once-Through Cooling

New, dispatchable resources like PHPP would also be required to provide generation capacity (that is, the ability to meet fluctuating, intermittent electricity loads and integrate fluctuating intermittent resources) in the likely event that facilities utilizing once-through cooling (OTC) are retired. The State Water Resources Control Board (SWRCB) has proposed significant changes to OTC units, which would likely require retrofit, retirement, or significant curtailment of dozens of generating units. In 2008, these units collectively produced about 58,000 GWh. While those OTC facilities owned and operated by utilities and recently-built combined cycles may well install dry or wet cooling towers, it is unlikely that the aging, merchant plants will do so. Most of these units operate at low capacity factors, suggesting a limited ability to compete in the current electricity market. Although the timing would be uncertain, new resources would out-compete aging plants and would displace the energy provided by OTC facilities and likely accelerate the retirements.

Any additional costs associated with complying with the SWRCB regulation would be amortized over a limited revenue stream today and into the foreseeable future. Their energy and much of their dispatchable, load-following capability will have to be replaced. These units constitute over 15,000 MW of merchant capacity and 17,800 GWh of merchant energy. Of this, much but not all of the capacity and energy are in local reliability areas, requiring a large share of replacement capacity – absent transmission upgrades – to locations in the same local reliability area. **Greenhouse Gas Table 8** provides a summary of the statewide utility and merchant energy supplies affected by the OTC regulations.

New generation resources that can either provide local support or energy will emit significantly less GHGs than the OTC fleet. Existing aging and OTC natural gas

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

generation averages 0.6 to 0.7 MTCO2/MWh, which is less efficient, higher GHG emitting than a new natural gas-fired combined-cycle/hybrid solar project like PHPP. When a project can provide energy and capacity, given its location, it can provide a significant net reduction in GHG emissions from the California electricity sector. A project located in a coastal load pocket, like the Los Angeles Local Reliability Area, would more likely provide local reliability support as well as facilitate the retirement of aging and/or OTC power plants to a degree that the PHPP project could not.

CUMULATIVE IMPACTS

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

This entire assessment is a cumulative impact assessment. The 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.

Greenhouse Gas Table 8
Aging and Once-Through Cooling Units: 2008 Capacity and Energy Output [a]

Plant, Unit Name	Owner	Local Reliability Area	Aging Plant?	Capacity (MW)	2008 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
Diablo Canyon 1, 2	Utility	None	No	2,232	17,091	Nuclear
San Onofre 2, 3	Utility	L.A. Basin	No	2,246	15,392	Nuclear
Broadway 3 [b]	Utility	L.A. Basin	Yes	75	90	0.648
El Centro 3, 4 [b]	Utility	None	Yes	132	238	0.814
Grayson 3-5 [b]	Utility	LADWP	Yes	108	150	0.799
Grayson CC [b]	Utility	LADWP	Yes	130	27	0.896
Harbor CC	Utility	LADWP	No	227	203	0.509
Haynes 1, 2, 5, 6 [c]	Utility	LADWP	Yes	1,046	1,529	0.578
Haynes CC [c]	Utility	LADWP	No	560	3,423	0.376
Humboldt Bay 1, 2 [a]	Utility	Humboldt	Yes	107	507	0.683
Olive 1, 2 [b]	Utility	LADWP	Yes	110	11	1.008
Scattergood 1-3	Utility	LADWP	Yes	803	1,327	0.618
Utility-Owned				7,776	39,988	0.693
Alamitos 1 – 6	Merchant	L.A. Basin	Yes	1,970	2,533	0.661
Contra Costa 6, 7	Merchant	S.F. Bay Area	Yes	680	160	0.615
Coolwater 1-4 [b]	Merchant	None	Yes	727	576	0.633
El Segundo 3, 4	Merchant	L.A. Basin	Yes	670	508	0.576
Encina 1-5	Merchant	San Diego	Yes	951	997	0.674
Etiwanda 3, 4 [b]	Merchant	L.A. Basin	Yes	666	848	0.631
Huntington Beach 1, 2	Merchant	L.A. Basin	Yes	430	916	0.591

Huntington Beach 3, 4	Merchant	L.A. Basin	No	450	620	0.563
Mandalay 1, 2	Merchant	Ventura	Yes	436	597	0.528
Morro Bay 3, 4	Merchant	None	Yes	600	83	0.524
Moss Landing 6, 7	Merchant	None	Yes	1,404	1,375	0.661
Moss Landing 1, 2	Merchant	None	No	1,080	5,791	0.378
Ormond Beach 1, 2	Merchant	Ventura	Yes	1,612	783	0.573
Pittsburg 5-7	Merchant	S.F.Bay	Yes	1,332	180	0.673
Potrero 3	Merchant	S.F.Bay	Yes	207	530	0.587
Redondo Beach 5-8	Merchant	L.A. Basin	Yes	1,343	317	0.810
South Bay 1-4	Merchant	San Diego	Yes	696	1,015	0.611
Merchant-Owned				15,254	17,828	0.605
Total In-State OTC				23,030	57,817	

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.
Notes:

a. OTC Humboldt Bay Units 1 and 2 are included in this list. They must retire in 2010 when the new Humboldt Bay Generating Station (not ocean-cooled), currently under construction, enters commercial operation.
b. Units are aging but are not OTC.
c. The Los Angeles Department of Water and Power (LADWP) reported a 2007 aggregate energy number of 4,003 GWh for all the Haynes units. Staff allocated the energy among the units based upon current and historical LADWP filings for the 2009 IEPR.

COMPLIANCE WITH LORS

Ultimately, ARB's AB 32 regulations may address both the degree of electricity generation sector emissions reductions (through cap-and-trade), and the method by which those reductions will be achieved (e.g., through command-and-control). However, the programmatic approach is currently under development. That regulatory approach may address emissions not only from the newer, more efficient, and lower emitting facilities licensed by the Commission, but also the older, higher-emitting facilities not subject to any GHG reduction standard that this agency could impose. This programmatic approach is likely to be more effective in reducing GHG emissions overall from the entire electricity sector than one that merely relies on displacing out-of-state coal plants ("leakage") or older "dirtier" facilities.

The Energy Commission and the Public Utilities Commission provided recommendations (CPUC 2008) to ARB on how to achieve such reductions through both programmatic and regulatory approaches and identified the regulation points should ARB decide that a multi-sector cap-and-trade system is warranted. As ARB codifies accurate GHG inventories and methods, it may become apparent that emission reductions from the generation sector are less cost-effective than other sectors, and that other sectors of sources can achieve reductions with relative ease and cost-effectiveness.

The project would be subject to ARB's mandatory reporting requirements and potentially other future requirements mandating compliance with AB 32 that are being developed by ARB. How the project would comply with these ARB requirements is speculative at this time, but compliance would be mandatory. The ARB's mandatory GHG emissions reporting requirements do not indicate whether the project, as defined, would comply with the potential GHG emissions reduction regulations being formulated under AB 32. The project may have to provide additional reports and GHG reductions, depending on

the future regulations expected from ARB. Similarly, this project would be subject to federal mandatory reporting of GHG emissions.

Reporting of GHG emissions would enable the project to demonstrate consistency with the policies described above and the regulations that ARB adopts and to provide the information to demonstrate compliance with any applicable EPS that could be enacted in the next few years. Since this power project would be permitted for more than a 60% capacity factor, the project is subject to the requirements of SB 1368 and the current Emission Performance Standard. PHPP's GHG emission performance would be well below the SB 1368 EPS. Source testing will be conducted to demonstrate compliance with the GHG performance standards.

The Energy Commission established a precedent decision in the Final Commission Decision for the Avenal Energy Project. This decision requires all new natural gas fired power plants certified by the Energy Commission to: (a) not increase the overall system heat rate for natural gas plants, (b) not interfere with generation from existing renewable facilities nor interfere with the integration of new renewable generation, and (c) take into account these factors to ensure a reduction of system-wide GHG emissions and support the goals and policies of AB 32 (CEC 2009d). PHPP, with its low heat rate and high flexibility, rapid start and fast ramping capabilities, and hybrid solar/natural gas operation, would satisfy these conditions.

NOTEWORTHY PUBLIC BENEFITS

Electricity is produced by operation of inter-connected generation resources and by knowing the fuel used by the generation sector, the resulting GHG emissions can be known. Operation of one power plant, like PHPP, affects all other power plants in the interconnected system. The operation of PHPP would have an impact upon system operation and GHG emissions in several ways:

- PHPP would provide flexible, dispatchable power necessary to integrate some of the growing generation from intermittent renewable sources, such as wind and solar generation.
- Approximately 10% of the total rated peak capacity and 3 to 5% of the total annual energy generation from the PHPP would come from renewable solar generation.
- PHPP would displace some less efficient local generation in the dispatch order of gas-fired facilities that are required to provide local electricity.
- PHPP would facilitate to some degree the replacement of high GHG-emitting (e.g., out-of-state coal) electricity generation that must be phased out to meet to the State's new Emission Performance Standard.
- PHPP could facilitate to some extent the replacement of generation provided by aging and once-through cooling power plants.
- The PHPP would utilize the General Electric Power Systems (GE) Rapid Start Process (RSP) to allow for fast startup capability.
- The PHPP, while located outside Big Creek/Ventura and the Los Angeles Local Reliability Areas (LRA), could help a load-serving entity (LSE) meet resource adequacy (RA) requirements in these areas..

The project would likely lead to a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from the state's power plants, would not worsen current conditions, and would thus not result in impacts that are cumulatively significant. Moreover, it would be consistent with AB 32 goals.

The energy displaced by the PHPP project would result in a reduction in GHG emissions from the electricity system. In other system roles, as described in **Greenhouse Gas Table 9**, PHPP would minimize its GHG impacts by filling nearly all of the expected future roles for gas-fired generation, in a high-renewables, low-GHG system.

Greenhouse Gas Table 9
PHPP, Summary of Role in Providing Energy and Capacity Resources

Services Provided by Generating Resources	Discussion, PHPP
Integration of Renewable Energy	• Would provide fast startup capability (within 2 hours). • Would provide rapid ramping capability. • Would have ability to provide regulation and reserves, and energy when renewable resources are unavailable. • Would have a modest renewable energy component.
Local Generation Displacement	• Could partially satisfy local capacity requirements (LCR). • Would provide voltage support. • *Would not* provide black start capability.
Ancillary Services, Grid System, and Emergency Support	• Would provide fast startup capability (within 2 hours). • *Would not* have low minimum load levels. • Would provide rapid ramping capability. • Would have ability to provide regulation and reserves. • *Would not* provide black start capability.
General Energy Support	• Would provide general energy support. • Could facilitate some retirements and replacements • Would provide cost-competitive energy. • Could help a load-serving entity (LSE) meet resource adequacy (RA) requirements.

Source: Energy Commission staff; based on: Expected Roles for Gas-Fired Generation (CEC2009b, p. 7).

CONCLUSIONS

PHPP, as an addition to the California electricity system, would be an efficient, new, dispatchable hybrid solar/natural gas-fired combined cycle power plant that would cause GHG emissions while generating electricity for California consumers. AB 32 emphasizes that GHG emission reductions must be "big picture" reductions that do not lead to "leakage" of such reductions to other states or countries. The project's GHG emissions per MWh would be lower than those of other power plants that the project would replace and, thus, would contribute to continued improvement of the California and overall Western Electricity Coordinating Council system greenhouse gas (GHG) emissions and GHG emission rate average.

The project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from the state's power plants, would not worsen current conditions, and would thus not result in impacts that are cumulatively significant. PHPP would also provide other potential GHG benefits by filling nearly all of the expected future roles for gas-fired generation, in a high-renewables, low-GHG system.

Staff does not believe that the minor GHG emission increases from construction activities would be 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 project. Additionally, control measures or best practices, that staff recommends such as limiting idling times and requiring, as appropriate, equipment that meet the latest emissions standards, would further minimize greenhouse gas emissions since staff believes that the use of newer equipment will increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. For all these reasons, staff concludes that the minor short-term emission of greenhouse gases during construction would be sufficiently reduced and would, therefore, not be significant.

The project would meet the Greenhouse Gases Emission Performance Standard (Title 20, California Code of Regulations, section 2900 et seq.) that applies to utility purchases of base load power from power plants. Any utility that enters into a contract with PHPP would be required to seek a finding that the project meets the EPS based on the operation of the project at that time, under a proposed PPA, and any other conditions that dictate the operation of the PHPP.

The PHPP project would be consistent with the precedent decision regarding GHG emissions established by the Avenal Energy Project's Final Energy Commission Decision.

PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification related to greenhouse gas emissions are proposed. The project owner would comply with mandatory 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.

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BIOLOGICAL RESOURCES

Testimony of Chris Huntley

SUMMARY OF CONCLUSIONS

This section summarizes the Energy Commission staff's analysis and conclusions about the impacts of the Palmdale Hybrid Power Project (PHPP) and describes feasible mitigation measures for those impacts in accordance with the requirements of the California Environmental Quality Act (CEQA).

The summary provides a general overview of the project impacts to each of the biological resources that are present on the project site, including linears have the potential to be present on the site, or are present off-site and have the potential to be indirectly affected by the proposed project. This summary also describes potential mitigation measures that may be employed to avoid or reduce potentially significant project impacts.

Vegetation and Rare Plants: Construction of the Palmdale Hybrid Power Project (PHPP) and linear facilities would result in the conversion of both native and non-native vegetation in the Antelope Valley and the foothills of the San Gabriel Mountains. These plant communities support a broad diversity of plants and wildlife and have the potential to support special-status wildlife species such as desert tortoise, Mohave ground squirrel, and Swainson's hawk. Although the power plant site is largely isolated from adjacent native plant communities by development, the large size of the parcel (over 400 acres) coupled with the presence of native vegetation, have resulted in the maintenance of habitat that supports numerous wildlife species. Grading on the plant site and linear facilities would result in direct and indirect impacts to native vegetation; sensitive plant communities; sensitive and common plants and wildlife; and jurisdictional habitats.

Development of the power block, solar arrays and linear facilities would result in the permanent loss of approximately 463.33 acres of native and non-native plant communities. These include Joshua Tree Woodland, Mojavean Juniper Scrub, and Mojave Desert Wash Scrub which are considered sensitive and would require compensation to reduce impacts to less than significant levels. Construction of the PHPP power block, solar arrays and linear facilities would also result in the loss of Mojave Creosote Bush Scrub; Desert Saltbush Scrub; Rabbitbrush Scrub; Agricultural Land; California Annual Grasslands; and Disturbed/Developed Land.

To reduce project effects on vegetation communities, staff has proposed Conditions of Certification **BIO-1** through **BIO-9** (Designated Biologist Selection, Designated Biologist Duties, Biological Monitor Qualifications, Biological Monitor Duties, Designated Biologist and Biological Monitor Authority, Worker Environmental Awareness Program, Biological Resources Mitigation Implementation and Monitoring Plan, Impact Avoidance and Minimization Measures, and Compliance Verification), and **BIO-10** (Revegetation for Impacts to Native Vegetation). The permanent loss of sensitive vegetation would be offset through the acquisition of mitigation lands for the Mohave ground squirrel in staff's proposed Condition of Certification **BIO-20.**

Threatened or endangered plants were not identified in the project area. Only one sensitive plant, crowned muilla, a California Native Plant Society List 4.2 species, was observed by the applicant during botanical surveys of the project area conducted in 2007, 2008, and 2010. Staff believes that impacts to crowned muilla which occur on the proposed PHPP power plant site would be less than significant under CEQA. Impacts to other rare plants which may occur in the project area would be reduced to less than significant levels through the implementation of staff's Condition of Certification **BIO- 11**.

Common Wildlife and Nesting Birds: Construction of the PHPP power block and solar arrays would adversely affect common wildlife and nesting birds that occur on the project site through the loss of habitat. To reduce project effects on wildlife, staff has proposed Conditions of Certification **BIO-1** through **BIO-10**. Impacts to habitat loss would be compensated by the application of Condition of Certification **BIO-20** (Mohave Ground Squirrel Habitat Compensation), and impacts to nesting birds would be avoided by the application of **BIO-15** (Pre-Construction Nest Surveys and Impact Avoidance Measures for Migratory Birds). In addition, while the project is not located in an important migratory pathway construction of the project is expected to result in adverse effects on bird species. It is unknown how birds will respond to the project once operational, due to the fact that solar technology has not been implemented and studied on a large scale. Therefore, staff cannot conclude that impacts to birds from collision with the placement of the solar arrays are not significant. Staff has proposed Condition of Certification **BIO-24** (Avian Protection Plan / Monitoring Bird Impacts from Solar Technology), which would require the applicant to prepare and implement an Avian Protection Plan, including a Bird Monitoring Study to monitor the death and injury of birds from collisions with facility features such as the solar arrays. In addition, while some disturbance-tolerant birds are expected to continue foraging on the project site once it is developed; most native birds are not expected to frequent the site.

Sensitive Wildlife: Construction of the power block, solar arrays and linear facilities also has the potential for impacts to listed species including desert tortoise (federal- and state-listed Threatened), Mohave ground squirrel (state-listed Threatened), and Swainson's hawk (state-listed Threatened). In addition, construction of the PHPP has the potential to directly and indirectly impact numerous other sensitive wildlife species including coast horned lizards, small mammals, and burrowing owls. Potential direct and indirect impacts to wildlife at the PHPP plant site and along the linear facilities can be reduced to less-than-significant levels with impact avoidance and minimization measures described in staff's proposed Conditions of Certification **BIO-1** through **BIO-12, BIO-15**, **BIO-18**, **BIO-20, BIO-21**,and **BIO-22**.

Desert tortoise: Although suitable habitat occurs on the project site, desert tortoise has not been detected on the PHPP power plant site or along the transmission line alignment. The closest sighting of desert tortoise is a 2001 record reported from approximately nine miles northeast of the northeast corner of transmission line Segment 1. Staff considers the likelihood of desert tortoise occurring on the PHPP power plant site to be extremely low, however there remains a potential for this species to occur along the transmission line alignment.

Based on the low potential for occurrence staff has not proposed compensatory mitigation for the loss of desert tortoise habitat. To reduce effects to desert tortoise

should they occur, staff has proposed Conditions of Certification **BIO-1** through **BIO-9**, which apply to protection of desert tortoise and other biological resources in and near the PHPP. Staff's proposed Condition of Certification **BIO-13** would involve additional conditions including installation of tortoise exclusion fencing, clearance surveys, monitoring; and verification that all desert tortoise impact avoidance, minimization, and compensation measures have been implemented. Staff's proposed Condition of Certification **BIO-14** would require the development and implementation of a Raven Monitoring, Management, and Control Plan and the payment of a raven management fee to minimize impacts to desert tortoise resulting from increases in raven populations. Implementation of these conditions would reduce impacts to desert tortoise, if present, to less-than-significant levels and would satisfy the California Department of Fish and Game's (CDFG) requirements under Fish and Game Code Section 2081.

Mohave Ground Squirrel: Although not detected in the project area the applicant has elected to consider the Mohave ground squirrel as being present and has proposed compensatory mitigation. Staff concludes that a compensatory mitigation ratio of 2:1 for the power plant site and 3:1 for the linear routes would be required to mitigate for this species. These ratios and the applicant's impact avoidance, minimization, and compensation measures provided in the Incidental Take Permit application have been incorporated into staff's proposed Conditions of Certification **BIO-19** and **BIO-20**. Implementation of these conditions would reduce impacts to Mohave ground squirrel to less-than-significant levels and would satisfy the CDFG's requirements under Fish and Game Code Section 2081.

Swainson's hawk: Suitable foraging and nesting habitat occurs within the project area, on the power plant site, and transmission line routes. Nesting Swainson's hawks have not been detected on the project site or linear facilities. The applicant considered Swainson's hawk to be absent from the project area and specific mitigation for this species was not proposed by the applicant. However, Swainson's hawk was observed by both CDFG and staff on the PHPP project site and transmission line corridor. Construction of the PHPP transmission line would result in the removal of 300 acres of foraging habitat. This includes 10.22 acres of agricultural lands 116.55 acres of Mojave creosote bush scrub, and 183.15 acres of Joshua tree woodland. With the exception of the 10.22 acres of lost agricultural lands that will require compensatory mitigation; staff would consider the dedication of mitigation lands for Mohave ground squirrel identified in Condition of Certification **BIO-20** to compensate for loss of native plant communities if they are located within 15 miles of known Swainson's hawk nest sites. Otherwise the applicant would be required to dedicate other native lands or increase the ratio of agricultural lands to mitigate the loss of foraging habitat for this species. However, for the purposes of compliance with CESA the applicant must provide security for the replacement costs of 300 acres of foraging habitat. By the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9** which include worker training, implementation of Best Management Practices, and biological monitoring, and Conditions of Certification **BIO-16** and **BIO-17**, which include pre-construction surveys and compensatory mitigation, potential impacts to Swainson's hawk would be reduced to less-than-significant levels and the project would be in compliance with the California Department of Fish and Game's requirements to fully mitigate the project's impacts under section 2081 of the California's Fish and Game Code.

Burrowing Owl: Burrowing owls or their sign (i.e., individuals, pellets, or feathers) were not observed within 500 feet of the PHPP power plant site or linear facilities. One burrowing owl was observed adjacent to the transmission line Segment 1 approximately 1,200 feet from the project alignment. Although surveys did not detect direct sign of burrowing owls, the applicant noted the presence of rodent burrows in the project area which provide nesting opportunities. Although burrowing owls were not detected, suitable nesting and foraging habitat is present in the PHPP project area. To reduce potential impacts to this species staff has proposed Condition of Certification **BIO-18** which requires pre-construction surveys for burrowing owls. As a component of **BIO-18** staff is requiring the applicant to provide updated maps that more accurately characterize potential habitat for this species prior to construction. With implementation of this condition, potential impacts to burrowing owls would be reduced to less-than-significant levels.

Golden Eagle: Golden eagle, a California Fully Protected species (i.e., may not be taken or possessed as defined under State law), were not observed at the PHPP power plant or along the linear facilities, but are known to occur in the region. The most likely potential for golden eagles to occur is along portions of the Segment 1 and Segment 2 transmission line corridors where the right of way crosses natural lands north of the San Gabriel Mountains. Golden eagles are not expected to frequent the PHPP power plant site due to its proximity to the Los Angeles World Airport and urbanized areas such as the city of Palmdale. Construction of the PHPP project is not expected to result in the loss of important foraging habitat for golden eagles and staff considered impacts to be less than significant due to the project's location in a largely urban environment. However, implementation of staff's proposed Condition of Certification **BIO-20**, the compensatory mitigation plan for Mohave ground squirrels, would further offset this habitat loss by the preservation of native vegetation in the region.

Region wide the USFWS has raised concerns regarding potential collision threats associated with solar and renewable technologies. To address potential collision concerns (discussed below under operational effects) staff has proposed Condition of Certification **BIO-24** (Avian Protection Plan / Monitoring Bird Impacts from Solar Technology). This requires a monitoring and reporting program that would document and report potential collision mortality from the proposed solar fields. The implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9, BIO-20,** and **BIO-24** which include worker training, implementation of Best Management Practices, pre-construction surveys, biological monitoring, and the avian protection plan, would be expected to reduce potential impacts to golden eagles to less-than-significant levels under CEQA, and the project would be in compliance with the California Department of Fish and Game's provision for no take of the State Fully Protected Species under Section 3511 of the California Fish and Game Code.

American Badger and Kit Fox: American badgers were not detected during project surveys in 2006 or 2008, although suitable grassland, desert scrub, and agricultural field habitats are present in the project area. Construction of the proposed project could cause direct effects to badgers and kit fox should these species be detected in the construction area. If avoidance of a non-maternity den is not feasible, badgers or kit foxes would be relocated. Implementation of **BIO-21** would reduce impacts to the American badger and desert kit fox to a less-than-significant level. Staff's proposed

Condition of Certification **BIO-20**, the compensatory mitigation plan for Mohave ground squirrel habitat, would also offset the loss of habitat for these species and reduce the impact from habitat loss to less-than-significant levels under CEQA.

Jurisdictional Waters: A total of 43 jurisdictional features were identified by the applicant in the project area. Twelve of these have been identified by the United States Army Corps of Engineers (USACE) as waters of the United States. Construction at the PHPP power plant site would not result in permanent impacts to State or federal jurisdictional waters, however the project's transmission line would span and access roads would cross a variety of jurisdictional features. Preliminary information provided by the applicant indicated that permanent impacts to jurisdictional waters would be avoided.

Staff's proposed Condition of Certification **BIO-23** provides recommendations and guidance consistent with CDFG Streambed Alteration Agreement requirements. These include restoration and compensation should permanent loss of state jurisdictional habitat occur. With implementation of staff's proposed Condition of Certification **BIO-23**, temporary impacts to 0.08 acre of State waters associated with desert washes would be mitigated to less-than-significant levels. This condition also fulfills requirements of CDFG's Lake and Streambed Alteration Agreement program pursuant to Fish and Game Code Section 1600 et seq.

Cumulative Impacts: Staff believes that implementation of the conditions of certification described below will minimize and offset the contributions of the PHPP to the cumulative loss of habitat for native plant communities and wildlife, including special-status species. Because of the PHPP project site's location in the regional landscape, the ability of this site to provide for long term recovery of listed species is low.

With implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-25**, construction, operation, and decommissioning of the PHPP would comply with all federal, state, and local laws, ordinances, regulations, and standards relating to biological resources and potential significant impacts to biological resources would be mitigated to less-than-significant levels.

INTRODUCTION

This section of the Final Staff Assessment provides the California Energy Commission (Energy Commission) staff's analysis of potential impacts to biological resources from the construction and operation of the proposed PHPP.

Information provided in this document addresses potential impacts to vegetation communities, aquatic resources, and special-status species. This analysis describes the biological resources at the project site and at the locations of ancillary facilities. This document explains the need for mitigation, evaluates the adequacy of mitigation proposed by the applicant, and specifies additional mitigation measures to reduce impacts to less-than-significant levels. It also describes compliance with applicable laws, ordinances, regulations, and standards (LORS) and recommends conditions of certification.

This analysis is based, in part, upon information provided in the PHPP Application for Certification (COP 2008a), Biological Resources Technical Report (ENSR 2008) and other submittals, responses to staff data requests (AECOM 2009a, AECOM 2009b, AECOM 2009c, AECOM 2009d, AECOM 2009f), and staff workshops (AECOM 2009g); site visits by Energy Commission staff on September 21 and September 25, 2009; March 18, 24, and 26, 2010, July 11, 2010; and October 14, 2010; communications with representatives from the CDFG and USFWS, and review of other projects occurring in the region; independent research; staff workshops and informational hearings (SES 2009n; 2009t); and review of comments and supplemental data provided by the applicant.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicant will need to abide by the laws, ordinances, regulations, and standards (LORS) during project construction and operation, as listed in **Biological Resources Table 1**.

Biological Resources Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Federal Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for protection of threatened and endangered plant and animal species and their critical habitat. "Take" of a federally-listed species is prohibited without an incidental take permit, which may be obtained through Section 7 consultation (between federal agencies) or a Section 10 Habitat Conservation Plan.
Migratory Bird Treaty (Title 16, United States Code, sections 703 through 711)	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act unless permitted by regulation (e.g., duck hunting).
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	Provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the act.
State	
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's rare, threatened, and endangered species. "Take" of a state-listed species is prohibited without an Incidental Take Permit.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals of California that are declared rare, threatened, or endangered.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations, Title 14, section 670.7).
Nest or Eggs (Fish and Game Code section 3503)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.
Migratory Birds (Fish and Game Code section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
California Environmental Quality Act (CEQA), CEQA Guidelines section 15380	CEQA defines rare species more broadly than the definitions for species listed under the state and federal Endangered Species Acts. Under section 15830, species not protected through state or federal listing but nonetheless demonstrable as "endangered" or "rare" under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society (CNPS) and some animals on the CDFG's Special Animals List.
Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.

Applicable Law	Description
Water Quality Control Plan for the Lahontan Region (Basin Plan)	The Basin Plan establishes water quality objectives that protect the beneficial uses of surface water and groundwater in the Region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provide comprehensive water quality planning. Beneficial uses for minor surface water bodies of the Koehn Hydrologic Area include wildlife habitat.
California Native Plant Protection Act of 1977 (Fish and Game Code section 1900 et seq.)	Designates state rare, threatened, and endangered plants.
California Desert Native Plants Act of 1981 (Food and Agricultural Code section 80001 et seq. and California Fish and Game Code sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.
Local	
Antelope Valley Areawide General Plan.	This plan requires the minimizing disruption and degradation of the environment, integrating land uses with natural environmental systems, instituting measures to mitigate the impacts of environmental hazards, and prohibiting expansion of urban uses into areas of rare and endangered species. It promotes the designation of significant plant and wildlife habitats as Significant Ecological Areas (SEAs), preservation of biotic diversity in the valley by designating rare and unique plant and animal SEAs and the measures for their protection, and adding new SEAs when appropriate. If projects have the potential to impact biotic resources, a biological assessment will be required. This plan requires the establishment of an open space network and prohibits the harvesting of Joshua trees or juniper trees for fuel or for their relocation out of its normal habitats. Management plans will be developed for MIS (Management Indicator Species) in cooperation with CDFG, standing dead trees will be maintained at reasonable density providing nesting habitat for raptors and other predators; interim management plans will be created when actual recovery plans do not exist.
City of Palmdale General Plan	The City of Palmdale General Plan (1993) sets forth goals to preserve and protect biological resources, including: (1) preserve significant natural and man-made open space areas; (2) protect significant ecological resources and ecosystems, including, but not limited to, sensitive flora and fauna habitat areas; (3) preserve designated natural hillsides and ridgelines in the Planning Area, to maintain the aesthetic character of the Antelope Valley; (4) protect the quality and quantity of local water resources; and (5) promote the attainment of state and federal air quality standards. Biological resources are addressed in the City's General Plan Goal ER2, which calls for protecting "…significant ecological resources and ecosystems, including, but not limited to, sensitive flora and fauna habitat areas." Significant Ecological Areas are identified at Big Rock Wash, Little Rock Wash, Ritter Ridge, Portal Ridge and Alpine Butte. Biological surveys are required for any new development in these areas, and significant environmental resources are required to be considered and preserved to the extent feasible. The plan also calls for the preservation of natural drainage courses and riparian areas containing significant concentrations of ecological resources, as well as significant Joshua tree woodlands. The City will require biological assessments and reports for projects in known or suspected natural habitat areas prior to Project approval. These reports will be used to establish significant natural habitat areas and ecologically sensitive zones to prevent disturbance and degradation of

Applicable Law	Description
	these areas. Recommended mitigation measures as identified in the reports will be required to be implemented as development occurs.
County of Los Angeles Significant Ecological Areas	Significant Ecological Areas are specified by the CLAGP as "ecologically important land and water systems that are valuable as plant or animal communities, often important to the preservation of threatened and endangered species, and conservation of biological diversity within the County." There are a total of 31 existing and proposed SEAs within Los Angeles County and a total of 11 within 10 miles of the project. Only the Little Rock Wash and Kentucky Springs SEA overlaps the Project area. Little Rock Wash SEA is spanned by the transmission line in two locations. (County of Los Angeles, 2007a).
City of Palmdale Native Desert Vegetation Ordinance	The City has adopted Ordinance No. 952, referred to as the Native Desert Vegetation Ordinance. This ordinance is designed to preserve a number of specimen-quality juniper (*Juniperus californica*) and Joshua trees (*Yucca brevifolia*) that add to community identity, and to encourage the use of native vegetation in new development landscaping. All landscaping for new developments must conform to the requirements set forth in the Native Desert Vegetation Ordinance

Desert Renewable Energy Conservation Plan – Interim Planning

In addition to the federal, state, and local LORS summarized above, federal and state agencies are currently collaborating to establish joint policies and plans to facilitate development of California's utility-scale renewable energy projects while conserving the State's biological resources. On October 12, 2009, the State of California and the U.S. Department of Interior entered into a Memorandum of Understanding (MOU) on renewable energy, building on existing efforts by California and its federal partners to facilitate renewable energy development in the state. The MOU stems from California and Department of Interior energy policy directives, California's legislative mandate to reduce greenhouse gases to 1990 levels by 2020, and Governor Arnold Schwarzenegger's goal in Executive Order # S-14-08 that 33 percent of California's electricity production come from renewable energy sources by 2020.

The California-Department of Interior MOU expands on several MOUs issued in 2008 to establish the activities of the California Renewable Energy Action Team (REAT). The REAT was initially formed with California Executive Order S-14-08 (issued November 18, 2008), to "*establish a more cohesive and integrated statewide strategy, including greater coordination and streamlining of the siting, permitting, and procurement processes for renewable generation* …."

The Energy Commission and CDFG are the primary state collaborators in the REAT, operating under a November 18, 2008 MOU between the two agencies to create a "one-stop process" for permitting renewable energy projects under their joint permitting authority. The BLM and the USFWS also participate in the REAT under a separate MOU signed in November 2008, which outlines the state and federal cooperation of the group. The October 12, 2009 MOU between California and the Department of Interior reiterates several tasks of the REAT provided for in S-14-08 and the Energy Commission-Fish and Game MOU.

The REAT's primary mission is to streamline and expedite the permitting processes for renewable energy projects in the Mojave and Colorado Desert ecoregions within the

State of California, while conserving endangered species and natural communities at the ecosystem scale. To accomplish this goal, the REAT Agencies are developing a Desert Renewable Energy Conservation Plan (DRECP), a science-based process for reviewing, approving, and permitting renewable energy applications in California. Once the DRECP is complete, anticipated in late 2012, the plan will provide tools to expedite coordination of federal and state endangered species act permitting. The DRECP will also offer a unified framework for state and federal agencies to oversee mitigation actions, including land acquisitions, for listed species.

The REAT Agencies approved a Planning Agreement to guide preparation of the DRECP on May 17, 2010. Section 8.9 of the Planning Agreement http://energy.ca.gov/2009publications/REAT-1000-2009-034/REAT-1000-2009-034-F.PDF> provides that the REAT Agencies will work to ensure that permitting for interim projects: be consistent with the preliminary conservation objectives for the DRECP; not compromise successful completion and implementation of the DRECP; facilitate Federal Endangered Species Act, California Endangered Species Act, National Environmental Policy Act, and California Environmental Quality Act compliance; and not be unduly delayed during preparation of the DRECP.

REAT Account

The REAT agencies signed a Memorandum of Agreement (MOA) with the National Fish and Wildlife Foundation (NFWF) to establish a REAT Account managed by NFWF that may be used by project developers as a tool to help implement specified mitigation for approved renewable energy projects in the Mojave and Colorado Desert region of southern California (the MOA is available at <www.energy.ca.gov/33by2020>). For each project using the REAT Account, an individual subaccount would be established for project specific tracking, compliance and accounting purposes. The subaccount would identify a list of the specific mitigation actions, the cost, and a timeframe for carrying out the actions. NFWF would manage the subaccount on behalf of the REAT agencies, and at their direction would disburse mitigation funding to satisfy mitigation requirements for impacts to biological resources. NFWF is a charitable non-profit corporation established in 1984 by the federal government to accept and administer funds to further the conservation and management of fish, wildlife, plants and other natural resources <hwww.nfwf.org>. Use of the REAT Account would not change any of the requirements a project proponent must fulfill in order to comply with applicable State and Federal environmental laws governing the permitting of the projects, but provides the project developer with an option for utilizing NFWF for carrying out the required mitigation. Staff's proposed Conditions of Certification **BIO-17** and **BIO-20** would provide the project owner with the option of implementing certain mitigation requirements through use of the REAT Account.

PROPOSED PROJECT

The City of Palmdale (City) proposes to construct a nominal 570-megawatt (MW) hybrid combined-cycle and solar thermal electrical generation facility on an undeveloped parcel within the City of Palmdale. Palmdale is located in the High Desert of Los Angeles County (LAC), approximately 60 freeway miles north of downtown Los Angeles (COP 2008a). The City of Palmdale is situated at an elevation of 2,700 feet, and is located in the Antelope Valley region of the western Mojave Desert. The Antelope

Valley is an internally drained basin bordered by the San Gabriel and Tehachapi Mountains. Near the center of the Antelope Valley, the dry basins, or playas, of Rosamond and Rogers lakes form the dominant natural landscape feature.

POWER PLANT SITE

The PHPP plant site is located south of East Avenue M (E Ave M) in the northernmost area of the City of Palmdale. The 333-acre plant development area is part of an approximately 600-acre City-owned property that is bounded by Sierra Highway to the west, East Ave M (Columbia Way) to the north, and U.S. Air Force Plant 42 on the south and east. Los Angeles World Airport (LAWA) currently operates a passenger terminal on Air Force Plant 42 as LA/ Palmdale Regional Airport (COP 2008a). The principal elements that have shaped the pattern and intensity of land uses in the Antelope Valley include major transportation corridors, Edwards Air Force Base, the future Palmdale International Airport, the U.S. Air Force Plant 42, and Fox Field (BLM 2006).

The proposed PHPP site would have a development footprint of 333 acres. Most of the PHPP site supports a mosaic of native plant communities including Creosote bush scrub, Saltbush scrub, and Joshua tree woodland. Several dirt access roads cross the parcel and a small barren area occurs near the center of the site. This area would support the solar thermal array, power block, access roads, and on-site support facilities such as an administration building, potable water tanks, and warehouse. To support construction, a temporary 50-acre construction laydown area would be located west of the proposed project site within the adjacent City-owned property. The main access to the site during construction and operation would be via a new street and signalized intersection at 10th Street developed by the City.

At the conclusion of construction, the PHPP plant site would be secured with eight-foot tall security fencing, with barbed wire or razor wire on top. Additionally, desert-style landscaping incorporating Joshua trees salvaged from the PHPP site is expected to be used to enhance the facility's appearance (COP 2008a). The planned PHPP construction schedule would last 27 months and the planned operational life of the project is 30 years. However, the PHPP facility could operate for a longer or shorter period depending on economic or other circumstances (COP 2008a).

Zero-Liquid Discharge System

The PHPP will be a zero liquid discharge (ZLD) design and evaporation ponds will not be required. Brine (cooling water blowdown) from the Project will be processed to solid waste on site and disposed of at an appropriately permitted offsite disposal facility (AECOM 2009e).

Infiltration Basins

The PHPP will require the construction of infiltration basins for stormwater management. These basins will range in size from 0.87 to 5.38 acres. Information provided in the AFC indicates that the maximum detention time will be 48 hours. The basins will be narrow steep-sided (33% slope) linear features lined with rip-rap. The basins will be fenced to keep out terrestrial wildlife and have been designed to drain completely and remain dry between rain events (AECOM 2009f).

Transmission Line

The proposed project includes a 230-kV transmission line connecting the PHPP site to Southern California Edison's (SCE) existing Vincent Substation, which is located south of the project site in an unincorporated area of Los Angeles County. Although the Vincent Substation is approximately 11 miles southwest of the project site, the proposed transmission line would be 35.6 miles long and would extend north and east of the project site, then south and back west, in order to avoid interference with existing aviation activities (COP 2008a).

The transmission line would be constructed in two segments within new and existing rights-of-way (ROW). Segment 1 would be 220-kV double circuit line 23.7 miles long, and would start from the project site and end at SCE's Pearblossom Substation. The majority of this route, approximately 18.2 miles, would be within the city of Palmdale, while the remaining 5.5 miles would be within unincorporated Los Angeles County (LAC) lands. Segment 1 would require a new transmission line ROW in the form of a utility corridor easement for the entire route (AECOM 2009a). As such, this segment would require permanent components including stub roads and pole foundations, and construction would require temporary components including pull sites and two construction laydown sites.

Segment 2 would consist of 11.9 miles of double-circuit 230-kV transmission line entirely within unincorporated LAC. This segment would parallel SCE transmission lines in an existing ROW, and therefore, would not require new stub roads (COP 2008a). However, a 0.5-acre construction laydown site and line pull sites would be required for Segment 2. These features would be constructed in the existing utility ROW.

Other Project-Related Features and Facilities

In addition to the proposed PHPP power plant site and the transmission line, there are other off-site features and facilities associated with the proposed project. These features and facilities include:

- A natural gas pipeline from the Southern California Gas Company line on E Avenue S located approximately 5 miles south of the proposed project site;
- A 7.4-mile reclaimed water supply pipeline extending west along E Avenue P from the Palmdale Water Reclamation Plant (PWRP), then north along the same route as the proposed natural gas pipeline to the east boundary of the proposed project site;
- A 1.37-mile potable water supply line along E Avenue M to the proposed power plant site; and
- A 1.54-mile sanitary wastewater pipeline along E Avenue M to the proposed power plant site.

Vegetation and Wildlife

Plant Communities

The PHPP is located in the Antelope Valley near the western and southern end of the Mojave Desert. The region is located in a broad transition zone between the desert and the Transverse Ranges which supports a variety of native and introduced plants and

wildlife. Though varied floristic influences exist in the Antelope Valley, this region has been subject to repeated disturbance from historic land uses such as farming, grazing, water diversion (i.e. Little Rock Reservoir and the California Aqueduct), and infrastructure development (i.e. the construction of residential and commercial properties, military land uses including Edwards Air Force Base, and Interstate 14 and Highway 138).

The PHPP consists of a large 333-acre parcel of desert scrub communities located within a matrix of urban development. Agricultural fields, a tank farm, an electrical sub-station, Air Force Plant 42, and an active rail line are also present in the project area. Vegetation on the project site is characterized by open, scattered assemblages of creosote bush scrub, saltbush scrub, and Joshua tree woodland. Dominant vegetation in most of the project area consists of creosote bush (*Larrea tridentata*) and saltbush (*Atriplex* spp.). A broad swath of Joshua tree woodland crosses the site. Outside of the project footprint, a large windrow of salt cedar (*Tamarisk* spp.) occurs along the eastern side of the Air Force Plant 42 access road. The proposed transmission line also crosses a variety of native and non-native plant communities including creosote bush scrub, saltbush scrub, Joshua tree woodland, fallow and active agricultural fields, and juniper woodlands. In some areas large ornamental trees are present, often as a component of rural residences and agricultural areas. Numerous drainages are also present along the transmission line route and support a variety of riparian-associated plant communities including Mojave riparian forest and desert wash scrub. Linear facilities such as pipelines for natural gas and water occur primarily in developed roadways.

In response to staff comments on the Preliminary Staff Assessment (PSA) the applicant conducted additional vegetation mapping for the proposed Segment 2 transmission line right of way in 2010. This mapping effort resulted in the refinement of existing data and identified additional vegetation communities that occur in the project area. Currently the project area supports a variety of plant communities including California annual grassland; Big Sagebrush scrub; Scrub oak woodland; Desert scrub; Riparian scrub; Mojave Creosote Bush Scrub; Joshua Tree Woodland; Desert Saltbush Scrub; Rabbitbrush Scrub; Mojavean Juniper Scrub; Mojave Riparian Forest; Mojave Desert Wash Scrub; Agricultural Land (active and fallow) and Orchards; and Urban and Disturbed/Developed Land. Not all of these plant communities would be subject to disturbance from the construction or operation of the PHPP project. The expected permanent loss to these communities from the construction and operation of the PHPP are identified in **Biological Resources Table 2**.

Biological Resources Table 2.
Direct Permanent Surface Disturbance per Affected Vegetation Community and Project Component.

Vegetation Communities/Cover Types	Location					
	Power Plant Site	Construction Laydown Area	Pipelines*	Transmission Line Segments 1	Transmission Line Segments 2	**Total (acres)**
Mojave Creosote Bush Scrub	116.55	0	0	11.96	7.66	**147.39**
Joshua Tree Woodland	183.15	0	0	2.2	3.14	**189.31**
Desert Scrub (Buckwheat, saltbush, Brittlebush)	0	0	0	11.79	5.11	**16.89**
Rabbitbrush Scrub	33.0	50.0	0	00.98	0	**84.28**
Mojavean Juniper Scrub	0	0	0	0	6.71	**6.71**
Mojave Riparian Forest	0	0	0	0	0	**0**
Big Sagebrush Scrub	0	0	0	0	0.20	**0.20**
California Annual Grassland	0	0	0	0	5.11	**5.11**
Mojave Desert Wash Scrub	0	0	0	0.39	0	**0.39**
Agricultural Land	0	0	0	10.22	0	**10.22**
Urban and Disturbed Lands	0	0	0	2.82	0	**2.82**
Total (acres)	**332.65**	**50.0**	**0**	**50.38**	**27.93**	**463.33**

*Reclaimed Water, Natural Gas, and Sanitary Wastewater pipelines are located within existing roadways or disturbed road shoulders. The Potable Water Pipeline is located within the PHPP project footprint.

Vegetation

The following is a concise description of the various plant communities present in the project area. Detailed descriptions of plant communities identified by the applicant may be reviewed in the Biological Technical Report (AECOM 2009e).

Mojave Creosote Bush Scrub

Mojave Creosote Bush Scrub is one of the three dominant vegetation communities on the power plant site and is found primarily in the southeastern portion of the parcel. It also occurs in isolated populations in the northern portion of the transmission line route, and is the dominant vegetation community in the southeastern portions of the route. It is not found along the other linear facilities (i.e., the natural gas and water pipelines; COP 2008a).

Mojave Creosote Bush Scrub is dominated by creosote bush (*Larrea tridentata*) and may contain scattered emergent Joshua trees (*Yucca brevifolia*) at low density. Associated shrubs in this vegetation type are widely spaced and often include burro-weed (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), spiny senna (*Senna armata*), Nevada jointfir (*Ephedra nevadensis*), cheesebush (*Hymenoclea salsola*), and box thorn (*Lycium andersonii*). On the PHPP site, this community also includes bladderpod (*Isomeris arborea*), spiny hop-sage (*Atriplex* sp.), cheesebush (*Hymenoclea salsola*), and winterfat (*Krascheninnikovia lanata*). Several species of cacti, including golden cholla (*Cylindropuntia echinocarpa*) and beavertail cactus (*Opuntia basilaris*), were also

observed on the site (COP 2008a). Scattered emergent Joshua tree and California juniper are also common in this vegetation type, particularly along the transmission line route. The herbaceous layer of this community commonly contains annual grasses such as cheat grass, and may contain several species of ephemeral spring annual wildflowers following spring rains. On the PHPP site this includes a broad diversity of annual native wildflowers including sapphire wool star (*Eriastrum densifolium*), white tidy tips (*Layia glandulosa*), desert dandelion (*Malacothrix glabrata*), and goldfields (*Lasthenia californica*).

Joshua Tree Woodland

Joshua Tree Woodland is an open vegetation type dominated by Joshua trees and is one of the three dominant vegetation communities of the power plant site, stretching diagonally from the northeast portion to the southwest portion. Although Joshua trees are present in low density throughout the linear facilities as a component of other vegetation communities, Joshua Tree Woodland is only dominant in a few areas (COP 2008a). Commonly occurring shrub species include creosote brush, California buckwheat (*Eriogonum fasciculatum*), beavertail cactus, cholla (*Opuntia echinocarpa*), big sagebrush (*Artemisia tridentata*), and bladder sage (*Salazaria mexicana*). The herbaceous layer may contain a variety of annual wildflowers and exotic grasses, particularly in years with favorable rainfall. This vegetation type intergrades with creosote bush scrub in some areas along the transmission line. These are among the areas staff noted as possibly containing mapping errors.

While it is difficult to accurately determine the age of individual trees because the trunks of Joshua trees lack annual growth rings, it has been estimated that some trees can live for 200 years or more (USFS 2006). Joshua trees are very susceptible to disturbance, do not tolerate soil compaction, and are difficult to successfully relocate.

Desert Saltbush Scrub

Desert Saltbush Scrub is not present on the power plant site, reclaimed water pipeline, or natural gas supply pipeline. However, it is dominant along the northern and eastern portions of the transmission line route (COP 2008a). This community is characterized by low-growing, grayish, microphyllous shrubs and the presence of some succulent species (Holland 1986). The dominant saltbush species on-site includes four-winged saltbush (*Atriplex canescens*) and allscale (*Atriplex polycarpa*).

Big Sagebrush Scrub

Big sagebrush is a widely distributed species in the western United States that is associated with many vegetation types throughout its range. It occurs both as an important understory shrub in forest and woodland communities and as an emergent shrub in grassland communities (Sawyer and Keeler-Wolf 1995). In stands mapped as Big Sagebrush Scrub within the proposed project, big sagebrush is the sole or dominant shrub with California juniper sometimes occurring as emergent trees or in low densities. Associated shrubs may include rubber rabbitbrush and California buckwheat. The herbaceous layer may contain non-native annual grasses such as cheat grass. Within the proposed project area, this community is associated with sandy or gravely alluvium in the vicinity of Littlerock Creek.

California Annual Grassland

Much of Segment 2 has been subject to recent wildfires and appears to be type converting from juniper woodlands to annual grasslands and various desert scrub communities. California Annual Grassland is typically dominated by various non-native grasses including soft chess (*Bromus hordeaceus*), cheat grass (*B. tectorum*), ripgut brome (*B. diandrus*), and red brome (*B. madritensis* ssp. *rubens*)) (Sawyer and Keeler-Wolf 1995). Other dominant and/or abundant species may include wild oats (*Avena* spp.) and filarees (*Erodium botrys*, *E. cicutarium*). Staff noted that portions of the Segment 2 transmission line west of Mount Emma Road was actively grazed by sheep and goats in 2009 and 2010.

Rabbitbrush Scrub

Rabbitbrush Scrub is one of the three dominant vegetation communities on the power plant site. This community occurs in a couple of locations along the transmission line route, but is more abundant along the reclaimed water pipeline and natural gas supply pipeline routes (COP 2008a). Rabbitbrush Scrub is a disturbance-related vegetation type (Holland 1986) that occurs along roadsides and in areas that have been disturbed by fire, grading or other soil disturbance, or heavy grazing. Stands of Rabbitbrush Scrub are overwhelmingly dominated by rubber rabbitbrush, but may include other shrub species at low cover including big sagebrush, saltbush, and California buckwheat. Cheat grass often occurs in the herbaceous understory.

Mojave Juniper Scrub

Mojavean Juniper Scrub is a low, open woodland community that is dominated by California juniper (Holland 1986). This community is restricted to the southern Sierra Nevada, the Tehachapi Mountains, and the desert slopes of the Transverse and Peninsular ranges. While this vegetation type is described as a woodland, California juniper can be considered to be a either a shrub or a low tree with a maximum height of about 13 feet (Hickman 1993). Other shrubs commonly occurring in this vegetation type include big sagebrush, California buckwheat, Nevada joint fir, box thorn, and chaparral yucca. The herbaceous layer is dominated by annual grasses such as cheat grass and may contain jimson weed (*Datura wrightii*) and annual spring wildflowers.

Mojavean Juniper Scrub was mapped only along the southwestern portion of the transmission line, once the Project enters the foothills of the San Gabriel Mountain range. One other isolated community was mapped at the southern end of the natural gas supply pipeline (ENSR 2008). Staff raised concerns regarding the mapping effort for this plant community in the PSA; however, supplemental mapping conducted by the applicant has resolved staff's concern with the previous mapping efforts.

Mojave Riparian Forest

Mojave Riparian Forest is characterized by a relatively open forest community that occurs along the larger rivers and streams in the Mojave Desert (Holland 1986). Unlike forest communities exhibiting a more closed canopy, a dense, shrubby understory is able to become established in this community, which adds to both its species diversity and structural composition. One small patch of Mojave Riparian Forest occurs along the transmission line, just west of where it crosses Little Rock Wash. Several cottonwood

trees are present along with standing water (ENSR 2008). A narrow access road runs adjacent to this area and serves as the primary access to a number of existing transmission line towers. Off highway vehicle use and trash dumping was observed by staff in this area.

Mojave Desert Wash Scrub

Mojave Desert Wash Scrub is characterized by a low-growing, remarkably diverse scrub, but lacking the conspicuous microphyllous trees of desert dry wash woodland (Holland 1986). This community is found throughout the Mojave Desert, typically occurring in the sandy bottoms of wide canyons, incised arroyos of upper bajadas, and within braided, shallow washes of the lower bajadas, usually below 5,000 feet. Two areas of Mojave Desert Wash Scrub are crossed by the transmission line. Both areas are part of the Little Rock Wash SEA. Habitat conditions at the northern crossing of Little Rock Creek were characterized as disturbed Desert Saltbush Scrub. Invasive species were common in the wash and included large areas dominated by Russian thistle (*Salsola tragus*). Scattered mulefat (*Baccharis salicifolia*) occurred along the margins of the creek and large open areas within the drainage supported dried algal mats. This section of the wash appears to be routinely crossed by agricultural vehicles.

Agriculture Land (Active and Fallow) and Orchards

Agricultural land may be defined broadly as land used primarily for production of food and fiber (Holland 1986). Active and fallow agricultural lands are present along the northern portion of the transmission line (ENSR 2008). On Segment 1, the only crops observed during the survey period by staff were alfalfa (*Medicago sativa*) and onions (*Allium* spp.). Other agricultural areas were either bare soil being prepared for planting, fallow, or recently harvested alfalfa fields. The orchards present along Pearblossom Highway in the southern portion of the route are pear orchards enclosed by chain-link fencing (ENSR 2008); however, staff noted peaches (*Prunus* spp.) present in one orchard along Segment 2.

Urban and Disturbed/Developed Land

Urban Land is comprised of areas of intensive use with much of the land covered by structures (Holland 1986). Disturbed/Developed Lands are generally characterized as those areas that are either devoid of vegetation as a result of site grading, or developed or occupied with structures and/or landscaped with non-native ornamental plants or shade trees (ENSR 2008). Vegetative cover of these areas ranges from being entirely devoid of vegetation to having moderate ornamental landscaping. Garbage dumping is evident in some of these areas and storage of various items (e.g., vehicles, scrap wood, appliances, furniture) occurs on others. Although many sections of the alignment can be characterized as developed and have limited habitat value, many disturbed or barren areas still provide foraging areas for native species.

Sensitive Vegetation Communities

Sensitive vegetation communities are those that are considered rare in the region, support special-status plant or animal species, or receive regulatory protection. Several plant communities meeting the description of sensitive occur in the project area. The applicant identified six special-status habitats from the vicinity of the project site

including Canyon Live Oak Ravine Forest, Mojave Riparian Forest, Southern California Threespine Stickleback Stream, Southern Cottonwood Willow Riparian Forest, Southern Riparian Scrub, and Southern Sycamore Alder Riparian Woodland. These communities are either known or believed to be of high priority for inventory by the California Natural Diversity Data Base (CDFG 2009). Two of these communities, Mojave Riparian Forest and Southern Riparian Scrub, occur in the project area (COP 2008a).

Although not identified by the applicant as a sensitive vegetation community, Joshua tree and juniper woodland habitats support unique assemblages of plant and wildlife species, and vast acreages of these habitats have been lost over the last several decades due to urbanization and agricultural activities in the Antelope Valley. In general, other desert plant communities lack vertical structure and shade. However, these habitats provide the important structural characteristics for mammals and avian species. Additionally, unlike herbaceous or shrub-dominated habitats, arid woodlands are extremely slow-developing, with mature juniper and pinyon woodlands requiring as much as 150 years to reach full maturity (Wangler and Minnich 1996). Due to the unique floristic composition and structure of these communities, and due to historic and ongoing losses, several local plans, ordinances, and policies have designated Joshua tree woodland and juniper woodland habitats as special status. The CDFG considers Joshua Tree Woodland as globally “uncommon, but not rare”, but this plant community is considered vulnerable to extirpation or extinction within the state of California (CDFG 2007). For the purposes of this staff assessment, this community meets the definition of sensitive and worthy of consideration.

Jurisdictional Waters

The Antelope Valley Watershed, which contains the majority of the proposed project, is a large (3,387 square mile), closed basin in the western Mojave Desert. All water that enters the watershed either infiltrates into the underlying groundwater basin, or flows toward three playa lakes located near the center of the watershed. These playa lakes are all located on Edwards Air Force Base and include Rosamond Lake, Rogers Dry Lake, and Buckhorn Dry Lake. Rosamond and Rogers Dry Lakes are used by Edwards Air Force Base for flight test activities, research operations, and emergency landings. Rogers Lake has been declared a National Historic Landmark by the National Parks Service due to its role in the development of the United States’ space program (AFFTC 2005).
Near the proposed project, there are multiple ephemeral streams and washes that carry surface water to the playa lakes described above. As a result of the dry climate in the project area, the existing ephemeral streams and washes typically flow only during periods of heavy rainfall, or as a result of melting snowpack from the local mountains.

The project also spans Little Rock Creek, a major intermittent drainage that transports water from the San Gabriel Mountains to the playas described above. On Segment 1 Little Rock Creek is an ephemeral wash that typically flows in response to precipitation events. On Segment 2 this drainage is better characterized as intermittent and the creek may flow for extended periods of time once Little Rock Reservoir overtops. In 2009 AMEC noted breeding amphibians at this crossing including western toad (*Anaxyrus* [*Bufo*] *boreas*) (AECOM2009e).

The Preliminary Jurisdictional Determination and Delineation of Waters Report (Table 1. Page 6; AECOM 2009d) identified 43 drainages that would be considered State jurisdictional waters. Two of these features, the Palmdale Ditch (which transports surface flows from Little Rock Reservoir to Palmdale Lake) and the California Aqueduct, qualify as Waters of the United States (AECOM 2009d). Supplemental information provided by the applicant in 2010 identified 14 drainages that would qualify as waters of the United States (AECOM 2010c). Wetlands are not present in the project footprint. The applicant has indicated that all areas meeting the regulatory definition of "Waters of the U.S." or "Waters of the State" (jurisdictional waters), defined by Section 404 of the Clean Water Act and Section 1600 of the Fish and Game Code, will be avoided by the project or spanned by the proposed transmission lines. The applicant has also indicated that existing access roads currently traveling through potentially jurisdictional waters would require limited improvement however some temporary disturbance may be required at individual road crossings (AECOM 2009d).

Significant Ecological Areas (SEAs)

Significant Ecological Areas (SEAs) are specified by the County of Los Angeles General Plan as "ecologically important land and water systems that are valuable as plant or animal communities, often important to the preservation of threatened and endangered species, and conservation of biological diversity within the County." (Cal Atlas.gov 2010). One of the 10 community priorities described in the plan is the protection of the natural environment, natural resources, and open spaces (Community Priority # 9, Goal C/OS-5). The SEA designation provides an additional level of environmental review for many development projects. Unless deemed exempt development within an SEA requires a SEA-Conditional Use Permit. Because the California Energy Commission has preemptive authority for the permitting of the project a separate Conditional Use Permit would not be required. There are 11 SEAs that range from approximately 0.6 to 8 miles from the project site (COP 2008a). Segment 1 and 2 of the transmission line will span the Little Rock Wash SEA. The Kentucky Springs SEA is located at the terminus of the transmission line at the Vincent Substation.

Wildlife

The PHPP project area is located in the western Mojave Desert within the juncture of several different ecological regions. These include the Northern Great Basin, Transverse and Coast Ranges, West Mojave and Sonoran Deserts, Tehachapi Mountains, Sierra Nevada, and Great Central Valley. The large number of ecotones, or transition areas between different plant communities, in this region is due in part to its location in the San Andreas Rift zone. The variety of relief, edaphic conditions, surface hydrology and subsurface conditions, floristic diversity, and access to seasonal water support a rich diversity of fauna. These regions also serve as an important wildlife corridor from the Sierra Nevada Ranges to the Angeles and Los Padres National Forests and the Pacific Ocean.

The PHPP power block, associated solar array, and most of the proposed linear facilities occur on native desert scrub communities which support a diverse assemblage of wildlife. With the exception of the transmission line routes, the arid conditions in the project area support a limited number of amphibians. Western toad was observed at Little Rock Creek and riparian vegetation on portions of Little Rock Creek in Segment 2

likely support California tree frogs (*Pseudacris cadaverina*) and Pacific tree frog (*P. hypochondriaca*). Arroyo toad (*A.* [Bufo] *californicus*), a federally endangered species and California Species of Special Concern, occurs in Little Rock Creek approximately 2.5 miles south of the transmission line crossing of Little Rock Creek at Mt. Emma Road. However, the construction of the Little Rock Reservoir has likely resulted in the extirpation of this species from the project area.

The broad diversity of vegetation communities and topographical features in the project area supports a variety of reptiles, many unique to particular vegetation types. The applicant identified several common species in the project area including western fence lizard (*Sceloporus occidentalis*), side-blotched lizard (*Uta stansburiana*), gopher snake (*Pituophis catenifer*), desert iguana (*Dipsosaurus dorsalis*), desert night lizard (*Xantusia vigilis*), long-nosed leopard lizard (Gambelia wislizenii), and Mojave rattlesnake (*Crotalus scutulatus*). Other reptiles that are expected to occur in the project area include glossy snake (*Arizona elegans*), common kingsnake (*Lampropeltis getula*), California whipsnake (*Masticophis lateralis*), red racer (*Masticophis flagellum*), night snake (*Hypsiglena chlorophaea*), long-nosed snake (*Rhinocheilus lecontei*), spotted leaf-nosed snake (*Phyllorhynchus decurtatus*), western patch-nosed snake (*Salvadora hexalepis*), and lyre snake (*Trimorphodon biscutatus*). Reptile species expected in Mojave riparian forest and desert wash habitats include the Gilbert skink (*Eumeces gilberti*), common garter snake (*Thamnophis sirtalis*), and southern alligator lizard (*Elgaria multicarinata*).

Birds were the most commonly detected wildlife species in the project area. Some of the species observed by the applicant include verdin (*Auriparus flaviceps*), LeConte's thrasher (*Toxostoma lecontei*), black-throated sparrow (*Amphispiza bilineata*), and California quail (*Callipepla californica*). On the project site Joshua trees provided suitable nesting substrate for numerous species including red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), ladder-backed woodpecker (*Picoides scalaris*), loggerhead shrike (*Lanius ludovicianus*), Bewick's wren (*Thryomanes bewickii*), cactus wren (*Campylorhynchus brunneicapillus*), northern mockingbird (*Mimus polyglottos*), and Scott's oriole (*Icterus parisorum*).

Birds observed utilizing scrub communities in the project area included burrowing owl (*Athene cunicularia*), lesser nighthawk (*Chordeiles acutipennis*), horned lark (*Eremophila alpestris*), western meadowlark (*Sturnella neglecta*), sage sparrow (*Amphispiza belli canescens*), migrant or wintering Brewer's (*Spizella breweri*), chipping (*Spizella passerina*), and savannah sparrows (*Passerculus sandwichensis*). Juniper woodland habitat supported species such as western scrub jay (*Aphelocoma californica*), phainopepla (*Phainopepla nitens*), and house finch (*Carpodacus mexicanus*). Although not observed Bendire's thrasher (*Toxostoma bendirei*) and American robin (*Turdus migratorius*) would also be expected to occur in this area.

Although the riparian habitat in the project area is fairly small, many migratory birds use these desert riparian areas as stopover habitat for foraging and rest. These include flycatchers, warblers, vireos, thrushes, tanagers, and grosbeaks. Common birds that were observed in this habitat by the applicant include Bullock's oriole (*Icterus bullockii*), black-headed grosbeak (*Pheucticus melanocephalus*), and orange-crowned warbler (*Vermivora celata*). Although not expected to occur in the project area, a few rare avian

species may potentially breed in riparian areas within the Antelope Valley region. These include the yellow-billed cuckoo (*Coccyzus americanus*), vermilion flycatcher (*Pyrocephalus rubinus*), southwestern willow flycatcher (*Empidonax traillii extimus*), least bell's vireo (*Vireo bellii*), yellow-breasted chat (*Icteria virens*), and summer tanager (*Piranga rubra*). Staff noted during surveys of Little Rock Creek in 2010 that two least bell's vireo males were detected calling in riparian habitat near the base of Little Rock Dam. While nesting was not confirmed staff considers it possible that riparian habitat upstream of the proposed Segment 2 transmission line corridor supports nesting habitat for this species. A single summer tanager was also noted in this area in 2010.

A large number of birds use agricultural fields in the Antelope Valley. Wintering ferruginous hawk (*Buteo regalis*), great horned owl (*Bubo virginianus*), and common raven (*Corvus corax*) were observed by the applicant and regularly hunt for voles, insects, and other prey in these fields. Other common birds that forage on invertebrates and/or seeds in agricultural fields in the Antelope Valley include killdeer (*Charadrius vociferous*) and American pipit (*Anthus rubescens*). Alfalfa fields are especially important as the primary foraging area for the locally nesting Swainson's hawk (*Buteo swainsoni*), a species listed as threatened by the CDFG that was observed by staff and CDFG on the project site. They also serve as habitat for flocks of mountain plovers (*Charadrius montanus*) that regularly winter in the Antelope Valley.

Many mammals are known to occur in the Antelope Valley. Within the project area, creosote bush scrub and other desert scrub communities provide foraging and breeding habitat for many mammalian species including Mohave ground squirrel (*Spermophilus mohavensis*), pocket mouse (*Perognathus* spp.), white-tailed antelope squirrel (*Ammospermophilus leucurus*), California ground squirrel (*Spermophilus beecheyi*), desert kangaroo rat (*Dipodomys deserti*), Merriam's kangaroo rat (*D. merriami*), desert cottontail (*Sylvilagus audubonii*), desert woodrat (*Neotoma lepida*), kit fox (*Vulpes macrotis*), and coyote (*Canis latrans*). The high-quality Joshua tree woodland in the project area provides foraging and breeding habitat for the cactus mouse (*Peromyscus eremicus*), canyon mouse (*Peromyscus crinitus*), and American badger (*Taxidea taxus*). Several bat species may forage over desert scrub and Joshua tree woodland, such as pallid bats (*Antrozous pallidus*), western pipistrelles (*Pipistrellus hesperus*), big free-tailed bat (*Nyctinomops macrotis*), western mastiff bat (*Eumops perotis*), Mexican free-tailed bat (*Tadarida brasiliensis*), and spotted bat (*Euderma maculatum*).

Juniper woodland provides breeding and foraging habitat for many mammals, such as the Panamint kangaroo rat (*Dipodomys panamintinus*), long-tail pocket mouse (*Chaetodipus formosus*), pinyon mouse (*Peromyscus truei*), and mule deer (*Odocoileus hemionus*). Common mammalian predators utilizing this habitat include gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), and mountain lion (*Puma concolor*).

Mojave riparian forest provides foraging and breeding habitat for ornate shrew (*Sorex ornatus*), brush mouse (*Peromyscus boylii*), and southern grasshopper mouse (*Onychomys torridus*). Predators such as the long-tailed weasel (*Mustela frenata*) are likely to be attracted to the wooded riparian habitats that occur south of the project area on Little Rock Creek. Migrant bats such as the western red bat (*Lasiurus blossevilli*) and the hoary bat (*Lasiurus cinereus*) may occur in riparian areas in the spring and early fall. Year-round residents, such as the Yuma myotis (*Myotis yumanensis*), small-footed

myotis (*M. ciliolabrum*), and California myotis (*M. californicus*) will forage in the riparian forest and surrounding uplands.

Agricultural lands of mixed fallow and planted alfalfa provide foraging and breeding habitat for populations of Botta's gophers (*Thomomys bottae*), voles (*Microtus* sp.), western harvest mice (*Reithrodontomys megalotis*), and house mice (*Mus musculus*).

Special-Status Species

The project area is known to support a variety of sensitive plant and wildlife species. **Biological Resources Table 3** lists special-status species that are known to occur or could potentially occur in the project area and vicinity. For rare plants, only crowned muilla (*Muilla coronate*; CNPS List 4.2) was detected on site during the 2006, 2008, and 2010 survey efforts (ENSR 2008; COP 2008a). Staff considers the rainfall conditions during the 2006, 2008, and 2010 surveys to be adequate for determining the presence/absence of most rare plant species listed below. As identified in the PSA, staff raised concerns that while the annual rainfall in the region was adequate to detect rare plants the timing of the surveys (April-June) would have missed early blooming desert plants in 2008. Staff was also concerned that the applicant conducted rare plant surveys without visiting reference sites and utilized wildlife biologists to conduct many of the rare plant surveys. In response to staff concerns regarding the timing of botanical surveys in the project area, the applicant conducted additional botanical surveys in March and May 2010. These surveys visited reference sites, utilized botanists and were conducted in those areas of the PHPP where ground disturbing activities may occur prior to Spring 2011 (L&W2010j). The areas included the power plant site, construction laydown area, reclaimed water pipeline, and an area set aside as a Joshua tree preserve.

Nine special-status wildlife species were detected on site during the surveys and are described below. The Mohave ground squirrel was not detected during protocol surveys conducted for the PHPP, but the applicant has elected to assume presence in the project area. Potential for occurrence is defined as follows:

Present: Species or sign of their presence recently observed on the site (species that are present are noted in **bold text** in **Biological Resources Table 3**).

High: Species or sign not observed on the site, but reasonably certain to occur on the site based on conditions, species ranges, and recent records.

Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record exists in the vicinity.

Low: Species or sign not observed on the site, and conditions marginal for occurrence.

Not likely to occur: Species or sign not observed on the site, outside of the known range, and conditions unsuitable for occurrence.

Biological Resources Table 3
Special-Status Species, Their Status, and Potential Occurrence at the Palmdale Hybrid Power Project Site

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
PLANTS			
Androsace elongata ssp. acuta	California androsace	CNPS: 4.2	**High**
Arctostaphylos gabrielensis	San Gabriel manzanita	CNPS:1B.2	**Not likely to occur**
Astragalus lentiginosus var. *Antonius*	San Antonio milk-vetch	CNPS: 1B.3	**Not likely to occur**
Astragalus preussii var. laxiflorus	Lancaster milk-vetch	CNPS: 1B.1	**Low**
Calochortus clavatus var. *Clavatus*	Slender mariposa lily	CNPS: 4.3	**Low**
Calochortus palmeri var. *palmeri*	Palmer's mariposa lily	CNPS: 1B.2	**Not likely to occur**
Calochortus striatus	Alkali mariposa lily	CNPS: 1B.2	**Moderate**
Calystegia peirsonii	Pierson's morning glory	CNPS: 4.2	**High**
Canbya candida	Pygmy poppy	CNPS: 4.2	**High**
Carex vulpinoidea	Brown fox sedge	CNPS: 2.2	**Not likely to occur**
Castilleja gleasonii	Mt. Gleason Indian paintbrush	**SR,** CNPS: 1B.2	**Not likely to occur**
Castilleja plagiotoma	Mojave Indian paintbrush	CNPS: 4.3	**Moderate**
Chorizanthe parryi var. *fernandina*	San Fernando Valley spineflower	**FC, SE,** CNPS:1B.1	**Not likely to occur**
Chorizanthe parryi var. *parryi*	Parry's spineflower	CNPS: 1B.1	**Low**
Chorizanthe spinosa	Mojave spineflower	CNPS:4.2	**Moderate**
Cryptantha holoptera	Winged cryptantha	CNPS: 4.3	**High**
Delphinium parryi ssp. *purpureum*	Mt. Pinos larkspur	CNPS: 4.3	**Moderate**
Eriastrum hooveri	Hoover's eriastrum	**FD,** CNPS: 4.2	**Moderate**
Eriogonum baileyi var. *praebens*	Bailey's woolly buckwheat	CNPS: 4.3	**High**
Galium johnstonii	Johnston's bedstraw	CNPS: 4.3	**Moderate**
Gilia interior	Inland gilia	CNPS: 4.3	**Low**
Gilia latiflora ssp. *cuyamensis*	Cuyama gilia	CNPS: 4.3	**High**
Goodmania luteola	Golden goodmania	CNPS: 4.2	**Moderate**
Juncus duranii	Duran's rush	CNPS: 4.3	**Not likely to occur**
Layia heterotricha	Pale-yellow layia	CNPS: 1B.1	**Moderate**
Lilium parryi	Lemon lily	CNPS: 1B.2	**Not likely to occur**
Linanthus concinnus	San Gabriel linanthus	CNPS: 1B.2	**Not likely to occur**
Loeflingia squarrosa var. *artemisiarum*	Sagebrush loeflingia	CNPS: 2.2	**Not likely to occur**
Mimulus johnsoni	Johnston's monkeyflower	CNPS: 4.3	**Not likely to occur**
Muhlenbergia californica	California muhly	CNPS: 4.3	**Not likely to occur**
Muilla coronata	**Crowned muilla**	CNPS: 4.2	**Present**
Nemacladus gracilis	Slender nemacladus	CNPS: 4.3	**High**
Opuntia basilaris var. *brachyclada*	Short-joint beavertail	CNPS: 1B.2	**High**
Orobanche valida ssp. *valida*	Rock Creek broomrape	CNPS: 1B.2	**Not likely to occur**
Perideridia pringlei	Adobe yampah	CNPS: 4.3	**High**
Phacelia mohavensis	Mojave phacelia	CNPS: 4.3	**Low**
Stylocline masonii	Mason's bedstraw	CNPS: 1B.1	**Low**
Symphyotrichum greatae (=	Greata's aster	CNPS: 1B.3	**Not likely to occur**

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
Aster greatae)			
Syntrichopappus lemmonii	Lemmon's syntrichopappus	CNPS: 4.3	**High**
Viola aurea	Golden violet	CNPS: 2.2	**Low**
INVERTEBRATES			
Plebulina emigdionis	San Emigdio blue butterfly	CDFG Special Animal	**Low**
FISH			
Catostomus santaanae	Santa Ana sucker	**FT**, CSSC	**Not likely to occur**
Gasterosteus aculeatus williamsoni	Unarmored threespine stickleback	**FE**, **SE**, SP	**Not likely to occur**
Gila orcutti	Arroyo chub	CSSC	**Not likely to occur**
Rhinichthys osculus ssp.	Santa Ana speckled dace	CSSC	**Not likely to occur**
AMPHIBIANS			
Bufo californicus	Arroyo toad	**FE**, CSSC	**Not likely to occur**
Rana muscosa	Mountain (Sierra Madre) yellow-legged frog	**FE**, CSSC	**Not likely to occur**
Spea hammondii	Western spadefoot	CSSC	**Low**
REPTILES			
Anniella pulchra pulchra	Silvery legless lizard	CSSC	**High**
Charina bottae umbratica	Southern rubber boa	**ST**	**Not likely to occur**
Emys (Clemmys) marmorata pallida	Southwestern pond turtle	CSSC	**Low**
Gopherus agassizii	Desert tortoise	**FT, ST**	**Low on power plant/Moderate on Transmission line**
Phrynosoma coronatum blainvillii	San Diego horned lizard	CSSC	**High**
Phrynosoma coronatum frontale	California horned lizard	CSSC	**Moderate**
Thamnophis hammondii	Two-striped garter snake	CSSC	**Low**
BIRDS			
Accipiter cooperii	**Cooper's hawk**	CDFG WL	**Present**
Agelaius tricolor	Tricolored blackbird	CSSC	**Not likely to occur**
Aquila chrysaetos	Golden eagle	SP	**Low on power plant/Moderate on Transmission line**
Asio otus	Long-eared owl	CSSC-	**Moderate**
Athene cunicularia	**Western burrowing owl**	CSSC	**Present**
Buteo regalis	**Ferruginous hawk**	CDFG WL	**Present**
Buteo swainsoni	**Swainson's hawk**	**ST**	**Present**
Chaetura vauxi	**Vaux's swift**	CSSC	**Present**
Charadrius montanus	Mountain plover	CSSC	High
Circus cyaneus	Northern harrier	CSSC	**Low**
Coccyzus americanus	Yellow-billed cuckoo	**FC, SE**	**Not likely to occur**
Elanus leucurus	White-tailed kite	SP	**Low**
Empidonax traillii extimus	Southwestern willow flycatcher	**FE, SE**	**Low**
Eremophila alpestris actia	**California horned lark**	CDFG WL	**Present**
Falco columbarius	Merlin	CDFG WL	**High**
Falco mexicanus	**Prairie falcon**	CDFG WL	**Present**
Gymnogyps californianus	California condor	**FE, SE,** SP	**Low**
Haliaeetus leucocephalus	Bald eagle	**FD, SE,** SP	**High**
Icteria virens	Yellow-breasted chat	CSSC	**Low**
Lanius ludovicianus	**Loggerhead shrike**	CSSC	**Present**
Numenius americanus	Long-billed curlew	CDFG WL	**High**

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
Piranga rubra	Summer tanager	CSSC	**Low**
Pyrocephalus rubinus	Vermilion flycatcher	CSSC	**Low**
Toxostoma bendirei	Bendire's thrasher	CSSC	**Moderate**
Toxostoma lecontei	**LeConte's thrasher**	CDFG WL	**Present**
Vireo bellii pusillus	Least Bell's vireo	**FE, SE**	**Low**
MAMMALS			
Antrozous pallidus	Pallid bat	CSSC	**Moderate**
Chaetodipus fallax pallidus	Pallid San Diego pocket mouse	CSSC	**Moderate**
Corynorhinus townsendii	Townsend's big-eared bat	CSSC	**Low**
Euderma maculatum	Spotted bat	CSSC	**Low**
Eumops perotis	Western mastiff bat	CSSC	**Low**
Lasiurus blossevillii	Western red bat	CSSC	**Moderate**
Onychomys torridus ramona	Southern grasshopper mouse	CSSC	**Moderate**
Perognathus longimembris brevinasus	Los Angeles pocket mouse	CSSC	**Not likely to occur**
Spermophilus mohavensis	**Mohave ground squirrel**	**ST**	**Present**
Taxidea taxus	American badger	CSSC	**High**

FE = Federally listed Endangered
FT = Federally listed Threatened
FD = Federally Delisted
FC = Federal Candidate
SE = State listed Endangered
ST = State listed Threatened (wildlife)
SR = State listed Rare (plants)
CSSC = California Species of Special Concern (wildlife)
SP = State Fully Protected Species
CDFG WL = California Department of Fish and Game Watch List species

CNPS (California Native Plant Society) Designations:

List 1A = Plants presumed extinct in California
List 1B = Plants considered by CNPS to be rare, threatened, or endangered in California, and throughout their range
List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere in their range
List 3 = Plants about which we need more information - a review list.
List 4 = Plants of limited distribution – a watch list

CNPS Threat Rank:

.1 = Seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat)
.2 = Fairly endangered in California (20-80% occurrences threatened)
.3 = Not very endangered in California (<20% of occurrences threatened or no current threats known)

Amphibians

Arroyo Toad (Anaxyrus [Bufo] californicus)

The arroyo toad is a medium-sized toad, and adults range from 2.2 to 2.6 inches in length (USFWS 1999). Dorsal coloration ranges from cream to light gray to light greenish-gray. Adults are primarily nocturnal and usually active between the first major rains in January and February to early August (Cunningham 1962).

Adults typically require overflow pools adjacent to the inflow channel of streams that are generally 3rd order or greater and generally free of predators. Normally, shallow pools with sandy or gravely bottoms surrounded by little woody vegetation are preferred. Regular disturbance in the form of flooding is required to maintain areas of sparsely vegetated, sandy stream channels and terraces, which are used by adults and sub-adults for foraging and burrowing (USFWS 2001). Outside the breeding season, arroyo toads use a wide range of habitats in both upland (to a distance of at least 3,740 feet from the upland-riparian ecotone) and riparian areas (Holland and Sisk 2001). Upland habitats used by arroyo toads include coastal sage scrub, chaparral, oak woodland, grassland, riparian, and agricultural habitats (Griffin and Case 2001; USFWS 2001).

This species is known to occur above Little Rock Reservoir and there are California Natural Diversity Data Base (CNDDB) records for arroyo toad within Little Rock Creek (2001 and 1970; approximately 2 miles south of Segment 2) (CPUC 2009). Critical habitat exists in Little Rock Creek approximately 2.5 miles south of Segment 2. Because of the historic construction of the Little Rock Reservoir and the modification of existing hydrology and sediment regimes below the dam this species is expected to have a low potential to occur in the project area.

Reptiles

Silvery Legless Lizard (Anniella pulchra pulchra)

This unusual lizard is found in sandy or loose loamy soils in areas of sparse vegetation in habitats including beaches, chaparral, desert, pine-oak woodland, or under sycamores, cottonwoods, or oaks growing on stream terraces (Jennings and Hayes 1994). Legless lizards forage for insects and spiders underneath leaf litter or underneath sandy soil, usually at the base of shrubs or other vegetation (Jennings and Hayes 1994). Their adaptation for burrowing, which requires soils with a high sand fraction, makes legless lizards vulnerable to ground disturbing activities such as agriculture. This species may use riparian woodland with sandy soil along creek and upland habitat along the transmission line route.

Desert Tortoise (Gopherus agassizii)

The desert tortoise is an herbivore that may attain a carapace length of 9 to 15 inches. The tortoise is able to live where ground temperature may exceed 140° F because of its ability to dig burrows and escape intense solar radiation. At least 95% of its life is spent in burrows. The tortoise enters brumation (the reptilian form of hibernation) during the period from September to November and leaves the burrow during the period from February to April. The presence of soil suitable for digging burrows is a limiting factor to desert tortoise distribution (USFWS 1994). A single tortoise may have a dozen or more

burrows within its home range, and different tortoises may use these burrows at different times. Desert tortoises inhabit semi-arid grasslands, gravelly desert washes, canyon bottoms, and rocky hillsides (USFWS 1994).

Plant species play a major role in defining desert tortoise habitat. Creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), Mojave yucca (*Yucca schidigera*), and blackbrush (*Coleogyne ramosissima*) generally distinguish desert tortoise habitat. At higher elevations, Joshua tree and galleta grass (*Pleuraphis rigida*) are common plant indicators (USFWS 1994).

The desert tortoise's range includes the Mojave Desert region of Nevada, southern California, and the southwest corner of Utah and the Sonoran Desert region of Arizona and northern Mexico. The desert tortoise range is divided into Mojave and Sonoran populations. The desert tortoise in the vicinity of the PHPP is part of the Mojave population, which is primarily found in creosote bush-dominated valleys with adequate annual forbs for forage.

The nearest designated critical habitat and known occupied habitat for this species is located approximately 16 miles northeast of the project site within the Fremont-Kramer Desert Wildlife Management Area (DWMA) (ENSR 2008). However, suitable habitat (including Mojave creosote bush scrub and Joshua tree woodland) is present in the project area. Protocol-level surveys conducted in 2006 and 2008 on the power plant site did not detect any tortoises. During the 2008 survey, one burrow that could potentially be used by a tortoise was observed on the 3,960-foot Zone of Influence (ZOI) transect for the power plant site, west of the site. The mouth of the burrow was overgrown with vegetation, and no sign of recent use (e.g., scat, tracks, etc.) was evident (AECOM 2009e).

***San Diego Horned Lizard* (*Phrynosoma coronatum blainvillii*)**

The San Diego horned lizard is a medium-sized (6 to 6.25 inches) total length, flat-bodied species. This species occurs in a wide variety of habitats throughout its range, though found primarily in chaparral and mixed chaparral-coastal sage scrub, to stands of pure coastal sage scrub. It is also known to occur in riparian habitats, washes, and most desert habitats. They are occasionally locally abundant in conifer-hardwood and conifer forests. This species is most common in open, sandy areas where abundant populations of native ant species (e.g., *Pogonomyrmex* and *Messer* spp.) are present. They primarily eat insects such as ants and beetles. San Diego horned lizards have been documented at Little Rock Reservoir one mile south of the transmission line alignment at Mt. Emma Road. Suitable habitat is present in portions of the alignment.

Birds

Western Burrowing Owl (Athene cunicularia)

The burrowing owl is a small, terrestrial owl of open country. Burrowing owls favor flat, open grassland or gentle slopes and sparse shrubland ecosystems. These owls prefer annual and perennial grasslands, typically with sparse, or nonexistent, tree or shrub canopies (Clark and Plumpton 2005). In California, burrowing owls are found in close association with California ground squirrels (Coulombe 1971). Owls use the burrows of

ground squirrels and other rodents for shelter and nesting (Martin 1973). Ground squirrels provide nesting and refuge burrows, and maintain areas of short vegetation height, which provide foraging habitat and allow for visual detection of avian predators by burrowing owls (Haug et al. 1993). In the absence of ground squirrel populations, habitats soon become unsuitable for occupancy by owls. Burrowing owls are semi-colonial nesters, and group size is one of the most significant factors contributing to site constancy by breeding burrowing owls (Haug et al. 1993). The nesting season, as recognized by the California Burrowing Owl Consortium (CBOC 1993), runs from 1 February through 31 August.

In the Mojave Desert, burrowing owls generally occur at low densities in scattered populations, but they can be found in much higher densities near agricultural lands where rodent and insect prey tend to be more abundant (Gervais et al. 2008). The project area contains suitable foraging habitat and California ground squirrel burrows that could provide breeding habitat. One individual was observed on the 1,200-foot ZOI transect during surveys for desert tortoise in April 2008 along transmission line Segment 1.

Swainson's Hawk (Buteo swainsoni)

The Swainson's hawk was once one of the most common birds of prey in the grasslands of California and nested in the majority of the lowland areas of the state. Currently, the nesting range is primarily restricted to portions of the Sacramento and San Joaquin valleys, northeast California, and the Western Mojave, including the Antelope Valley (Bloom 1980). The Swainson's hawk requires large amounts of foraging habitat, preferably grassland or pasture habitats. Its preferred prey includes voles (*Microtus* spp.), gophers, birds, and insects such as grasshoppers (Estep 1989). It has adapted to the use of some croplands, particularly alfalfa, as well as grain, tomatoes, and beets (Estep 1989). Crops such as cotton, corn, rice, orchards, and vineyards are not suitable because they either lack suitable prey, or prey is unavailable to the hawks due to crop structure. Swainson's hawks often establish territories in riparian systems adjacent to suitable foraging habitats as well as utilizing lone trees or groves of trees in agricultural fields.

Suitable foraging and nesting habitat occurs within the project area, on the power plant site and transmission line routes. Nesting Swainson's hawks have been detected during surveys for other projects in the region in 2009. These seven records range from approximately 14 miles to approximately 23 miles northwest of the PHPP power plant site (CPUC 2009), and other recorded occurrences (3 records from 1979 to 1999) range from 3 to 4 miles from the project site (CDFG 2009). Protocol nest surveys conducted by the applicant did not detect nesting of this species in the project area. However, one adult was observed on the PHPP site by CDFG and one juvenile was observed on the transmission line route during a site visit in 2009. Similarly, information provided by CDFG indicated that in 2009 a nesting pair of Swainson's hawks was detected within five miles of the transmission line and ten miles from the PHPP power plant site (CDFG 2009).

Prairie Falcon (Falco mexicanus)

Prairie falcons breed throughout California, with the exception of the northwest corner and along the immediate coast (Steenhoff 1998). This species is an uncommon resident that ranges from the southeastern deserts northwest through the Central Valley and along the inner Coast Ranges and Sierra Nevada. It is primarily associated with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas (Polite and Pratt 2005). This species was observed foraging at the power plant site during field surveys in 2006, and at least three foraging individuals were observed during the reconnaissance-level surveys in September 2009 by staff.

Bald Eagle (Haliaeetus leucocephalus)

The bald eagle is a large soaring bird of prey. It weighs 10 to 15 pounds and has a body length of 2.7 feet and a wingspan of 7 feet. The bald eagle was historically abundant in California, but its numbers declined to fewer than 30 pairs by 1967, when the species was federally listed as endangered. It was state listed as endangered in 1971. Due to tremendous population recovery, however, the bald eagle was down-listed to federally Threatened in 1995 and delisted in 2007. The species is still listed as state endangered.

Most of the annual food requirements of bald eagles are derived from, or are obtained around, aquatic habitats. The type of food consumed is typically proportional to its availability and most often consists of fish, water birds, and small to medium sized mammals. Consequently, nesting territories are usually near water. In California, Thelander (1973) found that 75% of the nest trees surveyed in 35 nesting territories were within a quarter mile of a body of water.

In Southern California, bald eagles primarily winter adjacent to large reservoirs and inland waters (Garrett and Dunn 1981). Individuals have been most frequently observed at Big Bear Lake, Cachuma Lake, Lake Mathews, Nacimiento Reservoir, San Antonio Reservoir, and along the Colorado River (Zeiner et al. 1990a). The bald eagle is primarily a migrant and wintering species in Southern California, and recent breeding attempts on the mainland south of Santa Barbara County (e.g., Silverwood Lake, Lake Skinner, and Lake Perris) have been unsuccessful (USFWS, unpublished data). Although this species is rare in Southern California (Garrett and Dunn 1981), it has been observed in suitable habitats throughout Los Angeles, Orange, Riverside, and San Bernardino counties. A bald eagle has been observed foraging at Little Rock Reservoir, approximately 1.5 miles south of transmission line Segment 2 (L. Welch, personal communication).

Golden Eagle *(Aquila chrysaetos)*

Golden eagles are typically year-round residents throughout most of their western United States range. They breed from late January through August with peak activity March through July (Kochert et al. 2002). Migratory patterns are usually fairly local in California where adults are relatively sedentary, but dispersing juveniles sometimes migrate south in the fall. This species is generally considered to be more common in southern California than in the northern part of the state (USFS 2008).

Habitats for this species typically include rolling foothills, mountain areas, and deserts. Golden eagles need open terrain for hunting and prefer grasslands, deserts, savanna,

and early successional stages of forest and shrub habitats. Golden eagles primarily prey on lagomorphs and rodents but will also take other mammals, birds, reptiles, and some carrion (Kochert et al. 2002). This species prefers to nest in rugged, open habitats with canyons and escarpments, with overhanging ledges and cliffs and large trees used as cover.

Absent interference from humans, breeding density is determined by either prey density or nest site availability, depending upon which is more limiting (USFWS 2009a). A compilation in Kochert et al. (2002) of breeding season home ranges from several western United States studies showed an average home range of 20–33 square kilometers (7.7 to 12.7 square miles) that ranged from 1.9 to 83.3 square kilometers (0.7 to 32.2 square miles). In San Diego, a study of 27 nesting pairs found breeding ranges to be an average of 36 square miles with a range from 19 to 59 square miles (Dixon 1937). Other studies from within and outside the United States include ranges from 9 to 74.2 square miles (McGahan 1968; Watson et al. 1992).

Golden eagles have not been observed at the PHPP project site and are not expected to be common species within the developed portions of the Antelope Valley. There is a potential for this species to occur along the transmission line right of way. Nesting habitat is generally not present on or adjacent to the project site however this species likely nests within the San Gabriel Mountains south of the Segment 2 transmission line.

Loggerhead Shrike (Lanius ludovicianus)

Loggerhead shrikes are uncommon residents throughout most of the southern portion of their range, including southern California. In southern California they are generally much more common in interior desert regions than along the coast (Humple 2008). In the Mojave Desert this species appears to be most numerous in flat or gently sloping deserts and desert/scrub edges, especially along the eastern slopes of mountainous areas (Humple 2008). Loggerhead shrikes initiate their breeding season in February and may continue with raising a second brood as late as July; they often re-nest if their first nest fails or to raise a second brood (Yosef 1996).

This species can be found within lowland, open habitat types, including creosote scrub and other desert habitats, sage scrub, non-native grasslands, chaparral, riparian, croplands, and areas characterized by open scattered trees and shrubs. Fences, posts, or other potential perches are typically present. In general, loggerhead shrikes prey upon large insects, small birds, amphibians, reptiles, and small rodents over open ground within areas of short vegetation, usually impaling prey on thorns, wire barbs, or sharp twigs to cache for later feeding (Yosef 1996).

Suitable habitat for loggerhead shrike occurs throughout the scrub habitats within the project survey area and loggerhead shrikes were observed frequently during the 2006 and 2008 surveys (COP 2008a). Individuals were detected in grassland, alkali sink, open scrub, and agricultural fields, and this species likely nests onsite.

Mammals

Pallid Bat (Antrozous pallidus)

The pallid bat is a light brown or sandy colored, long-eared, moderate-sized bat that occurs throughout California with the exception of the northwest corner of the state and the high Sierra Nevada (Zeiner et al. 1990b). Pallid bats are most commonly found in oak savannah and in open dry habitats with rocky areas, trees, buildings, or bridges for roosting. Coastal colonies commonly roost in deep crevices in rocky outcroppings, in buildings, under bridges, and in the crevices, hollows, and exfoliating bark of trees. Colonies can range from a few individuals to over a hundred (Barbour and Davis 1969) and usually this species occurs in groups larger than 20 individuals (Wilson and Ruff 1999). Although crevices are important for day roosts, night roosts often include open buildings, porches, garages, highway bridges, and mines. Pallid bats may travel up to several miles for water or foraging sites if roosting sites are limited. This bat prefers foraging on terrestrial arthropods in open habitats and regional populations and individuals may show selective prey preferences (Johnston and Fenton 2001). They may also occur in open coniferous forests. Pallid bat roosts are very susceptible to human disturbance, and urban development has been cited as the most significant factor contributing to their regional decline (Miner and Stokes 2005).

There is one CNDDB (2009) record for a pallid bat in Soledad Canyon from 1942, approximately 4.8 miles southwest of the Vincent Substation. Suitable habitat occurs adjacent to project area and the nearest record is approximately 11 miles west in Soledad Canyon. Several rocky outcrops occur at Little Rock Creek and along portions of the transmission line south of Mt. Emma Road. In addition, tunnels associated with the Palmdale ditch may provide roosting habitat.

Pallid San Diego Pocket Mouse (Chaetodipus fallax pallidus)

The pallid San Diego pocket mouse has been found in pinyon-juniper woodland, desert scrub, rocky slopes, and agave-ocotillo habitat (Lackey 1996). On desert slopes of the eastern San Gabriel Mountains, the species' distribution was closely correlated with the presence of yucca, particularly on dry, rocky southern slopes (Vaughan 1954). It can be found in sandy herbaceous areas, usually in association with rocks or coarse gravel. Suitable habitat occurs in the project area.

Mohave Ground Squirrel (Spermophilus mohavensis)

The Mohave ground squirrel (MGS) is rare throughout its range and is restricted to the Mojave Desert in San Bernardino, Los Angeles, Kern, and Inyo Counties. This species inhabits desert areas, including alluvial fans, basins, and plains with an abundance of native herbaceous vegetation. MGS can be found in Mojave creosote bush scrub, shadscale desert scrub, alkali scrub, and Joshua tree woodland. This species tends to avoid rocky areas and typically constructs burrows in sandy, alluvial, and gravelly soils (Best 1995). Home range size averages approximately 0.91 acres and varies from 0.25 to 2 acres.

The MGS emerges from aestivation in spring, typically between mid-February and March, and actively forages for vegetation, seeds, arthropods, and fruit (Best 1995) and tends to stay close to its burrow while foraging. Burrows are used for aestivation and

hibernation, predator avoidance, and thermoregulation. The breeding season occurs soon after emergence, and gestation lasts approximately 30 days (Best 1995). After acquiring fat stores for hibernation, the Mohave ground squirrel typically enters aestivation in July or August.

Documented occurrences of MGS (21 records from 1930 to 1992) range from approximately 0.5 to 10 miles from the project site (CDFG 2009). MGS were not observed on the project site during the focused biological surveys conducted in 2008; however MGS trapping was not conducted in 2008, 2009, or 2010. MGS trapping surveys conducted on the power plant site in 2006 by Eremico Biological Services (2006) and CSU Stanislaus (2006) did not detect any MGS (COP 2008a). Dr. Phil Leitner, a recognized expert on Mohave ground squirrel, conducted a habitat assessment of the power plant site and linear facilities in 2008 (COP 2008a). He concluded that the power plant site contains high quality habitat, but its functional value is reduced because it is an isolated patch of habitat surrounded by unsuitable habitat. The construction laydown area does not contain suitable habitat. The transmission line route is composed of suitable and unsuitable habitat (28 of the 35.6 miles is in the historic range of MGS). The reclaimed water pipeline route is composed of poor quality habitat and unsuitable habitat; the natural gas supply pipeline route is composed of poor quality habitat and unsuitable habitat; and the sanitary wastewater pipeline route is composed of suitable habitat. However, no disturbance would occur to the habitat along the pipeline routes because the lines would be located in City street ROWs. Despite the negative trapping results obtained in 2006, the project applicant has elected to assume presence of the MGS in suitable habitats on the power plant site and along portions of the transmission line, and has consulted with CDFG regarding project impacts to this state-listed species (COP 2008a).

American Badger (Taxidea taxus)

American badgers were once fairly widespread throughout open grassland habitats of California. They are now uncommon, permanent residents throughout most of the state, with the exception of the northern North Coast area. Known to occur in the Mojave Desert, they are most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. In the southwest, badgers are typically associated with Mojave creosote bush scrub and sagebrush. Mating occurs in late summer or early fall and two to three young are born in March or April (Long 1973). Badgers are fossorial, digging large burrows in dry, friable soils and will use multiple dens/cover burrows within their home range. They typically use a different den every day, although they can use a den for a few days at a time (Sullivan 1996). Cover burrows are an average of 30 feet in length and are approximately 3 feet in depth. Natal dens are larger and more complex than cover dens. In undisturbed, high-quality habitat, badger dens can average 0.64 dens per acre, but are usually at much lower density in highly disturbed areas (Sullivan 1996).

No American badgers were detected during project surveys in 2006 or 2008, although suitable grassland, desert scrub, and agricultural field habitats are present in the project area.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The determination of whether a project has a significant effect on biological resources is based on the best scientific and factual data that staff could review for the project. Significance criteria are defined in the general context of the California Environmental Quality Act (CEQA) and other relevant federal and state laws, ordinances, regulations, and standards. In this analysis the following impacts to biological resources are considered significant:

1. Substantial adverse effects to plant species considered by the CNPS, CDFG, or USFWS to be rare, threatened, or endangered in California or with strict habitat requirements and narrow distributions; substantial impact to a sensitive natural community (i.e., community that is especially diverse; regionally uncommon; or of special concern to local, state, and federal agencies);

2. Substantial adverse effects to wildlife species that are federally-listed or state-listed or proposed to be listed; a substantial impact to wildlife species of special concern to CDFG, candidates for state listing, or animals fully protected in California;

3. Substantial adverse effects on habitats that serve as breeding, foraging, nesting, or migrating grounds and are limited in availability or that serve as core habitats for regional plant and wildlife populations; and

4. Substantial adverse effects on important riparian habitats or wetlands and any other "Waters of the U.S." or state jurisdictional waters.

Direct and Indirect Impacts and Mitigation

The CEQA Guidelines define *direct impacts* as those impacts that result from the project and occur at the same time and place. *Indirect impacts* are caused by the project, but can occur later in time or farther removed in distance while still reasonably foreseeable and related to the project. The potential impacts discussed in this analysis are those most likely to be associated with construction and operation of the project.

Impact analyses typically characterize effects to plant communities as temporary or permanent, with a permanent impact referring to areas that are paved or otherwise precluded from restoration to a pre-project state. In the Mojave Desert ecosystem, the definition of permanent impacts needs to reflect the slow recovery rates of its plant communities. Natural recovery rates from disturbance in these systems depend on the nature and severity of the impact. For example, creosote shrubs can resprout a full canopy within five years after damage from heavy vehicle traffic (Gibson et al. 2004), but more severe damage involving vegetation removal and soil disturbance can require from 50 to 300 years for recovery. However, complete ecosystem recovery may require more than 3,000 years (Lovich and Bainbridge 1999). **Biological Resources Table 4** summarizes the impacts to biological resources resulting from PHPP construction and operation and suggests conditions of certification to mitigate these impacts.

Biological Resources Table 4
Summary of Impacts/Mitigation

Biological Resource	Impact/Mitigation
Mojave Desert Plant Communities and Wildlife Habitat	**Impact:** Permanent loss of approximately 333 acres of native vegetation at the power plant site, 50 acres at the adjacent laydown area, and 75.49 acres along the transmission line; potential direct impacts to terrestrial wildlife by heavy equipment and grading; increased risk of road kill; increased disturbance/dust to nearby vegetation and wildlife; spread of non-native invasive weeds. **Mitigation:** Avoidance and minimization measures (**BIO-1** through **BIO-8**); restoration/compensation (**BIO-10**).
Special-Status Plants	**Impact:** Potential loss and fragmentation of habitat, potential loss of individuals or populations. **Mitigation:** Surveys for rare plants prior to ground disturbance, avoidance of large populations of rare plants, and compensatory mitigation if large numbers of rare plants cannot be avoided (**BIO-10** and **BIO-11**).
Common Wildlife	**Impact:** Potential mortality or disturbance during construction and operation, loss or fragmentation of habitat, displacement, disruption of movement. **Mitigation:** Avoidance and minimization measures (**BIO-1** through **BIO-9**).
Waters of the State	**Impact:** Temporary impacts to 0.08 acre of waters of the state where access roads cross drainages. **Mitigation:** Measures to minimize impacts to Arizona crossings, including avoiding use of the crossings during periods of ponded or flowing water, the installation of railroad flat cars to provide access over the drainage if needed, the implementation of Best Management Practices to minimize the potential for off-site sediment transport, and restoration and compensation should permanent loss of jurisdictional habitat occur (**BIO-24**).
Special-Status Wildlife	
San Emigdio blue butterfly	**Impact:** Loss of host plants during construction, degradation of habitat. **Mitigation:** Dust control measures (**BIO-8**).
Arroyo Toad	**Impact:** Potential take of individuals during construction. **Mitigation:** General avoidance and minimization measures (**BIO-1** through **BIO-9**); specific arroyo toad avoidance and minimization measures (**BIO-12**).
Coast horned lizard, spadefoot toad, and Silvery Legless Lizard	**Impact:** Potential mortality and disturbance, loss of habitat, and habitat fragmentation **Mitigation:** General avoidance and minimization measures (**BIO-1** through **BIO-9**).
Desert Tortoise	**Impact:** Low potential for take of individuals during operation and construction; increased risk of predation from ravens and other predators; increased road kill hazard from construction and operations traffic. **Mitigation:** Avoidance and minimization measures (**BIO-1** through **BIO-9, BIO-13**); off-site habitat acquisition of 665 acres (**BIO-20**) for Mohave ground squirrel habitat; raven management plan and fee (**BIO-14**).
Swainson's Hawk	**Impact:** Potential loss of nest, eggs, or young; loss of breeding habitat; loss of 5.08 acres of agricultural and 600 acres of native lands that support foraging due to construction of power plant and transmission line Segment

Biological Resource	Impact/Mitigation
	1; disturbance of nesting and foraging activities for populations on and near the plant site and linear facilities. **Mitigation:** General avoidance and minimization measures (**BIO-1** through **BIO-9**); pre-construction surveys and minimization measures (**BIO-16**); and habitat compensatory mitigation (**BIO-17**).
Western Burrowing Owl	**Impact:** Potential loss of nest, eggs, or young; loss of breeding and foraging habitat; disturbance of nesting and foraging activities for populations on and near the plant site and linear facilities. **Mitigation:** Implement burrowing owl impact avoidance and mitigation measures; pre-construction surveys; detection and avoidance of active burrows and, if necessary, the acquisition of mitigation lands; and the creation of artificial burrows for displaced individuals (**BIO 18**).
Golden Eagle	**Impact**: Low potential for loss of foraging or nesting habitat. **Mitigation:** General avoidance and minimization measures (**BIO-1** through **BIO-9**); pre-construction surveys and minimization measures (**BIO-15**); and avian and bat protection plan (**BIO-24**).
Other Migratory/Special-Status Birds • Loggerhead Shrike • California Horned Lark • Le Conte's Thrasher • Prairie Falcon • Mountain Plover • Vaux Swift	**Impact:** Disturbance of nesting activities, potential loss of nest, eggs, or young; loss of breeding and foraging habitat. **Mitigation:** Conduct pre-construction nesting surveys, implement avoidance measures (**BIO-15**); off-site habitat acquisition and enhancement (**BIO-20**).
Bird Collisions and Electrocution	**Impact:** Avian species, including special-status species, could be subject to mortality due to collisions and/or electrocution on project transmission lines or solar arrays. **Mitigation:** Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Mitigating Bird Collisions with Power Lines* (APLIC 2004) (**BIO-8**) and avian and bat protection plan (**BIO-24**).
Mohave Ground Squirrel	**Impact:** Potential take of individuals during construction and operation; permanent loss of 322 acres of potential habitat; increased road kill hazard from construction and operations traffic. **Mitigation:** Avoidance and minimization measures including clearance surveys (**BIO-1** through **BIO-9, BIO-19**); off-site habitat acquisition, endowment, and enhancement of 665 acres (**BIO-20**).
American Badger and Kit Fox	**Impact:** Potential loss and fragmentation of habitat, loss of foraging grounds, crushing or entombing of animals during construction. **Mitigation:** Conduct pre-construction surveys and implement avoidance measures (**BIO-21**).
Pallid San Diego Pocket Mouse and Southern Grasshopper Mouse	**Impact:** Potential loss and fragmentation of habitat, potential mortality and disturbance of animals during construction. **Mitigation:** General avoidance and minimization measures (**BIO-1** through **BIO-9**), off-site habitat acquisition and enhancement (**BIO-20**).

Biological Resource	Impact/Mitigation
Special-Status Bats	**Impact:** Potential loss and fragmentation of habitat, potential mortality and disturbance of animals during construction, potential disruption of roost sites. **Mitigation:** Avoidance and minimization measures, including pre-construction surveys, avoidance of maternity colonies, provision of substitute roosting habitat, and exclusion of bats prior to demolition of roosts (**BIO-22**).

Impacts to Vegetation and Wildlife

Construction of the PHPP would result in the permanent land use conversion of sensitive vegetation communities and the potential loss of sensitive plant and animal species. Permanent loss involves long-term impacts associated with project features (e.g., PHPP power block and solar arrays, new transmission line towers) that would remain throughout the life of the project. These features would also include spur and access roads, pulling sites, staging areas, and work areas associated with each tower site.

Vegetation Impacts

Construction of the PHPP and associated linear facilities would result in the permanent loss of approximately 333 acres of native vegetation at the power plant site, 50 acres at the adjacent laydown area, and 75.49 acres along the transmission line. Impacts to native vegetation are not expected to occur from construction of the proposed pipelines as they are sited in existing roadways or disturbed road shoulders. **Biological Resources Table 2** (earlier in analysis) contains a concise description of the plant communities and habitat loss expected from the implementation of the PHPP.

Direct mortality to vegetation could occur from construction activities that remove vegetation, grade soils, or cause sedimentation or erosion. Clearing and grading may also result in the alteration of soil conditions, including the loss of native seed banks and changes to the topography and drainage of a site such that the capability of the habitat to support native vegetation is impaired. Indirect effects could include soil compaction, disruption of the native seed bank, increased dust, sediment transport, or colonization by invasive non-native species. These actions may result in reduced habitat quality for upland plants. In addition, the removal of vegetation cover and the disruption of soil crusts create possibilities for erosion, dust, and weed invasion that can affect habitat in adjacent areas.

The PHPP traverses a variety of both native and exotic vegetation communities. In some areas including the transmission line route, the project would cross large areas of disturbed fallow farmland dominated by exotic forbs and disturbance-tolerant natives such as rabbitbrush and saltbush. Conversely, the power plant site consists of good quality Mojave creosote bush scrub, saltbush scrub, and Joshua tree woodland. Although the power plant site is isolated from contiguous native plant communities by development, this area is over 380 acres in size and retains many natural components identified in healthy ecosystems. Soil complexity was observed in many areas, including microtopography and soil crusts which are more characteristic of less disturbed plant communities. Wildlife use of the site is high and the plant communities present support

a large assemblage of birds, reptiles, and small mammals. An adult Swainson's hawk, a State-listed species, was observed foraging on the project site.

Joshua tree and juniper woodland habitats support unique assemblages of plant and wildlife species and vast acreages of these habitats have been lost over the last several decades due to urbanization and agricultural activities in the Antelope Valley. In general, other desert plant communities lack vertical structure and shade. However, these habitats provide the important structural characteristics for mammals and avian species. Surveys conducted by the applicant on the power plant site identified over 40 bird nests within Joshua trees and their associated shrub layer, and staff noted numerous additional nests particularly for large raptors and corvids within the power plant site. Additionally, unlike herbaceous or shrub-dominated habitats, arid woodlands are extremely slow developing, with mature juniper and pinyon woodlands requiring as long as 150 years to reach full maturity (Wangler and Minnich 1996). Due to the unique floristic composition and structure of these communities, and due to historic and ongoing losses, several local plans, ordinances, and policies have designated Joshua tree woodland and juniper woodland habitats as special status.

The applicant has indicated that the loss of desert wash and riparian habitat is not expected to occur and access through areas supporting this habitat would be on existing access roads. However, staff believes that small amounts of desert wash or riparian vegetation may be subject to project disturbance from activities associated with the construction of transmission line towers and roads, pulling stations, and staging areas. The expansion of the access roads in some cases could remove riparian vegetation, including riparian scrub and possibly riparian trees. Although this hydrogeomorphic landform is relatively common in parts of the Antelope Valley, much of this habitat has been lost over the last several decades due to development and agricultural practices, particularly in undeveloped portions of the project area where off-road vehicle paths and paved roads transect desert washes.

In arid regions, riparian habitats play a particularly crucial role in maintaining biodiversity because up to 80% of vertebrate species rely on them for at least part of their lifecycle (Knopf et al. 1988) and because of the central role riparian habitats play in a variety of ecological functions (Rottenborn 1999; Fischer and Fischenich 2000). In the Antelope Valley, large areas of desert wash habitat have been subject to ongoing development. Therefore, because of the overall loss of desert wash and riparian habitat within California, its role in the functional hydrological connectivity of habitats, and its suitability to support several special-status species, the loss of this habitat associated with the PHPP is significant without mitigation.

Most of the impacts to vegetation communities for the PHPP would be permanent. The applicant has stated that the overall approach to mitigation of impacts to special-status habitats is to avoid impacts where possible through the delineation of work areas; redesign of tower locations, spur roads, pulling locations, and staging areas, particularly with regards to riparian habitat types; and restoration of temporarily disturbed areas. Where avoidance of impacts is not feasible, the applicant has proposed general mitigation (ENSR 2008). For sensitive plant communities, the applicant has identified avoidance and minimization measures in the AFC. These measures consist primarily of salvaging Joshua trees and cacti for inclusion in landscaping and buffer areas. Staff

concludes that impacts to native vegetation communities including Joshua tree woodland, juniper woodland, and riparian habitats would not be adequately mitigated with the currently proposed mitigation. However, staff concurs with many of the components identified in the general and specific measures proposed by the applicant.

Direct and indirect construction impacts to vegetation and wildlife would be reduced to less-than-significant levels with implementation of impact avoidance and minimization measures described in staff's proposed Conditions of Certification **BIO-1** through **BIO-8** and in other conditions of certification. These measures include but are not limited to the designation of a qualified biologist to oversee construction, monitor sensitive resource areas, provide worker training, prepare and implement a Biological Resources Mitigation Implementation and Monitoring Plan, and implement best management practices to avoid and salvage wildlife. To address specific construction-related impacts to native vegetation communities and habitat loss, staff has incorporated existing measures provided by the applicant and proposed supplemental measures into the Condition of Certification **BIO-10.** In addition, to mitigate for the loss of Mohave ground squirrel habitat the applicant will implement Condition of Certification **BIO-20** which requires the applicant to obtain 665 acres of desert scrub habitat. Provided the acquired lands contain at least 366.3 acres of Joshua tree woodland staff considers that the implementation of these measures would reduce impacts to native plant communities to less-than-significant levels.

Invasive and Noxious Weeds

The term "noxious weeds" includes all plants formally designated by the U.S. Secretary of Agriculture or other responsible State official as such, and these species usually possess one or more of the following characteristics: "aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being not native or new to or not common to the United States or parts thereof" (USFS 1995).

For the purpose of this discussion, project-related disturbance or impacts to all habitats, even disturbances such as grading for temporary road construction, were treated as permanent in large part due to the foreseeable establishment and spread of noxious weeds and the conversion of native habitats to ruderal habitats (or expansion of existing ruderal habitats) following disturbance. Noxious weeds often become established following disturbance. For example, in arid sites or in sites with poor nutrient availability, noxious weeds may become established following water and/or nutrient addition such as may occur along roadways as a result of increased runoff or nitrogen deposition.

Construction activities and soil disturbance could introduce new noxious weeds to lands adjacent to the PHPP plant site and its linear facilities and could further spread weeds already present in the project vicinity. New introductions occur when seed are inadvertently introduced to a site, most often with mulch, hay bales, or wattles used for erosion control, or when they are transported on construction equipment or their tires from off-site areas. Many invasive non-native species are adapted to and promoted by soil disturbance (Lathrop & Archibald 1980). Once introduced, they can out-compete native species because of minimal water requirements, high germination potential and high seed production (Beatley 1966); can outcompete native annuals where nitrogen deposition (near major highways such as I-14 and Highway 138) and precipitation rates

are higher, leading to higher risk of wildfire (Allen et al. 2010), and can become locally dominant, representing a serious threat to native desert ecosystems (Abella et al. 2008).

The spread of invasive plants is a major threat to biological resources in the Mojave Desert because nonnative plants can displace native plants, increase the threat of wildfire, and supplant wildlife foods that are important to desert tortoise and other herbivorous species. Noxious and invasive weeds pose a threat to the natural processes of plant community succession, fire frequency, biological diversity and species composition. Exotic annual plants, particularly red brome, increase the fuel load and frequency of fire in desert communities, which are poorly adapted to fire (BLM 2006). Noxious and invasive weeds can affect the persistence of some populations of special-status species by replacing the foraging base, altering habitat structure, or excluding a species by vegetative growth.

Direct impacts associated with the introduction of noxious weeds could occur when noxious weeds become established in an area. These invasive plant species can cause a permanent or long-lasting change to the environment by increasing vegetative cover, creating a dense layer that prevents native vegetation from germinating, or altering the edaphic and hydrological conditions. Noxious weeds can create such an unfavorable environment for wildlife that associate, mutualistic species necessary for native plant life cycles, such as seed dispersers, fossorial mammals, or pollinators, are lost from the area.

Indirect impacts attributed to the colonization of noxious weeds could include a gradual decrease in natural biodiversity as noxious weed infestations may extirpate native plant populations. To reduce the potential for the spread of invasive plants, the applicant has proposed measures such as cleaning vehicles prior to mobilization and restoring temporarily disturbed habitat at the conclusion of construction. Staff concurs with these measures but believes that additional measures, including establishing weed wash stations for construction vehicles and using only weed-free products for erosion control, are required to reduce the spread of noxious weeds from project activities. Staff has incorporated these recommendations into staff's proposed Condition of Certification **BIO-8**. Implementation of this and other conditions would reduce potential impacts to adjacent native plant communities from the introduction and spread of noxious weeds.

Fugitive Dust

Disturbance of the soil's surface caused by construction traffic and other activities would result in increased wind erosion of the soil. Aeolian transport of dust and sand can result in the degradation of soil and vegetation over a widening area (Okin et al. 2001). Dust can have deleterious physiological effects on plants and may affect their productivity and nutritional qualities (Sharifi et al. 1997; 1999). The destruction of plants and soil crusts by windblown sand and dust exacerbates the erodibility of the soil and accelerates the loss of nutrients (Okin et al. 2001). Soil erosion from construction activities and vehicle activity, which affects vegetation and soil properties, could have an adverse effect on Mohave ground squirrel foraging and burrowing potential. The impacts of increased dust and other construction impacts can be minimized with implementation of staff's proposed Condition of Certification **BIO-8** and with **SOIL&WATER-3** and **SOIL&WATER-4** included in staff's **Soil and Water** analysis.

Impacts to Special-Status Plants

One CNPS list 4.2 sensitive plant, the crowned muilla (*Muilla coronate*), has been observed on the proposed PHPP project site. In addition, approximately 18 additional special-status plant species known to occur in the region have a moderate to high potential for occurrence but have not been observed during field surveys conducted by the applicant in 2006, 2008, and 2010. State and federally listed plant species were not identified within the PHPP area. In response to staff concerns regarding the botanical surveys previously conducted by the applicant raised in the PSA and during a staff workshop conducted on March 24, 2010 the applicant conducted new botanical surveys in March and May 2010. These surveys were conducted in those areas of the PHPP where ground disturbing activities may occur prior to Spring 2011 (L&W2010j). The areas included the power plant site, construction laydown area, reclaimed water pipeline, and an area set aside as a Joshua tree preserve. The 2010 surveys identified, a crowned muilla, CNPS List 4.2, was detected on the proposed power plant site. This species was also detected during surveys of the power plant site in 2008.

Surveys were not conducted for the proposed transmission line alignment. Pending the completion of those surveys staff considers the habitat suitable to support a variety of sensitive plants. These include numerous species that have been vouchered in the general area (i.e., Little Rock Creek, Big Rock Creek, and Palmdale). According to the Consortium of California Herbaria, accessed by staff on Oct. 19, 2009, several rare plants including Palmer's mariposa lily (*Calochortus palmeri* var. *palmeri,* a CNPS List 1B.2 species) and Mason's nest straw (*Stylocline masonii,* a CNPS List 1B.1 species) could occur in the area. In addition, short-joint beaver tail cactus (*Opuntia basilaris var. brachyclada*) a CNPS List 1B.2 species is known from the project area.

CEQA Significance and CNPS Status

The California Native Plant Society (CNPS) cooperates under a memorandum of understanding with CDFG to identify which plants may be rare or threatened, evaluate threats to them, share occurrence data, and plan protective measures. In this role, CNPS evaluates plant taxa according to abundance, distribution, and threats, and it ranks rare species on a series of lists. The joint CNPS Rare Plant Program and CDFG's CNDDB Plant Status Review Process for CNPS List and CDFG Special Plants List status is a rigorous review process that evaluates existing literature, reviews herbarium collections, and communicates with experts before making a recommendation for listing. A summary of information on each candidate taxon is reviewed by a network of California botanists, representing State and federal agencies, environmental consulting firms, academic institutions, CNPS, and other conservation organizations.

All of the CNPS List 1B and List 2 plants potentially occurring in the project area are also included in the CDFG Special Plants List (CDFG 2010a) and are tracked by CDFG's CNDDB. The *CNPS Inventory* (2010) has been a broadly recognized and accepted source of science-based information on the rarity, endangerment, and distribution of California special-status plants since its first edition in 1974. The Energy Commission's regulations reference CNPS Lists in the definition of "species of special concern" (California Code of Regulations, Title 20, section 1702 (q) and (v)), By CNPS's standards, the plants on CNPS Lists 1A, 1B and 2 meet the definitions of Sections 2062 and 2067 (CESA) of the California Fish and Game Code, and are eligible for State

listing (CNPS 2001). The Energy Commission considers those plants appearing on CNPS List 1B or 2 to be potentially eligible to meet CEQA's Section 15380 criteria, and evaluates project impacts to each one known from the site, as explained below.

CNPS List 1B Taxa

CNPS List 1B species were not detected on the PHPP project site or linear facilities, however approximately three CNPS List 1B plants have a moderate to high potential to occur on or near the project site. These include, alkali mariposa lily (*Calochortus striatus*), pale-yellow layia (*Layia heterotricha*), and short-joint beavertail cactus. In Condition of Certification **BIO-11** below, staff recommends follow-up field surveys to inventory potential project impacts to rare plants along the transmission line alignments and recommends impact avoidance measures to conserve occurrences on-site to the greatest extent feasible. This measure would provide for the conservation of rare plants in portions of the project site through impact avoidance and require compensatory mitigation should impacts be unavoidable.

Although not detected on the PHPP power plant site, staff concurs that sensitive plants may occur on the transmission line alignments. Staff concludes that, absent mitigation, adverse impacts to CNPS List 1B species would be significant under CEQA. Staff concludes that these impacts can be mitigated below a level of significance by implementing staff's proposed Condition of Certification **BIO-11**, including measures to avoid direct impacts through avoidance, the implementation of best management practices, and through habitat acquisition if necessary. By incorporating these measures, staff concludes that impacts to CNPS List 1B species would be reduced to less than significant.

CNPS List 2 Taxa

Only one CNPS List 2 plant, the golden violet (*Viola aurea*) has a low potential to occur in the project area. Staff believes that if present, project impacts would include loss of plants and their habitat during ground-disturbing activity for project development and operation and additional habitat alteration or degradation to nearby occurrences due to potential indirect off-site effects. Based on analysis of their rarity, range and distribution, staff concludes that golden violet would meet criteria for consideration as rare, threatened or endangered under CEQA Section 15380. Staff concludes that, absent mitigation, adverse impacts to golden violet, would be significant under CEQA. Staff concludes that these impacts can be mitigated below a level of significance by implementing staff's proposed Condition of Certification **BIO-11,** including measures to avoid direct impacts through avoidance, the implementation of best management practices, and through habitat acquisition if necessary. By incorporating these measures, staff concludes that impacts to CNPS List 2 species would be reduced to less than significant.

CNPS List 4 Taxa

CNPS List 4 species are plants of limited or infrequent distribution throughout a broader area of California, and their vulnerability or susceptibility to threat appears low at this time (CNPS 2010). The CNPS List 4 plants reported on the project site was limited to crowned muilla. In addition, California androsace androsace (*Androsace elongata* ssp. *acuta*), slender mariposa lily, Pierson's morning glory, pygmy poppy, Lemmon's

syntrichopappus, and slender nemacladus have a high potential to occur in the project area. For example, although not detected on the project site, documented occurrences of Lemmon's syntrichopappus occur within 500 feet of the Vincent sub-station. Very few CNPS List 4 plants meet the definition for State or federal listing (CNPS 2001). Nevertheless, they may be locally significant if, for example, they occur at the periphery of their geographic ranges, exhibit unusual morphology, or occur in atypical habitats. Thus, they should be evaluated in a CEQA analysis. Based on known geographic ranges and abundance, absence of any reported unusual morphology among local populations, and local occurrence in typical habitat, staff concludes that project impacts to CNPS List 4 species occurring on the proposed project site and discussed above do not reach the level of significance under staff's significance criteria.

Ground-disturbing activity associated with the PHPP has the potential to disturb either individual plants or populations of sensitive plant species should they be present in the project area. Direct impacts to sensitive plant species could occur from construction activities that remove vegetation, grade soils, or cause sedimentation, including the construction of the proposed PHPP power block, the placement of transmission lines, maintenance of construction equipment and supplies, staging of equipment and materials, and use or improvement of existing access roads. Indirect impacts could include the disruption of native seed banks through soil alterations, the accumulation of fugitive dust, increased erosion and sediment transport, and the colonization of non-native, invasive plant species.

With the exception of Joshua trees, junipers, and cacti, the applicant has not proposed specific avoidance measures to reduce potential impacts to sensitive plant species. Because staff concludes there is a potential for rare plants to occur in the project area, staff has proposed mitigation that requires surveys for rare plants prior to ground disturbance, avoidance of large populations of rare plants, and compensatory mitigation if large numbers of rare plants cannot be avoided. These compensation measures are described in staff's proposed Conditions of Certification **BIO-10** and **BIO-11**. Implementation of these conditions would reduce impacts to rare plants to less-than-significant levels.

Impacts to Common Wildlife

Direct impacts to common wildlife associated with construction of the PHPP would include mortality from trampling or crushing and increased predation; increased noise levels due to heavy equipment; light impacts from construction during low-light periods; increased vehicular and human presence along access roads and riparian areas; displacement due to habitat modifications, including vegetation removal, alterations of existing soil conditions; and fugitive dust; and increased erosion and sediment transport. Indirect effects to wildlife as a result of the proposed project include the introduction of non-native, invasive plant species, alterations to existing hydrological conditions, and exposure to contaminants.

Depending on the timing and location of project activities, construction may also result in temporary disruption along terrestrial and riparian wildlife movement corridors crossed by the PHPP including Little Rock Creek and the various small tributaries that likely support a variety of nesting birds.

Direct mortality of small mammals; amphibians and reptiles; eggs and nestlings of bird species with small, well-hidden nests; and other less mobile species would likely occur during construction of the PHPP. This action would result during habitat clearing, earth removal, grading, digging, and equipment movement. Bird eggs and nestlings could be directly impacted by construction (specific impacts to nesting birds are discussed below in Migratory/Special Status Birds). More mobile species like birds and larger mammals are expected to disperse into nearby habitat areas during construction.

The applicant has recommended only general impact avoidance and minimization measures to reduce construction impacts to common wildlife. Staff has incorporated these recommendations into conditions of certification and provided additional language to reduce effects to common wildlife. These measures are designed to educate workers of the presence and sensitivity of wildlife that may occur in the project area; limitations on the work that may occur in native plant communities, reducing the effect of fugitive dust on adjacent areas through dust control and reduced vehicle speeds; the restoration of habitat at the conclusion of construction; and the control of noxious weeds. These measures are found in staff's proposed Conditions of Certification **BIO-1** through **BIO-9**. Implementation of these conditions would reduce impacts to common wildlife to less-than-significant levels.

Special-Status Wildlife

The Draft Biological Assessment for the PHPP identified 60 special-status biological resources known to occur in the vicinity (within approximately 10 miles) of the project site (AECOM 2009e). These resources include: 2 fish, 25 plants, 2 amphibians, 6 reptiles, 10 birds, 9 mammals, and 6 habitat communities. Listed species that may be subject to project disturbance include desert tortoise, Mohave ground squirrel, arroyo toad, and Swainson's hawk.

Impacts to listed species would occur in the same way as described for non-listed wildlife and could be caused by a variety of direct and indirect factors. Direct impacts to wildlife could include displacement and/or potential mortality of wildlife that are poor dispersers such as snakes, tortoise, lizards, and small mammals. Construction may also result in the temporary degradation of the value of adjacent native habitat areas due to disturbance, noise, increased human presence, and increased vehicle traffic during construction. Indirect impacts may include increased human presence and the loss of habitat through the colonization of noxious weeds. Mortality or loss of reproductive success may also occur during land clearing, excavation, grading, and construction of the PHPP. Impacts to these special-status species are detailed below.

Critical Habitat

Critical habitat for federal listed wildlife is not present in the project area. Critical Habitat Unit 1 (Fremont-Kramer) for desert tortoise occurs approximately 16 miles north of the power plant site and 8 miles northeast of the Segment 1 transmission line, respectively. Critical Habitat Unit 21 (Little Rock Creek Basin), designated for the arroyo toad, occurs 2.6 miles south of the Segment 2 transmission line. Construction of the PHPP project would not affect critical habitat for any federal listed species.

Impacts to Special-Status Invertebrates

The AFC indicated that special-status invertebrates were not detected in the project area (COP 2008a). However, the San Emigdio blue butterfly (*Plebulina emigdionis*) has some potential to occur in association with riparian drainages present along the proposed transmission line route. This species is known from the Mojave River near Victorville and isolated colonies have been reported in canyons along the north side of the San Gabriel Mountains near the desert's edge (Emmel and Emmel 1973; Murphy 1990). This butterfly is typically found in association with its primary host plant, four-wing saltbush (*Atriplex canescens*), but has also been observed in association with quail brush (*A. lentiformis*) (CDFG 2009).

If present, direct impacts to this species could occur through the removal of host plants from clearing and grading for tower placement. This species is closely associated with riparian areas and appears to require other environmental factors (e.g., the presence of *Formica pilicornis*, a native ant that may have a mutualistic relationship with this butterfly) (USACE and CDFG 2009). In addition, extensive vegetation clearing is not expected to occur within these areas. Potential indirect effects to the species could occur from the spread of noxious or invasive weeds or dust that degrade habitat utilized by this species. If present, these impacts would be considered significant absent mitigation. Because of the avoidance of riparian areas and proposed implementation of dust control measures identified in staff's proposed Condition of Certification **BIO-8**, staff considers the potential impacts to this species to be reduced to a level that is less than significant.

Impacts to Special-Status Amphibians

Several rare amphibian species have been documented in the region, including arroyo toad, mountain yellow-legged frog, and spadefoot toad. Arroyo toads are known from Little Rock Creek approximately three miles upstream of the project area, and mountain yellow-legged frogs are known from the upper watershed of Little Rock Creek. Habitat for mountain yellow-legged frogs is not present in the project area and staff concurs that mountain yellow-legged frogs do not have the potential to occur in the project area.

The population of arroyo toads on Little Rock Creek is well documented and staff has observed this species as recently as 2010 at the confluence of Santiago and Little Rock Creeks, approximately 3.5 miles south of the project area. Arroyo toads were not detected during protocol surveys at the transmission line crossing in 2009. Previously, the AFC concluded that neither of these species was observed during 2006 or 2008 surveys because of a lack of suitable habitat (i.e. lack of flowing water; COP 2008a). In addition, the Biological Assessment (AECOM 2009e) indicated that the most recent sighting of this species was in 2001, 2 to 3 miles south of the crossing. However, in response to CDFG and staff comments regarding the potential for arroyo toad to occur in the project area, the applicant conducted protocol surveys for arroyo toad at the proposed transmission line crossing in 2009.

Arroyo toads were not detected during surveys of the project area in 2009 and staff largely concurs that the potential for this species to occur in the project area is low. Staff conducted reconnaissance level surveys of Little Rock Creek during the 2010 breeding season for arroyo toads. Toads were verified calling near the confluence of Santiago

and Little Rock Creek above the dam; however toads were not detected during night time surveys below the dam. In addition, an inspection of the creek below the dam did not detect any egg masses or tadpoles. Further, it appears that habitat in this area has been compromised by the construction of the Little Rock reservoir which has trapped sediment, altered flows, and resulted in the degradation of stream channel below the dam. If arroyo toads persist below the Dam they are expected to occur in very low densities and are likely isolated from upstream populations. It is possible that this population has been extirpated from below the dam. However, provided arroyo toads have access to suitable pools that remain for approximately 65 to 85 days to allow tadpoles to metamorphose (Sweet 1992) this species may persist in variable stream systems. In addition, even periodic surveys may fail to detect small or isolated populations of highly cryptic or weather-dependent species.

Spadefoot toads have limited potential to occur in the project area and if present would likely be found south of Mt. Emma road along the proposed transmission line route. Suitable habitat does not occur on the power plant site; however, some suitable habitat occurs along the foothills of the San Gabriel Mountains. Direct impacts to these species include mortality during ground-disturbing activities at the transmission line alignments; being hit by vehicles on access roads; mechanical crushing during tower site preparation, grading of spur roads, and preparation of staging and stringing/pulling locations; fugitive dust; and general disturbance due to increased human activity. Indirect impacts to these species include compaction of soils and the introduction of exotic plant species. If present, staff considers these impacts to be significant absent mitigation.

The applicant has proposed general avoidance and minimization measures for sensitive species including pre-construction surveys, relocation, and restoration of disturbed areas. Staff concurs with the proposed measures and has incorporated the language into staff's proposed Condition of Certification **BIO-8**. Implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9** would further reduce impacts to spadefoot toads if present to less than-significant levels.

For the PHPP project, staff considers there to be a low possibility for arroyo toads to occur in the project area, but considering the federal status of this species, believes that pre-construction clearance surveys and monitoring are warranted. To avoid or minimize the possible incidental take of arroyo toads along the transmission line corridor at Little Rock Creek, the applicant has proposed a series of avoidance and minimization measures such as pre-construction surveys and monitoring. Staff has incorporated the applicant's impact avoidance and minimization measures into staff's proposed Condition of Certification **BIO-12.**

Implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9** and **BIO-12** would help prevent take of arroyo toads and reduce impacts to less-than-significant levels.

Impacts to Special-Status Reptiles

The AFC identified six special-status reptile species that have been reported from the vicinity of the project. These include desert tortoise, silvery legless lizard, San Diego coast horned lizard, California coast horned lizard, southwestern pond turtle, and two-

striped garter snake. Southern rubber boa is not expected to occur in the project area. Although the silvery legless lizard was considered absent from the project area in the Final Biological Resources Technical Report (ENSR 2008), staff disagrees with this assessment and has included this species in the analysis of this project. Potential impacts to these species are discussed below.

Southwestern pond turtle and two-striped garter snake have limited potential to occur in the project area and are more restricted to perennial or near perennial waterways in desert ecosystems. The preferred habitat for pond turtles includes ponds or slow-moving water with numerous basking sites (logs, rocks, etc.), food sources (plants, aquatic invertebrates, and carrion), and few predators (raccoons, introduced fishes, and bullfrogs). Two-striped garter snakes have been observed in riparian, freshwater marsh, coastal sage scrub, chaparral, oak woodland, and grassland habitats, and prey primarily on fish, fish eggs, and other aquatic vertebrates. Although habitat for these species occur upstream and these species have been recorded above the Little Rock Reservoir, based on habitat and climatic conditions at the crossing these species are not expected to occur in the project footprint.

Coast horned lizards and silvery legless lizards have been reported from the project area and may be subject to project impacts. These cryptic species are difficult to detect and are easily overlooked during surveys. Direct impacts to these species include mortality during ground-disturbing activities at the PHPP and transmission line alignments; being hit by vehicles on access roads; mechanical crushing during tower site preparation, grading of spur roads, and preparation of staging and stringing/pulling locations; fugitive dust; and general disturbance due to increased human activity. Indirect impacts to these species include compaction of soils and the introduction of exotic plant species. Staff considers these impacts to be significant absent mitigation.

The applicant has proposed general avoidance and minimization measures for sensitive reptiles including pre-construction surveys, relocation, and restoration of disturbed areas. Staff concurs with the proposed measures and has incorporated the language into staff's proposed Condition of Certification **BIO-8**. Implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9** would reduce impacts to coast horned lizards and silvery legless lizards to less-than-significant levels.

Desert Tortoise

Historically, desert tortoises were likely abundant in the PHPP project area. However, urbanization, infrastructure, and agricultural practices have fragmented existing populations in the region. Focused surveys for desert tortoise were conducted on the PHPP power plant site in 2006. Additional protocol-level surveys of the power plant site and transmission line route, including Buffer Zone and ZOI transects, were conducted in 2008 and 2009. Desert tortoise or their sign was not located on the power plant site; however, one burrow that potentially could be used by a tortoise (Class 5: good condition, undetermined species) was found in 2008 on the 3,960-foot ZOI transect for the power plant site, west of the site (AECOM 2009e). This burrow was overgrown with vegetation and no sign of recent use (e.g., scat, tracks, etc.) was detected (AECOM 2009e).

The applicant has indicated that while native habitat exists both on the site and in the area west of the site where the burrow was located, the PHPP site is nearly completely surrounded by extensive urban development. In addition, the AFC reported that focused surveys for desert tortoise conducted in 2008 by the Edwards Air Force Base (AFB) Environmental Management Natural Resources Team on Air Force Plant 42 did not detect desert tortoise or desert tortoise sign. The closest sighting of desert tortoise is a 2001 record reported from approximately nine miles northeast of the northeast corner of transmission line Segment 1 (BLM 2006). More recent sightings of tortoises have been made approximately 12 miles northeast of the northeast corner of transmission line Segment 1 (AECOM 2009e). Critical Habitat Unit 1 (Fremont-Kramer) for the desert tortoise is present approximately 16 miles north of the power plant site and 8 miles northeast of the transmission line Segment 1 in the Fremont-Kramer Desert Wildlife Management Area.

Dr. Alice Karl, a well-known desert tortoise expert hired by the applicant, considers the potential for desert tortoises to be present along the north-south portion of transmission line Segment 1 and the southeast portion of transmission line Segment 2 to be low (AECOM 2009e). Staff concurs with the assessment that the project site is isolated and provides little long-term value to the species. In addition, staff considers the likelihood of desert tortoise occurring on the PHPP power plant site is extremely low. Despite the lack of known, extant tortoise populations near the project site, some of the vegetation communities present on the transmission line route (e.g., desert scrub, desert wash, and Joshua tree woodland) are known to be used by desert tortoises. These areas are also contiguous with large areas of desert scrub, albeit many areas remain fragmented by roads and agricultural ditches. While desert tortoise or their sign were not observed in these areas, there remains a possibility that small remnant populations remain in the region. For example, in 2009 a small population of desert tortoise was discovered west of Interstate 14 and south of Oak Creek Road in the northwestern Antelope Valley (CPUC 2009). This area had been subject to several rounds of protocol-level surveys and desert tortoise was considered extremely unlikely to occur in the region (CPUC 2009). Nonetheless, the species was discovered and the area is now considered to support a low-density population.

While not considered present on the PHPP power plant site, there remains a low potential for this species to occur along the transmission line alignment. If present, construction activities could result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment. Other direct effects could include individual tortoises being crushed or entombed in their burrows, collection or vandalism, disruption of tortoise behavior during construction or operation of facilities, disturbance by noise or vibrations from the heavy equipment, and injury or mortality from encounters with workers’ or visitors' pets. Desert tortoises may also be attracted to the construction area by the application of water to control dust, placing them at higher risk of injury or mortality. Increased human activity and vehicle travel would occur from the construction and improvement of access roads, which could disturb, injure, or kill individual tortoises. Also, tortoises may take shelter under parked vehicles and be killed, injured, or harassed when the vehicles are moved.

Indirect effects to desert tortoises could include soil compaction, the introduction of non-native and invasive plant species, and increased human presence along access roads.

Construction would increase the number of transmission towers and substation-associated structures that provide potential nest and perch sites for common ravens, which are known predators of juvenile desert tortoises. Availability of perch sites and prey items has lead to substantial increases in raven populations in desert regions, particularly near human development. The new towers would result in an increase in potential nesting and perching sites for common ravens where the potential for desert tortoise occurs.

Human activities in project area including trash dumping, farming, sewage treatment, and irrigation potentially provide food or other attractants which attract and subsidize unnaturally high numbers of tortoise predators such as the common raven, kit fox, and coyote. Common raven populations in some areas of the Mojave Desert increased 1,500% from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002). Since ravens were scarce in this area prior to 1940, the current level of raven predation on juvenile desert tortoises is considered to be an unnatural occurrence (BLM 1990; USFWS 2008a). Ravens depend on human encroachment to expand into areas where they were previously absent or in low abundance.

Ravens habituate to human activities and are subsidized by the food and water, as well as roosting and nesting resources that are introduced or augmented by human encroachment. Ravens were observed in the project area and would be expected to use the new transmission line structures along Segment 1 and Segment 2 as potential nest and perch sites increasing the potential for loss of tortoises from raven predation.

The Antelope Valley area is already subject to elevated raven predation pressure and any loss of juvenile tortoise due to the further addition of raven subsidies could have a long-term effect on the tortoise population by reducing the recruitment of juvenile tortoises into the adult life stages (Boarman 2003). The effects of reduced recruitment may not be apparent for years because tortoises do not typically reach sexual maturity until approximately 15 to 20 years of age. In areas where populations are already low, such as the western Antelope Valley and areas east of the PHPP site, increased raven predation can affect recruitment and recovery of the species.

Regional Approach to Raven Control

The USFWS, in cooperation with CDFG and BLM, has developed a comprehensive, regional raven management and monitoring program in the California Desert Conservation Area to address the regional, significant threat that increased numbers of common ravens pose to desert tortoise recovery efforts (USFWS 2010). The Regional Raven Management Program will implement recommendations in the USFWS E*nvironmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008b). To mitigate the PHPP Project's contribution to cumulative and indirect impacts on desert tortoise from raven predation, staff proposes that the applicant contribute toward implementation of the Regional Raven Management Program (USFWS 2010), as described in staff's proposed Condition of Certification **BIO-14**.

To mitigate for the regional effects of ravens on desert tortoise, the applicant shall provide a onetime fee in the amount of $105.00 per acre through the REAT Account held by the National Fish and Wildlife Foundation (NFWF). The PHPP will result in the

loss of 333 acres of native vegetation at the power plant site, 50 acres at the adjacent laydown area, and 75.49 acres along the transmission line. This totals approximately 458.5 acres of potential desert tortoise habitat disturbed by the project. This payment of $48,142.50 would support the regional raven management plan activities focused within the Mojave Desert Recovery Unit, which would be adversely affected by increases in raven subsidies attributable to the proposed project. The fees contributed by the applicant would fund the raven removal actions, education and outreach efforts, and surveying and monitoring activities identified in the federal Environmental Assessment (USFWS 2008b). Staff has concluded that implementation of these actions would be an effective means of reducing the project's cumulative contributions to desert tortoise predation from increased raven numbers; would reduce the impacts below a level of significance; and would satisfy the requirements of the CDFG for full mitigation pursuant to CESA.

In addition, the applicant's Raven Management Plan would involve identifying and preventing conditions that might attract or support ravens (for example, eliminating food sources such as garbage or roadkill and minimizing creation of structures that could provide ravens perches, nests, or roosts), monitoring the effectiveness of raven management and control measures, and then implementing additional adaptive management measures to make sure that the project does not result in an increase in raven numbers. Implementation of measures in Condition of Certification **BIO-14** would avoid or minimize the contributions of the project to increased desert tortoise predation from ravens to less-than-significant levels.

After construction is complete, project-related impacts (increased levels of predation on young tortoises from increased raven numbers, increased levels of disturbance and incidence of vehicle strikes) could adversely affect desert tortoise. These potential operations impacts are discussed in more detail later in this subsection.

The applicant has recommended impact avoidance and minimization measures to reduce construction impacts to desert tortoise, including worker training, inspecting under vehicles, biological monitoring, pre-construction clearance surveys, and other measures. The applicant has not proposed to mitigate for the loss of desert tortoise habitat. Based on the low potential for occurrence, staff concurs with this approach. However, the applicant has proposed to acquire and enhance 665.5 acres of desert scrub communities to compensate for the potential take of Mohave ground squirrel (a detailed discussion of impacts and mitigation for Mohave ground squirrel is located below). Should desert tortoise be present in low densities, the conservation of lands for Mohave ground squirrel would mitigate the loss of habitat for desert tortoise.

Staff has incorporated these recommendations into proposed conditions of certification. These include staff's proposed Conditions of Certification **BIO-1** through **BIO-9**, which apply to protection of desert tortoise and other biological resources in and near the PHPP. Staff's proposed Condition of Certification **BIO-13** requires additional measures including installation of tortoise exclusion fencing, clearance surveys, monitoring; and verification that all desert tortoise impact avoidance, minimization, and compensation measures have been implemented. Staff's proposed Condition of Certification **BIO-14** would require the development and implementation of a Raven Monitoring,

Management, and Control Plan which would minimize impacts to desert tortoise resulting from increases in raven populations.

Implementation of these conditions would reduce impacts to desert tortoise, if present, to less-than-significant levels and would also satisfy the California Department of Fish and Game's requirements under Fish and Game Code Section 2081.

Migratory/Special-Status Bird Species

Both the PHPP site and transmission line corridor support vegetation communities that provide foraging, cover, and/or breeding habitat for a variety of resident and migratory birds. Nesting surveys conducted by the applicant in 2009 identified approximately 205 nest locations on the PHPP power plant site and linear facilities. Of these, approximately 66 nest locations including numerous stick nests were observed on the power plant site alone (AECOM 2009e). Staff noted during a site visit conducted in September 2009 that the high density of nests on the power plant site was associated with the presence of Joshua tree woodland.

The complex habitat structure provided by the Joshua trees is correlated to the large numbers of birds identified by the applicant on the project site. This included several special-status or watch list birds such as loggerhead shrike and LeConte's thrasher. Prairie falcons, along with many common birds, were identified on the site and mountain plover was observed foraging in an agricultural field approximately one mile from the transmission line (AECOM 2009e). The applicant indicated there was a low potential for mountain plover to occur in the vicinity of the project area (AECOM 2009e). Staff disagrees with the assertion that the potential for mountain plover to occur in the project area is low, as suitable wintering habitat (i.e. agricultural lands and fallow fields) are present adjacent to the transmission line corridor and wintering populations of this species are well documented from the Antelope Valley (CPUC 2009).

Several riparian associated birds identified in Table 3 also have limited potential to occur in the project area. These include the State and federally listed as endangered least bell's vireo and southwestern willow flycatcher. These species require a more permanent water source and riparian vegetation in the project area is not expected to support nesting habitat. However, least Bell's vireo was detected by staff approximately 1.5 miles upstream of the transmission line alignment for Segment 2 during surveys conducted near the base of the Little Rock Reservoir in 2010. Although this species was detected near the Dam habitat along the transmission line corridor provides marginal habitat for nesting. In addition several species of special concern including long eared owl (*Asio otus*), yellow breasted chat (*Icteria virens*), and vermilion flycatcher (*Pyrocephalus rubinus*), have a low to moderate potential to occur. Summer tanager (*Piranga rubra*) was observed in 2010 near the Little Rock Reservoir in 2010 but is not expected to nest near the transmission line alignment. These species are not expected to occur at the power plant site and the riparian vegetation at the proposed transmission line crossing does not provide the typical habitat utilized by these species.

Burrowing owl, another species well known from the Antelope Valley, was identified by the applicant along the transmission line corridor and Swainson's hawks were identified by CDFG and staff on the power plant site and transmission line corridor during a site visit in September 2009. Golden eagle has a low to moderate potential to occur on the

PHPP power plant site and transmission line right of way. Golden eagles likely nest within the San Gabriel Mountains and utilize the transmission line alignment for foraging to some degree. These species are discussed further below.

Direct impacts to nesting birds or raptors as a result of construction activities for the proposed project could include the removal or disturbance of vegetation that supports nesting birds, increased noise levels from heavy equipment, increased human presence, and exposure to fugitive dust. Indirect impacts could include the loss of habitat due to the colonization of noxious weeds and a disruption of breeding or foraging activity due to facilitated use of new or improved access roads by the public. Noise and lighting effects may also adversely affect behavior, reproduction, and increase the risk of predation. A detailed discussion of noise and lighting effects are described below for all birds.

Construction of the power plant would remove all nesting and foraging habitat and could result in direct and cumulative impacts to these species due to habitat loss or injury/fatality of individuals. With the exception of a few non-native birds such as European starling, the loss of active bird nests or young is regulated by the federal Migratory Bird Treaty Act and Fish and Game Code Section 3503. The applicant has proposed mitigation measures to avoid and minimize impacts to nesting birds that have been incorporated into staff's proposed Condition of Certification **BIO-15**. This measure includes pre-construction nesting surveys and the establishment of buffers around active nests. However, because of the density of nest sites on the PHPP power plant site, it is highly unlikely that nesting birds could be avoided if clearing and grubbing occur during the nesting season. Therefore, staff recommends that to avoid impacts to nesting birds, the applicant restrict clearing and grubbing to outside the nesting season. Implementation of staff's proposed conditions of certification would avoid direct impacts to nests, eggs, or young of migratory birds and would minimize the impacts of construction disturbance to nesting birds.

Species that utilize the project site for foraging, but not nesting, such as the prairie falcon, Brewer's sparrow (*Spizella breweri*), mountain plover, Lawrence's goldfinch (*Carduelis lawrencei*), and Vaux's swift would not be affected; however, the loss of foraging habitat would be an adverse impact. Overall, the loss of nesting and foraging habitat for these special-status bird species would add to the cumulative, significant loss of habitat for these species within the region.
Implementation of staff's proposed Condition of Certification **BIO-20**, the compensatory mitigation plan for Mohave ground squirrels, would offset this habitat loss by the preservation of similar plant communities.

Swainson's Hawk

Protocol surveys for the Swainson's hawk (state-listed Threatened) were completed by the applicant in 2009 within a one-mile radius of the power plant site and 0.5-mile radius of linear facilities. Swainson's hawks were not observed during these surveys or at historic nest sites visited during the surveys (AECOM 2009p). The applicant indicated in the AFC and Biological Resources Technical Report that Swainson's hawks are considered absent from the project area and that there is a low potential for foraging to occur. In addition, information in the Final Swanson's Hawk Nesting Survey Report (AECOM 2009p) indicated that this is an uncommon nester in the Antelope Valley. Staff

considers the 2009 survey information valid; however, staff disagrees with the applicant's assertion that the species should be considered absent from the project area. While not observed at the historic nesting sites, either because the nest trees were no longer present or the nests were not in use, the CDFG considers a nest site to be active if it was used at least once during the past 5 years (CDFG 2010b). In addition, seven pairs of Swainson's hawks were observed nesting within approximately 18 miles of the project site west of Highway 14, with at least one successful nest (CPUC 2009). At least two of those nests occur within 14 miles of the PHPP site. An additional nest site was recorded by Pete Bloom, a noted raptor expert, approximately ten miles east of the PHPP site and five miles east of the transmission line corridor respectively (CDFG 2009a). Further, one adult Swainson's hawk was observed at the PHPP power plant site by CDFG and one juvenile bird was observed perching in a tree by staff along transmission line Segment 1 near 90th Street in September 2009.

Swainson's hawk nests in areas such as riparian woodlands, roadside trees, trees along field borders, and the edges of remnant oak woodlands. In the Antelope Valley, this species has recently been observed nesting in Joshua tree woodlands (CPUC 2009). While not typical habitat for this species, the numerous stick nests observed on the PHPP power plant site and the presence of large trees bordering the many agricultural fields could provide suitable nest sites. Based on the recent observations of this species in the Antelope Valley, including six nesting pairs west of Highway 14 (CPUC 2009), and one active nest within five miles from the transmission line site, staff considers the project area as potential foraging and nesting habitat for Swainson's hawks. If present, direct impacts to Swainson's hawks could include the loss of habitat from the construction of the power plant, access roads, towers, staging areas, and pulling/splicing locations; and disruption of breeding activity due to increased dust, noise, and human presence associated with construction activities. Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to nest abandonment.

On the PHPP power plant site and transmission line corridors, direct impacts to this species, if present, would occur during the clearing and grubbing portion of the project when potential nest trees are removed. During construction of the transmission line, impacts to this species could occur when vehicle access and equipment work in close association with the large trees that border the many agricultural fields present along Segment 1. The total duration of potential effects to Swainson's hawks would occur for a maximum period of 27 months (COP 2008a). Specifically, construction of the PHPP power block and transmission line would require approximately 24 and 17 months respectively. Although the planned PHPP construction schedule would last 24 months, direct effects would be primarily limited to one nesting season on the PHPP power plant site and two nesting seasons along the linear transmission line routes. Swainson's hawks are not expected to occur along the pipeline alignments. Once potential nest trees are removed from the site, direct effects would be limited to noise and construction disturbance in adjacent areas. For the PHPP power plant site, the potential effects would be limited. This area is isolated from other potential nest sites and is bordered by developed areas (i.e. LA Worlds Airport and Air Force Plant 42) and frequently traveled arterial roadways.

Construction of the PHPP transmission line would also result in the removal of 5.08 acres of potential foraging habitat for Swainson's hawks (AECOM 2009p). Foraging habitat for Swainson's hawks includes dry land and irrigated pasture, alfalfa, fallow fields, low-growing row or field crops, rice land, and cereal grain crops (CDFG 1994). Swainson's hawks may also forage in non-native annual grassland, Joshua tree woodlands, and other desert scrub habitats that support a suitable prey base present within the proposed project.

Because the applicant considered this species to be absent from the project area, the applicant has not provided specific mitigation to avoid impacts to Swainson's hawk or to mitigate the loss of foraging habitat. To avoid potential impacts to nesting birds, the applicant has proposed conducting pre-construction surveys on the plant site and along all linear facilities. Staff considers this species to have a high likelihood of occurring, at least as a foraging species, and suitable nest trees are present. Because nesting Swainson's hawks have been documented within five miles of the project area and this species is a known nester in the region, staff considers the potential impacts to this species to be significant absent mitigation.

To mitigate for the loss of foraging habitat, the CDFG recommends that impacts to suitable foraging habitat within a five-mile radius of an active nest must be considered (CDFG 2010b). Although agricultural lands are important foraging habitat the loss of Joshua tree woodland and creosote bush scrub remain important habitat for this species. Coupled with the recent information on nesting in the Antelope Valley staff is requiring habitat compensation for the loss of foraging habitat. With the exception of the 5.08 acres of lost agricultural lands that will require compensatory mitigation; staff would consider the dedication of mitigation lands for Mohave ground squirrel to compensate for loss of native plant communities if they are located within 15 miles of known Swainson's hawk nest sites. Otherwise the applicant would be required to dedicate other native lands or increase the ratio of agricultural lands to mitigate the loss of foraging habitat for this species. However, for the purposes of compliance with CESA the applicant must provide security for the replacement costs of 300 acres of foraging habitat. This includes 10.22 acres of agricultural lands 116.55 acres of Mojave creosote bush scrub, and 183.15 acres of Joshua tree woodland.

Calculation of Security for Swainson's Hawk Compensatory Mitigation

To satisfy Section 2081 of the California Endangered Species Act, the applicant must provide financial assurances to guarantee that an adequate level of funding is available to implement all impact avoidance, minimization, and compensation measures described in the Swainson's hawk condition of certification that are required before project impacts occur. These financial assurances are generally provided in the form of an irrevocable letter of credit, a pledged savings account or another form of security prior to initiating ground-disturbing project activities. Staff's proposed conditions of certification typically specify the dollar amount of the security, and include a provision for adjusting that security amount when parcel-specific information is available. This security amount is calculated by multiplying the acreage of the impact area by the total per-acre costs, a figure which represents the sum of the costs required for: (1) land acquisition, (2) initial habitat improvements, and (3) a fund to support long-term management of the acquired lands.

The latter cost for the long-term management fund is typically the largest component of the compensatory mitigation fee. Interest from the fund provides enough income to cover annual stewardship costs on the acquired lands and includes a buffer to offset inflation. The amount for the fund is established by a Property Analysis Record (PAR), a computerized database methodology developed by the Center for Natural Lands Management (<www.cnlm.org/cms>) which calculates the costs of land management activities for a particular parcel. These activities include preparation of a Swainson's hawk management plan tailored for each parcel of mitigation land to assess habitat status, identify desired conditions, and develop plans to achieve conditions that would best support Swainson's hawk. Once the management plan is prepared and approved by the appropriate resource agencies, implementation of enhancement actions such as fencing, road closure, invasive plant control, habitat restoration, and monitoring can begin. The goal of these activities is to increase the carrying capacity of the acquired lands for Swainson's hawk and increase their population numbers by enhancing survivorship and reproduction.

Funding for the initial habitat improvements supports those actions needed immediately upon acquisition of the property to secure it and remove hazards. These activities might include fencing or debris clean-up, or other urgent remedial action identified prior to acquisition. When the management plan is completed for the acquired parcel, activities such as these are thereafter funded from the interest produced by the long-term management fund described above.

The applicant may elect to purchase and permanently protect compensation lands itself; to fund the acquisition and initial improvement of compensation lands through the National Fish and Wildlife Foundation (NFWF) by depositing funds for that purpose into NFWF's REAT Account; or to fund the acquisition of compensation lands through to a third party other than NFWF, as outlined in **BIO-17**.

Condition of Certification **BIO-17** would require that the project owner provide financial assurances to guarantee an adequate level of funding to implement the compensation measures described above. Because there are several suitable options available to the applicant to satisfy the compensation requirement, and because mitigation requirements must satisfy the requirements of the State Endangered Species Act, staff's calculation of the security amount includes estimates of all transaction and management fees described above.

Depending on the location and habitat type of the proposed Mohave ground squirrel mitigation lands (described below) it is possible that some or all of the compensation required under **BIO-17** would be achieved through implementation of Mohave ground squirrel habitat compensation. Should lands identified under Condition of Certification **BIO-20** (Compensation for Mohave Ground Squirrel) provide the habitat types and mitigation acreage required the funds dedicated for Condition of Certification **BIO-17** would be returned. Staff's calculation of the security amount includes estimates of all transaction and management fees required for land acquisition and management. These calculations are presented in **Biological Resources Table 4a**.

Biological Resource Table 4a was developed by the REAT group in 2010, which included the CDFG, Energy Commission, BLM, and USFWS to provide a transparent

guide to quantifying mitigation fees associated with land acquisition, enhancement and management. The costs associated with these activities identified in **Biological Resource Table 4a** were developed through extensive agency coordination and review of land costs, management fees, biological surveys, and other costs expected to be incurred by land management agencies.

Biological Resources Table 4a
Swainson's Hawk Compensation Cost Estimate[1]

	Task	Cost
1.	Land Acquisition 305 acres at 2:1 ratio=610 acres	$10,000 per acre[2]
2.	Level 1 Environmental Site Assessment	$3000 per parcel[3]
3.	Appraisal	$5000 per parcel
4.	Initial site work - clean-up, enhancement , restoration	$250 per acre[4]
5.	Closing and Escrow Costs – 1 transaction includes landowner to 3rd party and 3rd party to agency	$5000 per transaction
6.	Biological survey for determining mitigation value of land (habitat based with species specific augmentation)	$5000 per parcel
7.	3rd party administrative costs - includes staff time to work with agencies and landowners; develop management plan; oversee land transaction; organizational reporting and due diligence; review of acquisition documents; assembling acres to acquire….	10% of land acquisition cost (#1)
8.	Agency costs to review and determine accepting land donation - includes 2 physical inspections; review and approval of the Level 1 ESA assessment; review of all title documents; drafting deed and deed restrictions; issue escrow instructions; mapping the parcels….	15% of land acquisition costs (#1) × 1.17 (17% of the 15% for overhead)
	SUBTOTAL *- Acquisition & Initial Site Work*	***$8,116,050.00***
9.	Long-term Management and Maintenance (LTMM) Fund - includes land management; enforcement and defense of easement or title [short and long term]; monitoring….	$1450 per acre[5]
	SUBTOTAL *- Acquisition, Initial Site Work, & LTMM*	***$9,000,550.00***
	NFWF Fees	
10.	Establish the project specific account	n/a (presumes establishment of Mohave ground squirrel account for project)
11.	NFWF management fee for acquisition & initial site work	3% of SUBTOTAL
12.	NFWF Management fee for LTMM Fund	1% of LTMM Fund
13.	Call for and Process Pre-Proposal Modified RFP	n/a (presumes establishment of Mohave ground squirrel account for project)
	TOTAL *for deposit in REAT-NFWF Project Specific Account*	***$9,252,876.50***

1. Estimates prepared in consultation with CDFG. All costs are best estimates as of fall 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.

2. Based on mean of data provided by CDFG for land acquisition in Los Angeles County. If the agencies, developer, or 3rd party has better, credible information on land costs in the specific area where project-specific mitigation lands are likely to be purchased, that data overrides this general estimate. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.

3. For the purposes of determining costs, an average parcel is 60 acres (based on input from DFG).

4. Based on information from CDFG.

5. Estimate for purposes of calculating general costs. The actual long term management and maintenance costs will be determined using a Property Assessment Report (PAR) tailored to the specific acquisition.

In order to avoid impacts to Swainson's hawk, staff has developed the proposed Conditions of Certification **BIO-16** and **BIO-17**. These measures require pre-construction surveys for this species and the acquisition of mitigation lands if nesting is noted within five miles of the project site. If a nest is identified, the project owner would establish a disturbance-free buffer around the nest. In the central valley the CDFG recommends that a 0.25-mile buffer zone be established in nesting areas away from urban development (CDFG 2010b). However, in the Antelope Valley a 0.5 mile buffer has been recommended by CDFG (CDFG 2009). By the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9,** which include worker training, implementation of Best Management Practices, and biological monitoring, potential impacts to Swainson's hawk would be reduced to less-than-significant levels and the project would be in compliance with the California Department of Fish and Game's requirements to fully mitigate under section 2081 of California's Fish and Game Code.

Burrowing Owls

Burrowing owls or their sign (i.e., individuals, pellets, or feathers) were not observed within 500 feet of the PHPP power plant site or linear facilities during focused surveys for this species conducted in 2008 and 2009 (ENSR 2008). During the ZOI surveys conducted for desert tortoise, a single burrowing owl was observed adjacent to transmission line Segment 1 approximately 1,200 feet from the project alignment. Although surveys did not detect direct sign of burrowing owls, the applicant noted the presence of rodent burrows in the project area which provide nesting opportunities (ENSR 2008). In addition, staff considers it likely that burrowing owls could forage in the area and this species is known to occur in the Antelope Valley. If burrowing owls are present within a construction zone or adjacent to such an area, disturbance could destroy occupied burrows or cause the owls to abandon their burrows. Construction during the breeding season could also result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment and would constitute a significant impact absent mitigation.

Although staff concurs with the results of the surveys, the maps of expected burrowing owl habitat provided in the Biological Resources Attachment DR-2a (Burrowing Owls Habitat Assessment and Focused Survey) within Inland Energy's Supplemental Response #3 (April 9, 2009) to Energy Commission Data Request Set 1 and Response to Energy Commission Data Request 2, #147 & #155 appear to be deficient. These maps identified areas within the project alignment that the applicant has designated suitable habitat for burrowing owl. Staff reviewed the maps and conducted a site visit of the project site on September 21 and 25, 2009. Staff considers the maps a useful tool; however, staff believes the maps under-represent potential habitat for burrowing owls. Although burrowing owls prefer annual and perennial grasslands, typically with sparse or nonexistent tree or shrub canopies (Clark and Plumpton 2005); they are routinely observed within other plant communities in the Antelope Valley and High Desert. Staff considers potential foraging and nesting habitat in the project area to include, but not be limited to, agricultural, disturbed/ruderal, desert wash, and low density creosote bush scrub communities. In many agricultural areas owls can quickly colonize fallow fields and are routinely observed along the margins of active fields.

To avoid potential impacts to burrowing owls that might be nesting or residing within burrows in the project impact area, the applicant has proposed conducting pre-construction surveys on the plant site and along all linear facilities in areas supporting suitable habitat, using methods recommended by CDFG (CBOC 1993). Should owls occur within areas subject to project disturbance, construction would be scheduled to avoid the breeding season. If it becomes necessary to destroy an occupied burrow, the applicant would implement a passive relocation plan, construct artificial burrows, and acquire compensatory lands that would be funded in perpetuity to offset the loss of foraging habitat.

Burrowing owls are not expected to be directly impacted by construction of the PHPP and staff concurs with the applicant's proposed impact avoidance, minimization, and mitigation measures. These include the detection and avoidance of active burrows and, if necessary, the acquisition of mitigation lands; and the creation of artificial burrows for displaced individuals. Staff has incorporated them into staff's proposed Condition of Certification **BIO-18**. In order to ensure that surveys for burrowing owls are conducted in all suitable habitats, as a component of **BIO-18** staff is requiring the applicant to provide updated maps that more accurately characterize potential habitat for this species. With implementation of this condition, potential impacts to burrowing owls would be reduced to less-than-significant levels.

Golden Eagles

Golden eagles were not observed at the PHPP power plant or along the linear facilities, but are known to occur in the region. The most likely potential for golden eagles to occur is along portions of Segment 1 and Segment 2 of the transmission line corridors where the right of way crosses natural lands. Golden eagles are not expected to frequent the PHPP power plant site due to its proximity to the Los Angeles World Airport and the city of Palmdale.

Nest sites or breeding activity was not observed on the site and the project does not support nesting habitat. However, potential nesting habitat is present within the adjacent San Gabriel Mountains. Staff inspected the foothills of the San Gabriel Mountains and reviewed aerial photography to evaluate potential nest sites for this species. Although there are a variety of topographical features in the region (i.e., shallow caves, small rock outcrops, and trees) most of these features do not appear suitable for golden eagle nesting.

The USFWS is the primary federal authority charged with the management of golden eagles in the United States. A permit for take of golden eagles, including take from disturbance such as loss of foraging habitat, may be required for this project. USFWS guidance on the applicability of current Eagle Act statutes and mitigation is currently under review. On November 10, 2009 the USFWS implemented new rules (74 FR 46835) governing the "take" of golden and bald eagles. Although the federal government may issue a take permit for this species, the direct take of golden eagles would not be authorized by the CDFG. This species is designated as "fully protected" (California Fish & Game Code §§ 3511) and may not be taken or possessed.

Based on guidance provided by the USFWS (72 FR 31132 [disturbance], June 5, 2007) staff defined disturbance as an activity that would result in injury to an eagle or which

would substantially interfere with normal breeding, feeding, or sheltering behavior. For example, a nestling being knocked from the nest by a startled adult would be considered an injury. A nestling fed inadequately because adults were agitated in the vicinity of the nest due to construction-related noise and activity would also be considered substantial interference, as would a situation in which nestlings starve because the adults were excluded from their familiar foraging grounds and could not provide adequate food to their young. Staff concluded that project construction activities could potentially injure or disturb golden eagles if nests were established sufficiently close to project boundaries to be affected by the sights and sounds of construction.

Direct impacts to golden eagles could occur through the loss of or disruption of foraging habitat, noise, construction activities and human disturbance or collision with solar panels or other project features. Because this species commences nest building prior to most other birds, disruption of nest building or the abandonment of existing nest sites could occur should eagles nest within 1 mile of the project site. This species is sensitive to human encroachment and if nests are disturbed by humans, nest abandonment will typically occur (Thelander 1974). A study by Whitfield et. al. (2008) found that human activities up to and in some cases exceeding one mile from a nest site have resulted in nest disturbance.

Golden eagles avoid developed areas, and eagle populations in California have declined during the past century due to a decrease in open habitats (Grinnell and Miller 1944). The development of the 463 acre project site is not expected to result in substantial loss of foraging habitat for this species. While it is possible that this species may periodically forage in the region, golden eagles are not expected to forage near the PHPP power plant site.

Indirect effects to golden eagles could result from degradation and alteration of habitat along the transmission line route or through collision with new transmission line structures.

Golden eagles are not known to nest in the project area and are unlikely to be disturbed from the construction of the proposed project. However, if present in the project area, project activities that disrupt nesting would be considered significant absent mitigation. The applicant has proposed mitigation measures to avoid and minimize impacts to nesting birds that have been incorporated into staff's proposed Condition of Certification **BIO-15**. This measure includes pre-construction nesting surveys and the establishment of buffers around active nests. If active nests are detected, the project owner would establish a disturbance-free buffer around the nest. No construction activities would be authorized within the 1.0-mile buffer pending the successful fledging of the nest.

Overall the loss of nesting and foraging habitat for golden eagles is not expected to be significant due to the project's location in a largely urban environment. However, implementation of staff's proposed Condition of Certification **BIO-20**, the compensatory mitigation plan for Mohave ground squirrels, would further offset this habitat loss by the preservation of native vegetation in the region.

The USFWS has also raised concerns regarding potential collision threats associated with solar and renewable technologies. To address potential collision concerns

(discussed below under operational effects), staff has proposed Condition of Certification **BIO-24** (Avian Protection Plan / Monitoring Bird Impacts from Solar Technology). This requires a monitoring and reporting program that would document and report potential collision mortality from the proposed solar fields.

In summary, the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9, BIO-20,** and **BIO-24** which include worker training, implementation of Best Management Practices, pre-construction surveys, biological monitoring, and the avian protection plan, would be expected to reduce potential impacts to golden eagles to less-than-significant levels under CEQA, and the project would be compliance with the California Department of Fish and Game's provision for no take of the State Fully Protected Species under Section 3511 of California's Fish and Game Code.

Special-Status Mammals

Mohave Ground Squirrel

Potential habitat for the Mohave ground squirrel is located on the PHPP power plant site, adjacent to portions of the proposed pipelines, and along approximately 26 miles of the transmission line right-of-way north of Mt. Emma Road (AECOM 2009e). Habitat in the project area with the potential to support this species includes Mojave creosote bush scrub, desert saltbush scrub, Mojave desert wash scrub, and Joshua tree woodland.

The applicant conducted protocol surveys at the PHPP power plant site in 2006 and 2008, and Mohave ground squirrels were not observed or trapped during these surveys. Trapping was not conducted along the proposed transmission line alignment.

To further evaluate the potential for Mohave ground squirrels to occur in the project area, the applicant conducted a habitat assessment on April 16, June 19, and June 20, 2008 (AECOM 2009e; Leitner 2008). The results of this assessment indicated that habitat for this species is present on the project site; however, there is no evidence suggesting the animals are present on the PHPP power plant site. The applicant has indicated that even if present the area holds little long-term value for the species as the area is isolated from known populations, and cut off by agricultural and urban development (AECOM 2009e). Staff concurs that the site is isolated; however the area is large and provides good quality native habitat. In addition, native plant communities with connectivity to large contiguous blocks of potentially occupied habitat border the transmission line alignment. In total, approximately 331 acres of permanent habitat loss is expected to occur for this species. This includes 300 acres at the power plant site and 31 acres along the transmission line route.

While the PHPP site is not known to support this species, trapping events have been demonstrated to have low success rates in some circumstances (CDFG 2009) and there remains a potential for this species to be present on site and along the proposed transmission line route. Because of the potential for this species to occur in the project area, the applicant has chosen to assume presence and seek authorization for take of Mohave ground squirrel.

Direct impacts to Mohave ground squirrel, if present, include crushing of burrows, mortality due to road kill, and loss of habitat due to the installation of permanent

structures and/or roads. Indirect impacts include degradation of habitat due to the spread of noxious weeds and dust. The duration of potential impacts to Mohave ground squirrel vary according to the project component. Construction of the power block and solar facility would occur over a period of 24 months. The transmission line would be constructed concurrently and require approximately 17 months to complete.

During this time, resident Mohave ground squirrels, if present, would be most susceptible to mortality during clearing and grubbing activities. Once completed, animals that stray from adjacent undisturbed areas could become trapped in excavations or subject to mortality by vehicles and equipment. Operational impacts include increased risk of road kill and disturbance due to increased use of access roads by the public and maintenance personnel.

The applicant proposes to acquire and enhance mitigation lands to compensate for the potential take of Mohave ground squirrels during construction of the proposed project. For the purposes of this analysis the applicant has not suggested the number of individuals that would be “taken” during construction on the plant site as no animals were detected during protocol surveys of the site. However, as stated above, the applicant has indicated that although the species was not detected and the site remains isolated from other populations, the project will assume presence for this species.

In the habitat assessment report completed for the PHPP, the applicant’s Mohave ground squirrel expert, Dr. Philip Leitner, suggests that a 2:1 mitigation ratio is appropriate for impacts at the power plant site because the site is isolated from existing populations, and that a 3:1 ratio would adequately mitigate project impacts along the transmission line route (Leitner 2008). However, in the Incidental Take Permit application, the applicant suggested that a ratio of 1:1 for the power plant was more appropriate. Staff has coordinated with CDFG regarding this issue and determined that although isolated, the site supports good quality habitat for a number of resident species including Mohave ground squirrel. In addition, the ongoing land use conversions occurring in the region ranging from residential development to renewable energy projects continue to degrade habitat for this species. Because Mohave ground squirrel habitat is being converted at a rate higher than anyone ever anticipated, CDFG concludes a 2:1 ratio is the minimum for which habitat should be compensated going forward to protect the species. As such, staff concurs with Dr. Leitner’s initial assessment regarding the power plant site. Staff concludes that a ratio of 2:1 for the power plant site and 3:1 for the linear routes would be required to mitigate for this species. This would require the project owner to acquire 610 acres of compensatory mitigation. These ratios and the applicant’s impact avoidance, minimization, and compensation measures provided in the Incidental Take Permit application have been incorporated into staff’s proposed Conditions of Certification **BIO-19** and **BIO-20**. Implementation of these conditions would reduce impacts to Mohave ground squirrel to less-than-significant levels and would also satisfy the CDFG’s requirements under Fish and Game Code Section 2081.

Calculation of Security for Mohave Ground Squirrel Compensatory Mitigation

To satisfy section 2081 of the California Endangered Species Act, the applicant must provide financial assurances to guarantee that an adequate level of funding is available to implement all impact avoidance, minimization, and compensation measures

described in the Mohave ground squirrel conditions of certification that are required before project impacts occur. These financial assurances are generally provided in the form of an irrevocable letter of credit, a pledged savings account or another form of security prior to initiating ground-disturbing project activities. Staff's proposed conditions of certification typically specify the dollar amount of the security, and include a provision for adjusting that security amount when parcel-specific information is available. This security amount is calculated by multiplying the acreage of the impact area by the total per-acre costs, a figure which represents the sum of the costs required for: (1) land acquisition, (2) initial habitat improvements, and (3) a fund to support long-term management of the acquired lands.

The latter cost for the long-term management fund is typically the largest component of the mitigation fee. Interest from the fund provides enough income to cover annual stewardship costs on the acquired lands and includes a buffer to offset inflation. The amount for the fund is established by a Property Analysis Record (PAR), a computerized database methodology developed by the Center for Natural Lands Management (<www.cnlm.org/cms>) which calculates the costs of land management activities for a particular parcel. These activities include preparation of a Mohave ground squirrel management plan tailored for each parcel of mitigation land to assess habitat status, identify desired conditions, and develop plans to achieve conditions that would best support Mohave ground squirrel. Once the management plan is prepared and approved by the appropriate resource agencies, implementation of enhancement actions such as fencing, road closure, invasive plant control, habitat restoration, and monitoring can begin. The goal of these activities is to increase the carrying capacity of the acquired lands for Mohave ground squirrel and increase their population numbers by enhancing survivorship and reproduction.

Funding for the initial habitat improvements supports those actions needed immediately upon acquisition of the property to secure it and remove hazards. These activities might include fencing or debris clean-up, or other urgent remedial action identified prior to acquisition. When the management plan is completed for the acquired parcel, activities such as these are thereafter funded from the interest produced by the long-term management fund described above.

The applicant may elect to purchase and permanently protect compensation lands itself; to fund the acquisition and initial improvement of compensation lands through NFWF by depositing funds for that purpose into NFWF's REAT Account; or to fund the acquisition of compensation lands through to a third party other than NFWF, as outlined in **BIO-20**.

Condition of Certification **BIO-20** would require that the project owner provide financial assurances to guarantee an adequate level of funding to implement the compensation measures described above. Because there are several suitable options available to the applicant to satisfy the compensation requirement, and because mitigation requirements must satisfy the requirements of the State Endangered Species Act, staff's calculation of the security amount includes estimates of all transaction and management fees described above. These calculations are presented in **Biological Resources Table 4b**.

Biological Resources Table 4b
Mohave Ground Squirrel Compensation Cost Estimate[1]

	Task	Cost
1.	Land Acquisition (total of 610 acres) 2:1 ratio on power plant site 3:1 on transmission line	$10,000 per acre[2]
2.	Level 1 Environmental Site Assessment	$3000 per parcel[3]
3.	Appraisal	$5000 per parcel
4.	Initial site work - clean-up, enhancement , restoration	$250 per acre[4]
5.	Closing and Escrow Costs – 1 transaction includes landowner to 3rd party and 3rd party to agency	$5000 per transaction
6.	Biological survey for determining mitigation value of land (habitat based with species specific augmentation)	$5000 per parcel
7.	3rd party administrative costs - includes staff time to work with agencies and landowners; develop management plan; oversee land transaction; organizational reporting and due diligence; review of acquisition documents; assembling acres to acquire….	10% of land acquisition cost (#1)
8.	Agency costs to review and determine accepting land donation - includes 2 physical inspections; review and approval of the Level 1 ESA assessment; review of all title documents; drafting deed and deed restrictions; issue escrow instructions; mapping the parcels….	15% of land acquisition costs (#1) × 1.17 (17% of the 15% for overhead)
	SUBTOTAL *- Acquisition & Initial Site Work*	***$8,847,825.00***
9.	Long-term Management and Maintenance (LTMM) Fund - includes land management; enforcement and defense of easement or title [short and long term]; monitoring….	$1450 per acre[5]
	SUBTOTAL *- Acquisition, Initial Site Work, & LTMM*	***$9,812,075.00***
	NFWF Fees	
10.	Establish the project specific account	$12,000
11.	NFWF management fee for acquisition & initial site work	3% of SUBTOTAL
12.	NFWF Management fee for LTMM Fund	1% of LTMM Fund
13.	Call for and Process Pre-Proposal Modified RFP	$30,000
	TOTAL *for deposit in REAT-NFWF Project Specific Account*	***$10,141,152***

1. Estimates prepared in consultation with CDFG. All costs are best estimates as of fall 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.

2. Based on mean of data provided by CDFG for land acquisition in Los Angeles County. If the agencies, developer, or 3rd party has better, credible information on land costs in the specific area where project-specific mitigation lands are likely to be purchased, that data overrides this general estimate. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.

3. For the purposes of determining costs, an average parcel is 60 acres (based on input from CDFG).

4. Based on information from CDFG.

5. Estimate for purposes of calculating general costs. The actual long term management and maintenance costs will be determined using a Property Assessment Report (PAR) tailored to the specific acquisition.

American Badger and Desert Kit Fox

American badgers were not detected on the PHPP site, but the site includes suitable foraging and denning habitat for this species. In addition, habitat along the transmission line alignment could support this species. The American badger is a California species of special concern and potential impacts to individuals of this species must be mitigated to less-than-significant levels. The desert kit fox (*Vulpes macrotis*) is not a special-status species, but it is protected under Title 14, California Code of Regulations (sections 670.2 and 670.5), and potential impacts to individuals of this species must be avoided. Desert kit fox may occur in the project area, and the site includes suitable foraging and denning habitat for this species.

Construction of the PHPP project could kill or injure American badgers or desert kit fox by crushing with heavy equipment or could entomb them within a den. Construction activities could also result in disturbance or harassment of individuals. Staff's proposed Condition of Certification **BIO-21** requires that prior to ground disturbance, a qualified biologist perform a preconstruction survey for badger and kit fox dens in the project area, including areas within 250 feet of all project facilities, utility corridors, and access roads. If present, the applicant will flag and avoid occupied badger and kit fox dens during ground-disturbing activities and establish a buffer to avoid loss of maternity dens. If avoidance of a non-maternity den is not feasible, badgers or kit foxes shall be relocated. Implementation of **BIO-21** would reduce impacts to the American badger and desert kit fox to a less-than-significant level.

Pallid San Diego Pocket Mouse and Southern Grasshopper Mouse

The Pallid San Diego pocket mouse and southern grasshopper mouse have the potential to occur in the project area, including the PHPP power plant site and associated linear facilities. Trapping for these species was not conducted, but based on habitat conditions, there is potential for direct loss of these species. Direct impacts to these species would include mechanical crushing by vehicles and construction equipment, trampling, dust, and loss of habitat. Construction disturbance can also result in the flushing of small animals from refugia which increases the predation risk for small rodents. Indirect impacts include alteration of soils, such as compaction that could preclude burrowing, and the spread of exotic weeds.

Both the pallid San Diego pocket mouse and the southern grasshopper mouse have very limited home ranges, and construction of the power block and transmission line facilities would result in permanent habitat loss for these species, if present. For example, the average home ranges for southern grasshopper mice were approximately 9.1 acres for breeding males, 4.2 acres for non-breeding males, and 4.2 acres for females (Frank and Heske 1992). Population densities of this species are relatively low compared to other rodent species, which can make detection difficult. McCarty (1975) reported a density of 0.7 mice per acre in a Mojave Desert creosote scrub community and others also have reported low population densities (e.g., Baily and Sperry 1929; Frank and Heske 1992).

If present, these species are likely distributed across the site in low densities. Nonetheless, construction of the PHPP would remove over 383 acres of vegetation on the PHPP site and these animals would be subject to mortality from construction

activities. Staff considers this impact to be significant and the applicant has proposed general mitigation measures to reduce project impacts to these species. These measures include biological monitoring, the salvaging of any animals uncovered during construction, and restoration of disturbed areas following construction. Staff has incorporated the measures provided by the applicant into Conditions of Certification **BIO-1** through **BIO-9**. However, staff considers the salvaging of these species to be difficult based on the ecology of the mice and difficult to implement due to the type of ground disturbance that would occur on the project site. However, Condition of Certification **BIO-20** requires the acquisition of lands to mitigate for impacts to Mohave ground squirrel. These species likely to co-occur in at least some of the habitat to be acquired to reduce impacts to Mohave ground squirrel. Implementation of the proposed Conditions of Certification **BIO-1** through **BIO-9,** and **BIO-20** would reduce impacts to pallid San Diego pocket mouse and southern grasshopper mouse to less-than-significant levels.

Special-Status Bats

The AFC indicated that there was a low potential for sensitive bat species to occur in the project area. However, several species including pallid bat, Townsend's big-eared bat, western mastiff bat, and Yuma myotis have the potential to forage within the project area. Some species utilize large areas for foraging. For example, the pallid bat is capable of flying more than 18 miles, although most foraging occurs within about two miles of the diurnal roost (Hermanson and O'Shea 1983).

The rocky mountainous terrain associated with Little Rock Creek and the foothills of the San Gabriel Mountains provides ample locations for both day roosts and maternity sites. In addition, several structures that may support bats, including mine shafts, hollow trees, dense forests, abandoned water tanks, and tunnels associated with the Palmdale Ditch, occur near the project area. A known population of Yuma myotis occurs below Little Rock Reservoir in an enclosed section of the Palmdale Ditch approximately two miles south of the project. Similarly, a tunnel associated with the Palmdale Ditch also occurs immediately adjacent to Segment 2 of the transmission line south of Mt. Emma Road.

The PHPP is not expected to result in the loss of maternity, day roosts, or hibernacula for sensitive bats. These features are not known to occur on the power plant site, and while bats will utilize large trees for day roosts, the habitat on the project site (Joshua tree woodland) is generally not suited for this behavior. Potential roost sites do occur along portions of the transmission line route south of Mount Emma Road. Direct impacts to these species could include mortality of individuals during construction activities, loss of habitat due to construction of permanent structures (e.g., new towers or access roads) or other construction activities, and temporary disturbance during construction (noise, air turbulence, dust, and ground vibrations from construction equipment). Bats that forage near the ground, such as the pallid bat, would also be subject to crushing or disturbance by vehicles driving at dusk, dawn, or during the night. The construction and use of access roads could also disturb bats, particularly at the Little Rock Creek crossing where bats are known to occur.

In general, bats are highly mobile and it is unlikely that construction activities would result in mortality of bats in the project area. Although bats forage in the project area,

most activities will occur during daylight hours when the potential for bat interactions is limited. The applicant has proposed monitoring and avoidance measures during construction to reduce impacts to hibernacula or day roosts. Staff concurs with these measures and has incorporated them into Condition of Certification **BIO-22** which requires pre-construction surveys, avoidance of maternity colonies, provision of substitute roosting habitat, and exclusion of bats prior to demolition of roosts. Implementation of this condition would reduce project impacts to less-than-significant levels.

Impacts to Wildlife Movement Corridors or Native Wildlife Nursery Sites

In southern California, fragmentation of the landscape has reduced much of the remaining habitat available to native species (Haas 2000). In addition, recent studies suggest that habitat fragmentation and isolation of natural areas ultimately results in the loss of native species within those communities (Soulé et al. 1988; Soulé 1991). Wildlife corridors provide a variety of functions and can include habitat linkages between natural areas; provide greenbelts and refuge systems; and divert wildlife across permanent physical barriers to dispersal such as highways and dams by roadway underpasses and ramps (Hass 2000; Simberloff et al. 1992). Generally, the accepted definition describes a wildlife corridor as a linear habitat, embedded in a dissimilar matrix that connects two or more larger blocks of habitat (Beier and Noss 1998). Noss (1987) also suggests several potential advantages to corridors, including increased species richness and diversity, decreased probability of extinction, maintenance of genetic variation, a greater mix of habitat and successional stages, and alternative refugia from large disturbances.

Large-scale development, including agriculture, infrastructure (i.e. Highway 14, California Aqueduct), commercial and residential development, and military uses (Edwards Air Force Base) has resulted in large-scale habitat fragmentation within the project area. Wildlife movement has been hindered by this development, restricting movement corridors within the project area to a few locations. The West Mohave Plan (WMP) indicates that the SEA at Big Rock Wash provides important wildlife corridors and habitat linkages between the San Gabriel Mountains and the Antelope Valley and Little Rock Creek also plays similar functions but to a lesser degree (BLM 2006). Similarly, much of Segment 1 and Segment 2 occur within sparsely populated areas with connectivity to natural lands.

The PHPP power plant site is located in a rapidly developing area. Currently the site is bordered by land uses which inhibit wildlife movement, including Sierra Highway, railroad lines, Air Force Plant 42, and LA Worlds Airport. While some natural lands occur to the north, most of this area supports agricultural and residential developments. Because the site is isolated, it has a reduced function for many species; however, the site is large enough to support populations of species with very limited home ranges that never disperse from the site (i.e. small mammals, reptiles, and plants) and acts as an important nesting site for migratory birds.

Conversely, much of the proposed transmission corridor occurs in natural lands with little development. At Little Rock Creek the transmission line would span an important movement corridor for wildlife. In this area the adjacent floodplain and upland areas are slowly becoming subject to urbanization as residential housing expands in the region.

Off highway vehicle use and trash dumping are also common in this area. Upstream of the project site, the Little Rock Reservoir acts as a barrier for many species. Despite the existing development adjacent to Little Rock Creek, there remains adequate vegetated natural areas that provide for wildlife movement in the area. Construction of the transmission line in this area is not expected to adversely affect wildlife movement in this region. The transmission line has a very limited footprint and does not result in a physical barrier to wildlife movement. The line would be located in an existing utility corridor and construction activities would occur during day light hours. Although wildlife usage would be lower when construction crews are present, many species conduct movement at night or during crepuscular periods when construction actives would be limited. Staff considers impacts to wildlife movement from the construction and operation of the PHPP power plant site and transmission line to be adverse, but not significant.

Impacts to Waters of the State

A total of 43 jurisdictional features were identified by the applicant in the project area (COP 2008a). Twelve of these have been identified by the USACE as waters of the United States (Figure 2, Biological Resources AMEC 2010c). These include Little Rock Creek/Wash, Palmdale Ditch, the California Aqueduct, and a series of small drainages located on Segment 2 of the proposed Transmission line alignment. However, construction would not occur within these drainages. Within Segment 1 and most of Segment 2, these drainages consist of ephemeral desert washes that lack riparian vegetation and transport flows only in response to intense rainfall. As Segment 2 transitions to the foothills of the San Gabriel Mountains, many of the small drainages support narrow bands of riparian vegetation and likely support flows for longer periods of time.

Construction at the PHPP power plant site would not result in permanent impacts to State or federal jurisdictional waters (COP 2008a). A jurisdictional delineation provided by the applicant indicated that jurisdictional features are not present on the proposed PHPP site and the applicant has indicated that transmission line footings would not be located within State or federal waters. Vehicle passage and maintenance of the access roads would result in temporary impacts to 0.08 acres of State jurisdictional waters (AECOM 2009g). The AFC and Preliminary Jurisdictional Waters Report indicated that impacts to jurisdictional waters would be avoided along the access roads.

Direct impacts to jurisdictional habitats could include the removal of native riparian vegetation, the discharge of fill, degradation of water quality, and increased erosion and sediment transport. Most of these impacts would occur during the use of access roads by heavy equipment and vehicle passage where jurisdictional waters traverse access roads. Indirect impacts could include alterations to the existing topographical and hydrological conditions and the introduction of non-native, invasive plant species.

Desert wash habitats provide micro habitats for a variety of species and play an important role in conveying surface flows during storm events. Although this hydrogeomorphic landform is relatively common in parts of the Antelope Valley, much of this habitat has been lost over the last several decades due to development and agricultural practices, particularly in undeveloped portions of the project area where off-

road vehicle paths and paved roads transect desert washes. Staff considers temporary and permanent impacts to jurisdictional waters to be significant absent mitigation.

The applicant has proposed several measures to minimize disturbance to existing Arizona crossings during construction of the transmission lines. An Arizona crossing is a type of road that allows water to flow across the road during periods of wet weather. These include avoiding use of the crossings during periods of ponded or flowing water, the installation of railroad flat cars to provide access over the drainage if needed, and by the implementation of Best Management Practices to minimize the potential for off-site sediment transport. Staff has incorporated the avoidance measures provided by the applicant into staff's proposed Condition of Certification **BIO-23**, and has provided additional recommendations and guidance consistent with CDFG Streambed Alteration Agreement requirements. These include the requirement of restoration and compensation should permanent loss of jurisdictional habitat occur. With implementation of staff's proposed Condition of Certification **BIO-23**, temporary impacts to 0.08 acre of State waters associated with desert washes would be mitigated to less-than-significant levels. This condition also fulfills requirements of CDFG's Lake and Streambed Alteration Agreement program pursuant to Fish and Game Code Section 1600 et seq. The USACE has indicated that although waters of the United States do occur, the proposed project would not be regulated provided work is conducted outside the ordinary high water mark for areas designated as waters of the United States. Condition of Certification **BIO-23** includes language requiring the applicant to avoid permanent impacts to all waters of the United States.

Operation Impacts and Mitigation

Potential operation impacts to biological resources include increased risk of raven predation on desert tortoise and wildlife, increased levels of traffic and disturbance, potential collisions with structures, and lighting. These impacts are discussed below.

Ravens

Construction and operation of the PHPP could provide new sources of food, water, and nesting sites that might draw unnaturally high numbers of tortoise predators, such as the common raven. Clearing and grading activities result in the exposure of large numbers of fossorial species, such as small rodents and reptiles. Many of these species are killed or injured during these activities and attract ravens and other opportunistic predators. Ravens depend on human encroachment to expand into areas where they were previously absent or in low abundance. Roads provide a ready source of raven food in the carcasses of small mammals and reptiles that result from vehicle collisions, and increased nesting opportunities are provided by human structures. In addition, water is readily available at pastures, farmlands, sewage ponds, and wildlife guzzlers (BLM 2006). Common raven populations in some areas of the Mojave Desert have increased 1,500% from 1968 to 1988 in response to expanding human use of the desert (Boarman 2003). Since ravens were scarce in this area prior to 1940, the current level of raven predation on juvenile desert tortoises is considered to be an unnatural occurrence (BLM 2006).

The applicant has indicated that because of the low likelihood of desert tortoise occurring in the project area, a raven control plan is not warranted (AECOM 2009e).

However, ravens are capable of long-distance dispersal and are known to forage many miles from their nest sites. Staff considers that the construction and operation of the PHPP would result in new attractants and potential subsidies that might result in changes in raven population or behavior, which could subsequently affect the desert tortoise population in the region through increased predation. To reduce this effect, staff has proposed the development and implementation of a Raven Monitoring, Management, and Control Plan for the PHPP project. These measures are described in more detail in staff's proposed Condition of Certification **BIO-14**.

As described in staff's proposed Condition of Certification **BIO-8**, excess ponded water, food waste and other attractants would be controlled to reduce subsidies to ravens. This potential impact would be minimized by using the minimal amount of water needed for dust abatement, by routine trash collection and appropriate storage, and by use of a Biological Monitor to inspect the construction sites and ensure that potential attractants of the common raven are minimized.

Cumulative/Regional Impacts of Ravens

Construction and operation of the PHPP and subsequent increases in raven predation could contribute incrementally to cumulative impacts to the western Mojave Desert population of desert tortoise. The PHPP is currently located in an area with low potential for desert tortoise to occur; however, elevated raven predation pressure and any cumulative loss of juvenile tortoise due to the further addition of raven subsidies could have a long-term effect on the regional tortoise population by reducing the recruitment of juvenile tortoises into the adult life stages (Boarman 2003). As desert tortoises have recently been discovered in areas of the Antelope Valley previously thought to be unoccupied (i.e. west of Highway 14) approximately 20 miles from the PHPP site, and the long distances ravens are capable of flying, any raven subsidies in the region would contribute to the decline in tortoise populations. The overall effects of this predation on populations in the region may not be apparent for years because tortoises do not typically reach sexual maturity until approximately 15 to 20 years of age. The USFWS has developed a comprehensive, regional raven management and monitoring program in the California Desert Conservation Area to address the regional, significant threat that increased numbers of common ravens pose to desert tortoise recovery efforts (USFWS 2010). To mitigate for the regional effects of ravens, staff's proposed Condition of Certification **BIO-14** would require the applicant to contribute a one-time fee to support the regional raven management plan activities. The fund and fee are described above (**Impacts to Desert Tortoise**). The fee would offset contributions of the project to cumulative impacts associated with regional increases in raven numbers, and implementation of the project-specific raven management efforts proposed by the applicant would reduce impacts to desert tortoise from raven predation to less-than-significant levels under CEQA.

Other Predators

In addition to ravens, feral dogs have emerged as significant predators of the tortoise. Dogs may range several miles into the desert and have been found digging up and killing desert tortoises (USFWS 1994; Evans 2001). Dogs brought to the project site with visitors may harass, injure, or kill desert tortoises or Mohave ground squirrels, particularly if allowed off leash to roam freely in occupied habitat. Implementation of

staff's proposed Condition of Certification **BIO-6**, the Worker Environmental Awareness Program (WEAP), and restrictions on pets being brought to the site (Condition of Certification **BIO-8**), would reduce the potential for these impacts.

Increased Risk from Roads/Traffic

Vehicle traffic would increase as a result of PHPP construction and improvement of access roads, increasing the risk of injuring or killing desert tortoise and other wildlife. Construction traffic along access and spur roads, particularly in areas used by nesting birds or near ephemeral water sources, can adversely affect wildlife by disrupting breeding, foraging, and movement. Wildlife species are most vulnerable to disturbances during their breeding seasons and these disturbances could result in nest, roost, or territory abandonment and subsequent reproductive failure if these disturbances were to occur during the breeding season. The use of access roads by construction and maintenance vehicles would result in accidental road-killed wildlife if these species occurred on roads during construction activities. Diurnal reptiles and small mammals such as desert tortoise, western fence lizards, desert cottontails, and California ground squirrels are the most likely to be subject to vehicle-caused mortality, although few if any wildlife species are immune to vehicle collisions.

To minimize the risks of increased traffic fatality and other hazards associated with roads at the PHPP project site, the applicant has proposed a variety of impact minimization measures which staff has incorporated into staff's proposed Condition of Certification **BIO-8**. These measures include confining vehicular traffic to and from the project site to existing routes of travel, prohibiting cross-country vehicle and equipment use outside designated work areas, and imposing a speed limit of 25 miles per hour within the project area, on maintenance roads for linear facilities, and on access roads to the PHPP site.

Noise

Noise from construction activities could temporarily discourage wildlife from foraging and nesting immediately adjacent to the project area. Noise from clearing, grading, and construction use would generate the greatest construction impacts on wildlife, especially in undisturbed portions of the transmission line alignment. Construction would affect wildlife in adjacent habitats by interfering with breeding or foraging activities and movement patterns, causing animals to temporarily avoid areas adjacent to the construction zone. This could disrupt foraging, breeding, sheltering, and other activities. Nocturnal (i.e., active at night) wildlife would be affected less by construction than diurnal (i.e., active during the day) species since construction would occur primarily during daylight hours. However, construction may also occur during dusk, dawn, or nighttime, and if this occurs, impacts to nocturnal species would be similar to impacts described for diurnal species. More mobile species like birds and larger mammals are expected to disperse into adjacent habitat areas during the land clearing and grading phases associated with tower construction.

Construction noise may affect birds in several ways, including annoyance which causes birds to abandon nests that are otherwise suitable; raise the level of stress hormones, interfering with sleep and other activities; cause permanent injury to the auditory system; and interfere with acoustic communication by masking important sounds or

sound components (Dooling 2006). Many bird species rely on vocalizations during the breeding season to attract a mate within their territory, and noise from construction could disturb nesting birds and other wildlife and adversely affect nesting and other activities. Reijnen et al. (1995) demonstrated that for two species of European warbler (*Phylloscopus* spp.), sound levels between 26 dB(A) and 40 dB(A) reduced breeding density by up to 60% compared to areas without disturbance. These data suggest disturbance from adjacent road noise and urban development may be a contributing factor in the use of habitat adjacent to developed areas. Similar effects may occur in other taxa.

The loudest noise likely to occur with PHPP construction is created by steam blows, an activity needed after construction to clear out the steam system. A series of short steam blows, lasting two or three minutes each, is performed several times daily over a period of two or three weeks. Steam blows can produce noise as loud as 130 dBA at a distance of 100 feet. In order to minimize disturbance from steam blows, the steam blow piping can be equipped with a silencer that would reduce noise levels by 20 to 30 dBA. Staff's proposed Conditions of Certification **NOISE-8** require that any high pressure steam blows be muffled with an appropriate silencer. Based on the analysis described in staff's **Noise** analysis, staff concludes that noise impacts to nesting birds and other wildlife would be less than significant if suggested mitigation measures are implemented.

The primary noise sources associated with operation of the PHPP include the steam turbine generators, cooling tower, start-up boiler, and various pumps and fans. As discussed in the **Noise** analysis, power plant noise levels are predicted to be less than 40 dBA Ldn (34 dBA Leq) at all sensitive receptors during daytime operation and less than 22 dBA Lmax at night. The impact on operational noise on surrounding wildlife is expected to be less than significant.

Bird Collisions and Electrocution

Birds are known to collide with communications towers, transmission lines, and other elevated structures. Estimates of the number of bird fatalities specifically attributable to interactions with utility structures vary considerably. Nationwide, it is estimated that hundreds of thousands to as many as 175 million birds are lost annually to fatal collisions with transmission and distribution lines (Erickson et al. 2001). In California, even general estimates are unavailable, although it is plausible that such collisions result in the deaths of hundreds of thousands of birds each year (Hunting 2002).

The tallest structures at the PHPP plant site would be the heat recovery steam generator stack (HRSG) which would be 145 feet tall. The power block, cooling tower, and other structures would be 60 feet or less in height. The PHPP would also require the construction of approximately 35 miles of new 220-kV transmission line. Portions of Segment 1 would result in a new collision risk where transmission towers are sited in new right-of-way. Segment 2 would largely occur within an existing transmission line corridor.

Avian interactions with transmission lines and structures and the risks those interactions impose vary greatly by location within the proposed project. Bird collisions with power

lines generally occur when a power line or other aerial structure transects a daily flight path used by a concentration of birds, or migrants are traveling at reduced altitudes and encounter tall structures in their path (Brown 1993). Collisions are more probable near wetlands, valleys that are bisected by power lines, and within narrow passes where power lines run perpendicular to flight paths. Passerines (e.g., songbirds) and waterfowl (e.g., ducks) are known to collide with wires (APLIC 2006), particularly during nocturnal migrations or poor weather conditions (Avery et al. 1978). While the HRSG structures would pose a collision risk because of their height and location in the landscape, the overall signature (height and width) of the HRSG is fairly limited. In addition, while the site supports a variety of bird species, many of which are migratory, the PHPP site is not located in a high risk area for collision. Portions of the transmission line that span Little Rock Wash/Creek will increase the potential for collision but would not be expected to substantially increase the potential for avian mortality. In Segment 1 Little Rock Wash is ephemeral and on Segment 2 the line would be located within an existing transmission line corridor.

Because the proposed route for the new transmission line would not occur in high collision-risk areas, staff considers the risk of collision at the power plant site and transmission line corridor to be less than significant.

Power line electrocutions result in the losses of tens to hundreds of thousands of birds annually in the United States (Erickson et al. 2001). In the project area, Swainson's hawks, bald and golden eagles, peregrine falcons, and other large aerial perching birds are susceptible to electrocution on power lines because of their large size, distribution, and proclivity to perch on tall structures that offer views of potential prey. Electrocution occurs when a perching bird simultaneously contacts two energized phase conductors or an energized conductor and grounded hardware. This happens most frequently when a bird attempts to perch on a transmission tower/pole with insufficient clearance between these elements. Electrocution can occur when horizontal separation is less than the wrist-to-wrist (flesh-to-flesh) distance of a bird's wingspan or where vertical separation is less than a bird's length from head-to-foot. Electrocution can also occur when birds perched side-by-side span the distance between these elements (APLIC 2006).

The proposed transmission line would be energized at 220-kV, which poses a low risk for most avian electrocutions. The majority of raptor electrocutions are caused by lines that are energized at voltage levels between 1-kV and 69-kV, and "the likelihood of electrocutions occurring at voltages greater than 69-kV is extremely low" (APLIC 2006). In addition, the applicant has proposed constructing the line in accordance with the *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC 2006). As such, staff's proposed Condition of Certification **BIO-8** requires transmission lines and all electrical components to be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Mitigating Bird Collisions with Power Lines* (APLIC 2004) to reduce the likelihood of large bird electrocutions and collisions. With the proposed mitigation addressed in staff's proposed Condition of Certification **BIO-8**, staff concludes that the proposed transmission lines would not pose a significant threat to birds.

Lighting

Increased lighting during low-light periods can cause some species to leave the area and can disrupt foraging, breeding, or other activities. Many insects are drawn to lights, and species that prey on insects, such as bats, may be attracted to lighted construction areas which would increase the potential for disturbance and mortality. Increased lighting can also increase predation risks for many species. Because the power plant site would be fenced and graded and is largely surrounded by existing land uses lighting is expected to have minimal effects to wildlife either on or in adjacent areas. The primary concern with lighting would be associated with avian species.

Lighting plays a significant role in collision risk with tall towers because lights can attract nocturnal migrant songbirds, and major bird kill events have been reported at lighted communications towers (Manville 2001), with most kills from towers higher than 300 to 500 feet (Kerlinger 2004). Increased lighting during low-light periods can cause some species to leave the area and can disrupt foraging, breeding, or other activities. Many insects are drawn to lights, and species that prey on insects, such as bats, may be attracted to lighted construction areas which would increase the potential for disturbance and mortality. PHPP operations would require on-site nighttime lighting for safety and security, which could disturb nocturnal wildlife. To reduce off-site lighting impacts, lighting at the PHPP facility would be restricted to areas required for safety, security, and operation. Exterior lights would be hooded, and lights would be directed on site so that light or glare would be minimized. Low-pressure sodium lamps and fixtures of a non-glare type would be specified. Switched lighting would be provided for areas where continuous lighting is not required for normal operation, safety, or security; this would allow these areas to remain un-illuminated (dark) most of the time, thereby minimizing the amount of lighting potentially visible off site. These measures are described in staff's proposed Condition of Certification **VIS-4**. With implementation of this measure, lighting at the PHPP would have no adverse effects on wildlife.

Lighting may also be required to facilitate nighttime construction activities, which might disrupt the activities and affect behavior of nocturnal wildlife. As discussed in the Visual Resources section, construction lighting must be consistent with worker safety codes, directed toward the center of the construction site, shielded to prevent light from straying offsite, and task-specific. Staff has proposed Condition of Certification **VIS-3** to formalize temporary lighting measures during construction activity and on the laydown area. See staff's **Visual** analysis for more details about staff's proposed Conditions of Certification **VIS-3** and **VIS-4**. With implementation of this measure, construction lighting at the PHPP would have no adverse effects on wildlife.

Glare

Large scale solar facilities present a new and relatively un-researched risk for bird collisions. As described above birds are likely to collide with various structures associated with the solar field or PHPP power plant site. Although not physically imposing structures the proposed solar arrays may also pose some collision risk to birds. Depending on the time of day, use of the site by various species, and glare or polarized light it is possible that birds will collide with the arrays. Operation of the solar panels could also cause an increase in Polarized Light Pollution (PLP) which occurs from light reflecting off of dark colored anthropogenic structures. According to Horvath

et al., PLP caused by anthropogenic structures can alter the ability of wildlife to seek out suitable habitat and elude or detect the presence of predators (2009). It has also been documented that for a variety of birds and other species PLP can affect their ability to detect natural polarized light patterns in the sky which can lead to the effect on their navigation ability and ultimately effects on dispersal and reproduction (Horvath et al., 2009).

Bird fatality studies conducted at the Calico Solar facility near Daggett, California indicated that much of the bird mortality consisted predominantly of collisions with mirrors. These collisions were partially attributed with increased numbers of birds attracted to the adjacent evaporation ponds and agricultural fields (McCrary, 1986). The Proposed Project would not include evaporation ponds but is located in a region known to support large numbers of birds. To date little is known regarding the avian response to glare from solar technology. However, it is likely that glare will affect birds to some degree. In the same way that large mirrored buildings may be confused by birds as open sky; the mirrors will reflect light and take on the color of the image being reflected. This may result in birds confusing the solar panels as either open sky or water and increase the collision risk. Bird response to glare from solar panel technology is not well understood.

Although collision risk from transmission and facility structures is not considered significant little is known regarding potential impacts from glare or polarized light. Given the lack of research-based data on these impacts, staff cannot conclude that they are not significant. Staff recommends Condition of Certification **BIO-24** (Avian and Bat Protection Plan / Monitoring Impacts of Solar Technology on Birds and Bats) to monitor and minimize potential bird mortality due to glare. Staff concludes that the Avian and Bat Protection Plan and mortality monitoring as recommended in Condition of Certification **BIO-24** would effectively determine rates of bird and bat mortality and would result in implementation of further feasible measures as needed to mitigate significant bird collisions, if they should occur, below a 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 (Cal. Code Regs., tit. 14, § 15130). Cumulative impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is “cumulatively considerable” (14 Cal. Code Regs., § 15130(a)). Such incremental effects are to be “viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects” (14 Cal. Code Regs., § 15164(b)(1)).

This cumulative impact analysis consists of a broad, regional evaluation of the impacts of past projects that threaten plant and animal communities within California’s southern deserts and also discusses in a general fashion future foreseeable threats. This overview of regional impacts is followed by a more detailed discussion of the effects of past, present, and future projects to biological resources of the western Mojave Desert.

Regional Overview

Historically, the high desert has been subject to repeated disturbance from farming, grazing, water diversion, military land uses, and infrastructure development. The loss of natural lands to development has resulted in the displacement of native species, the restriction of regional movement corridors, and the loss of genetic diversity. In some areas, development (i.e. Highway 14) has functionally eliminated the movement of some wildlife. The expansion of population centers in the Antelope Valley including the cities of Lancaster and Palmdale has resulted in the continued loss of open space and the degradation of riparian and natural areas that historically supported populations of unique or rare species. Development and urbanization in these areas is expected to continue and increase substantially to accommodate the increasing population expected in the Antelope Valley. This will continue to adversely affect biological resources, further fragmenting wildlife corridors and contributing to the loss and degradation of habitat capable of supporting special-status species.

The expansion of renewable energy projects in the region will also contribute to the loss of natural lands. For example the Bureau of Land Management (BLM) has received more than 40 applications for solar energy projects located in the California Desert Conservation Area (CDCA). Future growth, including renewable energy projects and residential development in the area, may accelerate these impacts. Many of these developments have occurred directly within or adjacent to sensitive riparian areas, desert washes, Joshua tree woodland, or within habitats that support special-status species.

Proposed Projects

The AFC provided a list of proposed development projects within a 3-mile radius of the proposed PHPP site. These include the Fairway Business Park a 39 acre site located approximately 1.3 miles southwest of the PHPP plant site; the Palmdale Transit Village Specific Plan area, a large scale housing and development area that includes 1,027 new housing units, located approximately 2.5 miles southwest of the PHPP plant site; the Amargosa Creek Specific Plan area, a 45 acre medical center located approximately two miles northwest of the PHPP plant site; and the 30th St W and Ave K projects, a 13 acres development project located approximately three miles northwest of the PHPP plant site in Lancaster.

The Tehachapi Renewable Transmission Project (TRTP) is a large scale transmission line that would involve approximately 173 miles of new and existing rights-of-way from the Tehachapi Wind Resource Area in southern Kern County through Los Angeles County and east to the existing Mira Loma Substation in Ontario, San Bernardino County. The proposed transmission lines would connect to the Vincent Substation within an existing ROW and construction would include a rebuild of a 220-kV transmission line to 500-kV standards.

The large scale land conversion and associated habitat loss in the Antelope Valley coupled with the cumulative project list identified by the applicant in the AFC was considered in the evaluation of cumulative impacts for the PHPP project. In general the proposed projects coupled with the historic loss of habitat in the Antelope Valley are examples of the types of activities that lead to the regional situation being one of

increased loss of habitat and habitat fragmentation. Because the project will result in the permanent loss of natural lands, the Commission must consider whether the project, after the application of mitigation, would contribute to the cumulative significant loss and degradation of habitat for desert plants and wildlife, including desert tortoise, Mohave ground squirrel, Swainson's hawks, burrowing owls, and other special-status species. As proposed, the project would involve the conversion of natural lands on the PHPP plant site and linear facilities. While good quality habitat occurs on the PHPP plant site and numerous wildlife species utilize the area; the site is isolated from adjacent natural lands. In addition, while habitat loss is occurring on a regional level the proposed site does not have the potential to play a significant role in the conservation of sensitive plants and wildlife in the Antelope Valley. With the exception of Swainson's hawk which was observed foraging on the site; desert tortoise and Mohave ground squirrel have a low potential to occur on the project site. Construction of the transmission line would remove important foraging habitat for wildlife and result in short term impacts to desert washes. However, these impacts would be small compared to the large scale loss of habitat occurring in the region and with mitigation are not expected to result in cumulative effects to biological resources.

Staff believes that implementation of the conditions of certification described below will minimize and offset the contributions of the PHPP to the cumulative loss of habitat for native plant communities and wildlife, including special-status species. Because of the PHPP project sites location in the regional landscape, the ability of this site to provide for long term recovery of listed species is low. Staff's proposed Condition of Certification **BIO-20** requires the applicant to acquire and enhance at least 665 acres of suitable habitat for Mohave ground squirrel. This habitat would be connected to other suitable habitat for these species and would offset any habitat loss associated with the PHPP. Cumulative impacts to native vegetation including Joshua tree woodland would also be off-set through the acquisition of these lands. Staff's proposed Condition of Certification **BIO-11** requires the preservation and if needed acquisition of lands to reduce impacts to sensitive plants. To off-set potential impacts to burrowing owl staff's proposed Condition of Certification **BIO-15** requires avoidance and acquisition of lands for this species. To reduce the project's contribution to indirect cumulative effects from raven predation of desert tortoise staff has proposed Condition of Certification **BIO-14**, the Raven Management and Monitoring Plan. While Swainson's hawks were not observed nesting in the project area staff's proposed Condition of Certification **BIO-16** and **BIO-17**, which require the avoidance of nest sites and the perseveration of foraging habitat for this species. To off-set potential collision risks with facility structures staff has proposed Condition of Certification **BIO-24**. Finally, staff's proposed Condition of Certification **BIO-23** requires that the impacts to the desert washes be mitigated by the implementation of best management practices and the avoidance of direct impacts. With implementation of these conditions of certification, the PHPP project would not result in a significant contribution to cumulative impacts to biological resources.

COMPLIANCE WITH LORS

The proposed project must comply with state and federal laws, ordinances, regulations, and standards (LORS) that address state and federally listed species, as well as other sensitive species and habitats. The Energy Commission has a one-stop permitting

process for all thermal power plants with a generating capacity of 50 MW or more under the Warren-Alquist Act (Pub. Resources Code § 25500). Under the act, the Energy Commission's certificate is "in lieu of" other state, local, and regional permits (*ibid*.) The Commission's streamlined permitting process accomplishes a primary objective of the Renewable Energy Action Team, as identified in the Governor's Executive Order S-14-08 — to create a "one stop" process for permitting renewable energy generation facilities under California law. Accordingly, Commission staff has coordinated environmental review with the California Department of Fish and Game and the Lahontan Regional Water Quality Control Board, as well as the U.S. Fish and Wildlife Service. Staff has incorporated all required terms and conditions that might otherwise be included in state permits into the Energy Commission's certification process. The conditions of certification described below satisfy the following state LORS and take the place of terms and conditions that, but for the Commission's exclusive authority, would have been included in California Endangered Species Act of 1984 and Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.). **Biological Resources Table 5** provides a summary of the proposed project's compliance with federal, state, and local LORS.

Biological Resources Table 5
Compliance with Laws, Ordinances, Regulations, and Standards

Applicable Law	Description	Rationale for Compliance
Federal		
Federal Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for protection of threatened and endangered plant and animal species and their critical habitat. "Take" of a federally-listed species is prohibited without an incidental take permit, which may be obtained through Section 7 consultation (between federal agencies) or a Section 10 Habitat Conservation Plan.	The project is not expected to result in take of listed species and a federal Biological Opinion would not be required. Staff's proposed Conditions of Certification **BIO-1** through **BIO-9**, **BIO-12**, **BIO-13**, and **BIO-14** include measures to minimize or avoid the potential for take of the federally listed arroyo toad and desert tortoise.
Migratory Bird Treaty (Title 16, United States Code, sections 703 through 711)	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act unless permitted by regulation (e.g., duck hunting).	Staff's proposed Condition of Certification **BIO-15** includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds covered under the Migratory Bird Treaty Act.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	Provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the act.	Staff's proposed Condition of Certification **BIO-15** includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds including bald and golden eagles. In addition, staffs Condition of Certification **BIO-24** require the development of an avian and bat protection plan.
State		
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's rare, threatened, and endangered species. "Take" of a state-listed species is prohibited without an Incidental Take Permit.	Staff's proposed Conditions of Certification **BIO-1** through **BIO-9**, **BIO-13**, **BIO-14**, **BIO-16**, **BIO-17**, **BIO-19**, and **BIO-20** would ensure that the project is not likely to jeopardize the continued existence of desert tortoise, Swainson's hawk, or Mohave ground squirrel or result in the degradation of occupied habitat for any state-listed species.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals of California that are declared rare, threatened, or endangered.	Analysis of potential project impacts to rare, threatened, or endangered species is provided above, and conditions of certification are proposed that would minimize impacts to these species.

Applicable Law	Description	Rationale for Compliance
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations, Title 14, section 670.7).	Golden eagle, bald eagle, California condor, and white-tailed kite are species designated as fully protected that have the potential to occur in the project area. However, staff's proposed Condition of Certification **BIO-15** and **BIO-24** includes preconstruction nest surveys, no-disturbance buffers around active nests, monitoring of nests to minimize impacts to nesting birds including fully protected species, and requires the development of an avian and bat protection plan.
Nest or Eggs (Fish and Game Code section 3503)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.	Staff's proposed Condition of Certification **BIO-15** includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds. Staff's proposed Condition of Certification **BIO-6** includes a Worker Environmental Awareness Program to educate workers about compliance with environmental regulations, including Fish and Game Code section 3503.
Migratory Birds (Fish and Game Code section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.	Staff's proposed Condition of Certification **BIO-15** includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds. Staff's proposed Condition of Certification **BIO-6** includes a Worker Environmental Awareness Program to educate workers about compliance with environmental regulations, including Fish and Game Code section 3513.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.	Staff's proposed Condition of Certification **BIO-23** includes measures to minimize and avoid impacts to riparian habitat.
California Environmental Quality Act (CEQA), CEQA Guidelines section 15380	CEQA defines rare species more broadly than the definitions for species listed under the state and federal Endangered Species Acts. Under section 15830, species not protected through state or federal listing but nonetheless demonstrable as "endangered" or "rare" under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society (CNPS) and some animals on the CDFG's Special Animals List.	Implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-25** would ensure that the project would be in compliance with CEQA.

Applicable Law	Description	Rationale for Compliance
Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.	Staff's proposed Condition of Certification **BIO-23** includes measures to minimize and avoid impacts to jurisdictional waters of the state.
Water Quality Control Plan for the Lahontan Region (Basin Plan)	The Basin Plan establishes water quality objectives that protect the beneficial uses of surface water and groundwater in the Region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provide comprehensive water quality planning. Beneficial uses for minor surface water bodies of the Koehn Hydrologic Area include wildlife habitat.	Staff's proposed Condition of Certification **BIO-23** includes measures to minimize and avoid impacts to jurisdictional waters of the state.
California Native Plant Protection Act of 1977 (Fish and Game Code section 1900 et seq.)	Designates state rare, threatened, and endangered plants.	Staff's proposed Conditions of Certification **BIO-10** and **BIO-11** include restoration and compensation for impacts to native plant communities, special-status plant surveys, and a Sensitive Plant Protection Plan to minimize impacts to special-status plants.
California Desert Native Plants Act of 1981 (Food and Agricultural Code section 80001 et seq. and California Fish and Game Code sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.	Staff's proposed Conditions of Certification **BIO-1** through **BIO-10**, and **BIO-20** include measures to minimize and mitigate potential impacts to Joshua Trees and/or cacti.
Local		

Applicable Law	Description	Rationale for Compliance
Antelope Valley Areawide General Plan.	This plan requires the minimizing disruption and degradation of the environment, integrating land uses with natural environmental systems, instituting measures to mitigate the impacts of environmental hazards, and prohibiting expansion of urban uses into areas of rare and endangered species. It promotes the designation of significant plant and wildlife habitats as Significant Ecological Areas (SEAs), preservation of biotic diversity in the valley by designating rare and unique plant and animal SEAs and the measures for their protection, and adding new SEAs when appropriate. If projects have the potential to impact biotic resources, a biological assessment will be required. This plan requires the establishment of an open space network and prohibits the harvesting of Joshua trees or juniper trees for fuel or for their relocation out of its normal habitats. Management plans will be developed for MIS (Management Indicator Species) in cooperation with CDFG, standing dead trees will be maintained at reasonable density providing nesting habitat for raptors and other predators; interim management plans will be created when actual recovery plans do not exist.	Implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-25** would ensure that the project remains in compliance with the Antelope Valley Areawide General Plan.
City of Palmdale General Plan	The City of Palmdale General Plan (1993) sets forth goals to preserve and protect biological resources, including: (1) preserve significant natural and man-made open space areas; (2) protect significant ecological resources and ecosystems, including, but not limited to, sensitive flora and fauna habitat areas; (3) preserve designated natural hillsides and ridgelines in the Planning Area, to maintain the aesthetic character of the Antelope Valley; (4) protect the quality and quantity of local water resources; and (5) promote the attainment of state and federal air quality standards. Biological resources are addressed in the City's General Plan Goal ER2, which calls for protecting "…significant ecological resources and ecosystems, including, but not limited to, sensitive flora and fauna habitat areas." Significant Ecological Areas are identified at Big Rock Wash, Little Rock Wash, Ritter Ridge, Portal Ridge and Alpine Butte. Biological surveys are required for any new development in these areas, and significant environmental resources are required to be considered and preserved to	Implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-25** would ensure that the project remains in compliance with the City of Palmdale General Plan.

Applicable Law	Description	Rationale for Compliance
	the extent feasible. The plan also calls for the preservation of natural drainage courses and riparian areas containing significant concentrations of ecological resources, as well as significant Joshua tree woodlands. The City will require biological assessments and reports for projects in known or suspected natural habitat areas prior to Project approval. These reports will be used to establish significant natural habitat areas and ecologically sensitive zones to prevent disturbance and degradation of these areas. Recommended mitigation measures as identified in the reports will be required to be implemented as development occurs.	
County of Los Angeles Significant Ecological Areas	Significant Ecological Areas are specified by the CLAGP as "ecologically important land and water systems that are valuable as plant or animal communities, often important to the preservation of threatened and endangered species, and conservation of biological diversity within the County." There are a total of 31 existing and proposed SEAs within Los Angeles County and a total of 11 within 10 miles of the project. Only the Little Rock Wash and Kentucky Springs SEA overlaps the project area. Little Rock Wash SEA is spanned by the transmission line in two locations. (County of Los Angeles, 2007a).	Staff has included conditions of certification to reduce impacts to biological resources that occur in these areas. Staff's proposed Conditions of Certification **BIO-1** through **BIO-25** include measures to minimize or avoid the potential to conflict with polices protecting ecologically important land and water systems within the County.
City of Palmdale Native Desert Vegetation Ordinance	The City has adopted Ordinance No. 952, referred to as the Native Desert Vegetation Ordinance. This ordinance is designed to preserve a number of specimen-quality juniper (*Juniperus californica*) and Joshua trees (*Yucca brevifolia*) that add to community identity, and to encourage the use of native vegetation in new development landscaping. All landscaping for new developments must conform to the requirements set forth in the Native Desert Vegetation Ordinance	Staff's proposed Conditions of Certification **BIO-1** through **BIO-10**, and **BIO-20** include measures to minimize and mitigate potential impacts to Joshua Trees and/or cacti.

NOTEWORTHY PUBLIC BENEFITS

There are no noteworthy public benefits to biological resources from construction of the PHPP.

FACILITY CLOSURE

In the future, PHPP would experience either a planned closure or be unexpectedly (either temporarily or permanently) closed. When facility closure occurs, it must be done

so that it protects the environment and public health and safety. A closure plan would be prepared by the project owner prior to any planned closure (COP 2008a). To address unanticipated facility closure, an “on-site contingency plan” would be developed by the project owner and approved by the Energy Commission Compliance Project Manager (CPM). Facility closure requirements are discussed in more detail in the **General Conditions** section of this Final Staff Assessment. Facility closure mitigation measures would also be included in the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) prepared by the project owner and described in staff’s proposed Condition of Certification **BIO-7.**

The facility closure plan should address habitat restoration measures to be implemented in the event of a planned or an unexpected permanent closure and must also include a funding mechanism to ensure sufficient funds are available for decommissioning and habitat restoration. Planned or unexpected permanent facility closure should address the removal of the transmission conductors since birds are known to collide with transmission line ground wires.

Staff’s proposed Condition of Certification **BIO-25** contains measures to ensure that impacts to biological resources are addressed prior to the planned permanent or unexpected permanent closure of the project.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

Staff only received comments on the Biological Resources section of the PSA from the City of Palmdale (applicant). Energy Commission staff has summarized these comments and have provided the following responses:

City of Palmdale (Applicant), written comments dated May 12, 2010
Applicant Paragraph 1, no comment identified: Applicant provided supplemental information regarding the presence of jurisdictional Waters of the U.S. within the project area. The data included a letter provided by the U.S. Army Corps of Engineers (USACE) on April 5, 2010 confirming the Applicant’s determination that the PHPP would not impact jurisdictional Waters of the U.S.

> Staff response: Staff has reviewed the information and concurs with the data provided by the applicant. Staff notes however, that the letter provided by the USACE indicates that the PHPP would not impact jurisdictional Waters of the U.S. provided best management practices and avoidance measures identified by the applicant are implemented and that all proposed discharges of dredged or fill material would occur outside the ordinary high water mark. As proposed in Staff’s proposed Condition of Certification **BIO-23** (Streambed Impact Minimization And Compensation Measures), permanent impacts to jurisdictional Waters of the U.S. have not been authorized.

City of Palmdale (Applicant), written comments dated May 12, 2010
Applicant Paragraph 2, no comment identified: Applicant provided supplemental information including revised vegetation mapping for Segment 2 of the proposed transmission line alignment and botanical survey data completed in 2010 for the power plant site and reclaimed water pipeline.

Staff response: Staff has reviewed the information provided by the applicant and believes the updated vegetation maps more closely represent the community types that occur on Segment 2 of the proposed transmission line alignment. Staff notes that vegetation identified as Big Basin Scrub in the PSA and by applicant in their submittal is in error and that the community type is better classified as Big Sagebrush Scrub. This data has been revised in the FSA and vegetation acreages updated based on the data provided by the applicant. Staff also reviewed the botanical survey data provided by the applicant and concurs with the survey results for t2010. Staff however, does not consider the occurrence potential for rare plants provided by the applicant to be justified based on the presence of habitat in the project area and known occurrences of these species in the region. This conclusion however does not alter the significance discussions identified in the PSA or this FSA nor does it alter proposed mitigation strategies identified in the conditions of certification.

City of Palmdale (Applicant), written comments dated May 12, 2010
Applicant Comment #3a: Applicant has requested changes to the requirements in **BIO-8** and **BIO-10** related to topsoil salvage and storage. In addition, applicant requests that topsoil salvage be limited to only the top two to three inches of due to space limitations on the site. Applicant indicates this amount of topsoil is consistent with other siting cases.

Staff response: Staff has recommended Conditions of Certification that are consistent with other projects, insofar as the projects, their impacts, and available documentation are comparable. For example the amount of topsoil salvage is the same for the Calico Solar Project (08-AFC-13) and the Rice Solar Energy Project (09-AFC-10); all recent projects considered by the Energy Commission. However, staff has considered applicant's request and revised Condition of Certification **BIO-8** and **BIO-10** to remove the collection and storage of the top one inch as dressing and revised the language to only include the salvage and storage of the top six to eight inches of topsoil.

City of Palmdale (Applicant), written comments dated May 12, 2010
Applicant Comment #3b: Applicant requests changes to the mitigation required in **BIO-11** for CNPS List 3 and 4 plants. The applicant contends these plants are not considered rare under CEQA, nor are they listed as threatened or endangered and hence not required to be protected or mitigated.

Staff response: Throughout the Final Staff Assessment the term "special-status plants" refers to all plant taxa included in several different compendia of rare, threatened or endangered plants of California, including the California Native Plant Society's *Inventory of Rare and Endangered Plants* (http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi) and the California Department of Fish and Game's *Special Vascular Plants, Bryophytes, and Lichens List* (http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPPlants.pdf). In addition to the conservation status categories requested by the applicant (listed above) "special status plants" also includes plant taxa ranked by CNPS as List 3 and List 4. By staff's definition, all of these plant taxa have special conservation status by their inclusion in these compendia. However, staff has concluded that none of the

project's potential impacts to CNPS List 3 or List 4 species would reach a level of significance under CEQA and staff has revised Condition of Certification **BIO-11** to remove mitigation requirements for List 3 and List 4 plants that may occur in association with the PHPP project.

City of Palmdale (Applicant), written comments dated May 12, 2010
Applicant Comment #3c: Applicant requests that all requirements related to desert tortoise handling be deleted from the following conditions of certification including **BIO-2**, **BIO-3**, **BIO-7**, **BIO-8** and **BIO-13.** The Applicant has indicated that no take authorization is being sought for the Project and the applicant believes that no desert tortoise will be found on the power plant site or pipeline routes. In addition, applicant indicates that any desert tortoise that may be found along the transmission line Segment 1 can be avoided or construction postponed until the tortoise moves of its own accord. The applicant also requests that the requirements related to payment of fees for a regional raven monitoring and management plan in **BIO-14** be deleted.

Staff response: Staff considers the potential for desert tortoise to occur on the project site to be low. However, because there remains a potential for desert tortoise to occur on the transmission line alignment both staff and CDFG recommend the language remain as proposed in the PSA. As proposed the language in conditions of certification **BIO-2**, **BIO-3**, **BIO-7**, **BIO-8** and **BIO-13** would serve as the PHPP's Section 2081 Incidental Take Permit. Should desert tortoise be discovered this language would provide legal coverage in compliance with CESA without requiring the applicant to process the request as a project amendment through the CPM.

City of Palmdale (Applicant), written comments dated May 12, 2010
Applicant Comment #3d: The Applicant requests that the requirements to perform 10-mile surveys for nesting Swainson's hawk be removed. Further, the Applicant agrees to provide mitigation for Swainson's hawk foraging habitat as follows: 2:1 ratio for alfalfa/agricultural field impacts (10.22 acres) and 1:1 ratio for impacts to Joshua tree woodlands (approximately 190 acres of impact), provided this acreage is also suitable to satisfy Mohave ground squirrel (MGS) compensation requirements. Further surveys (i.e., beyond pre-construction surveys to within a half mile of the Project site) should not be required if the Applicant assumes presence and agrees to mitigation. In addition, the Applicant believes that there is relatively few Swainson's hawk nesting in the Antelope Valley, and hence the requirement for mitigation lands to be "near" lands currently occupied or used needs to reflect a reasonable distance. The applicant suggests that lands within 15 miles of CNDDB records would fit these criteria.

Staff response: Staff reviewed the May 13, 2010 Swainson's hawk guidelines developed by the Commission and CDFG (2010b). An excerpt from that document states the following. "The current land uses in the Antelope Valley area support approximately 10 breeding pairs. This area comprises the southernmost edge of the known breeding range for this species in California. The small number of breeding Swainson's hawks in the Antelope Valley and the potential isolation from other Swainson's hawk populations makes the Antelope Valley population particularly susceptible to extirpation. Swainson's hawks have high nest site fidelity, meaning they return to the same site year after year (Estep

1989, Woodbridge et al. 1995) This may limit exchange of individual birds between distant breeding groups (Hull et al. 2007). Hull et al. (2007) found evidence suggesting that the Central Valley population has had little recent genetic exchange with other populations east of the Sierra Nevada. Due to the geographical isolation of the Antelope Valley Swainson's hawk population from other breeding populations, together with the species' high site fidelity, it is reasonable to infer that rapid re-colonization of the Antelope Valley would be unlikely if nesting pairs were lost. Given these facts, the California Department of Fish and Game (Department) would consider impacts to breeding pairs to be potentially significant because they may cause the population to become less than self-sustaining.

Staff agrees with the proposed changes provided by the applicant however notes that the population of this species in the Antelope Valley is unique and warrants protection and that a 2:1 mitigation ratio is appropriate for this species. Staff concurs with the applicant's provisions regarding the nesting of compensatory mitigation lands for Swainson's hawk provided the mitigation ratios required for the loss of Joshua tree woodland, Swainson's hawk and Mohave ground squirrel identified in staff's FSA are present at the proposed mitigation lands. However, staff intends to provide the applicant with an option regarding the assumption of presence and dedication of mitigation lands for Swainson's hawk. Staff recommends providing language that allows the applicant to either survey within a five mile radius for this species and mitigate in relation to the presence of this species in the project area or to assume presence and provide compensatory mitigation according to Condition of Certification **BIO-17**. Staff has incorporated this language into the FSA and Conditions of Certification **BIO-16** and **BIO-17,** however, staff has preserved language within Condition of Certification **BIO-17** that requires the applicant to acquire mitigation lands for Swainson's hawk in the event habitat cannot be adequately 'nested' with the Mojave ground squirrel compensatory mitigation.

City of Palmdale (Applicant), written comments dated May 12, 2010

Applicant Comment #3d: In its comments submitted on March 9, 2010, the Applicant requested that the proposed 2:1 mitigation ratio for Mohave ground squirrel mitigation required in Condition of Certification **BIO-20** for the PHPP plant site be revised from a 2:1 to 1:1 ratio. However, as discussed at the March 16, 2010 PSA Workshop, the Applicant is willing to accept the higher ratio provided the mitigation lands can be nested to achieve all mitigation requirements (i.e., for Mohave ground squirrel, Swainson's hawk foraging habitat, and rare plant species). Applicant also requests the removal of the requirement that compensation lands be "adjacent to" protected lands, and suggests changing the language to "adjacent to, or in the vicinity of" protected lands, to allow flexibility and agency discretion. This comment applies to **BIO-20**, item (1)(d), and it is Applicant's understanding that CEC and CDFG agree to this proposed change in wording. Applicant also requests that the presumed cost of land be reduced from $4,000 to $2,000 an acre, which is consistent with several recent siting cases, for the PAR-like calculation in **BIO-20**, item (3)(a).

Staff response: Staff agrees with the proposed changes provided by the applicant regarding the nesting of compensatory mitigation lands provided the

dedicated lands support adequate vegetation to comply with the mitigation requirements identified in the conditions of certification. Staff has incorporated this language into the FSA and Conditions of Certification **BIO-10**, **BIO-11**, **BIO-16** and **BIO-17,** however, staff has preserved language within each of the condition of certification that requires the applicant to provide security and acquire mitigation lands should nesting of the conditions not be possible.

Staff has considered the request by applicant to revise the language of Condition of Certification **BIO-20** to remove the requirement that compensation lands be "adjacent to" protected lands. Staff recognizes that a number of factors should be considered in the acquisition of mitigation lands including the size of the parcel. However, the basic tenets of conservation biology require that lands acquired for the preservation of wildlife not consist of isolated or fragmented habitat. Therefore staff considers connectivity to adjacent natural lands to be an important factor in the long term management of mitigation lands. However, staff has revised the text to read "Be adjacent to larger blocks of lands that are already protected, or be in a location approved by the CDFG …" Staff considers this change in language to provide sufficient flexibility in the acquisition of mitigation lands.

Staff reviewed the applicant request that the presumed cost of land be reduced from $4,000 to $2,000 an acre, which the applicant indicated is consistent with several recent siting cases for the PAR-like calculation indentified in Condition of certification **BIO-20**. Staff has reviewed recent siting cases including the Calico Solar Project (08-AFC-13) and the Rice Solar Energy Project (09-AFC-10) which used land acquisition costs obtained from the Renewable Energy Action Team, a multi-agency group which included staff from the Energy Commission, CDFG, BLM, and the USFWS. The REAT group developed a comprehensive cost table that identified the fees associated with the review and acquisition of mitigation lands. In addition, staff coordinated with CDFG regarding land costs in the western Antelope Valley. A review of the CDFG list of recent land costs for approximately 30 parcels resulted in an arithmetic mean of $10,000 per acre. In addition, the interim mitigation strategy identified in SB X8 34 provided an in-lieu fee spreadsheet that identified land costs in Los Angeles County as $10,000 per acre. Staff applied this land cost to the compensatory mitigation and security requirements in the FSA. The actual costs to comply with this condition will vary depending on the final footprint of the Project, the costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a Property Analysis Report or similar analysis.

City of Palmdale (Applicant), written comments dated May 12, 2010

Applicant Comment #3f: In its comments submitted on March 9, 2010, the Applicant had requested that condition of certification **BIO-22** (Bat Avoidance and Minimization Measures) be deleted in its entirety. However, based on the discussion at the March 16, 2010 PSA Workshop, the Applicant agrees to accept this requirement, but requests that an addition be made to the condition in order to clarify the extent of the pre-construction surveys.

Staff response: Staff considers the potential for bats to occur along the Segment 2 transmission line corridor to be high considering the presence of small rock outcrops and the Palmdale adit (tunnel) that is located immediately adjacent to the transmission line right of way. However, staff has reviewed the condition of certification and revised the text to better specify where surveys are required.

City of Palmdale (Applicant), written comments dated May 12, 2010

Applicant Comment #3f: The applicant indicated in comments submitted on March 9, 2010, that desert kit fox should be removed from Condition of Certification **BIO-21**. However, at this time the applicant does not request changes to Condition of Certification **BIO-21.**

Staff response: Staff agrees with this statement.

CONCLUSIONS

With implementation of staff's proposed conditions of certification, construction and operation of the PHPP would comply with all federal, state, and local laws, ordinances, regulations, and standards relating to biological resources, and potential significant impacts to biological resources would be mitigated to less-than-significant levels.

Many of staff's proposed conditions of certification require the submittal of draft plans, financial securities, proposals, or survey results prior to the start of construction. These reports are necessary for staff to ensure impacts will be minimized, as the proposed project would be located in an area with a rich diversity of sensitive biological resources. **Biological Resources Table 6** summarizes these pre-construction plan requirements.

Biological Resources Table 6
Summary of Pre-Construction Plans and Proposals

Condition of Certification	Plan/Report to be Submitted	Timing
BIO-6	Worker Environmental Awareness Program (WEAP)	At least 60 days prior to the start of any project-related site disturbance activities
BIO-7	Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP)	At least 60 days prior to start of any project-related site disturbance activities
BIO-10	a. Restoration Plan b. Formal acquisition proposal for Joshua Tree Woodland and Mojavean Juniper Scrub compensation lands describing the parcel(s) intended for purchase	a. To be included in BRMIMP b. No less than 90 prior to acquisition of compensation lands
BIO-11	a. Report describing results of floristic surveys b. Sensitive Plant Protection Plan (to be prepared only if sensitive species are detected during floristic surveys)	a. At least 60 days prior to the start of any ground-disturbing activities b. At least 60 days prior to the start of any ground-disturbing activities
BIO-12	Report describing results of arroyo toad clearance surveys and compliance with mitigation measures	Within 30 days of completion of arroyo toad clearance surveys
BIO-13	a. Draft Desert Tortoise Translocation Plan b. Final Desert Tortoise Translocation Plan c. Report identifying which items of the Translocation Plan have been completed, and a summary of all modifications to measures made during implementation d. Report describing how each of the mitigation measures described in BIO-13 has been satisfied	a. No less than 60 days prior to start of any site mobilization or disturbance activities b. Within 30 days after initiation of translocation activities c. Within 30 days of completion of desert tortoise clearance surveys
BIO-14	a. Final Raven Monitoring, Management, and Control Plan b. Payment of Raven Fee	a. No less than 60 days prior to start of any site mobilization or disturbance activities b. No less than 60 days prior to start of any site mobilization activities
BIO-15	Letter-report describing the findings of the pre-construction nest surveys	At least 10 days prior to the start of any project-related ground disturbance activities
BIO-16	a. Report describing results of pre-construction Swainson's hawk surveys	a. Within 30 days of commencement of construction activities

Condition of Certification	Plan/Report to be Submitted	Timing
	b. Swainson's Hawk Monitoring and Mitigation Plan (to be prepared only if pre-construction surveys detect nesting Swainson's hawks within one mile of proposed construction activities)	b. At least 30 days prior to the start of any project-related site disturbance activities
BIO-17	a. Formal acquisition proposal for Swainson's hawk compensation lands describing the parcel(s) intended for purchase b. Written verification that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient(s) c. As an alternative to (b) above, written verification of Security in accordance with this condition of certification. d. If Security is provided, the project owner, or an approved third party, shall complete and provide written verification of the proposed compensation lands acquisition e. Management plan for the compensation lands and associated funds	a. No less than 90 days prior to acquisition of the compensation lands b. Within 18 months of the start of project ground-disturbing activities c. No later than 30 days prior to beginning project ground-disturbing activities d. Within 18 months of the start of project ground-disturbing activities e. Within 180 days of the land or easement purchase, as determined by the date on the title
BIO-18	a. Draft Burrowing Owl Relocation Area Management Plan (to be completed only if burrowing owls will be relocated) b. Final Burrowing Owl Relocation Area Management Plan c. Burrowing Owl Monitoring and Mitigation Plan (to be completed only if pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities)	a. No less than 60 days prior to start of any site mobilization or disturbance activities b. Prior to any ground-disturbing activities c. At least 30 days prior to the start of any project-related site disturbance activities
BIO-19	a. Draft Mohave Ground Squirrel Translocation Plan b. Final version of a Mohave Ground Squirrel Translocation Plan c. Report describing results of Mohave ground squirrel clearance surveys and compliance with mitigation measures	d. No less than 60 days prior to start of any site mobilization or disturbance activities a. At least 60 days prior to start of any project-related ground disturbance activities b. Within 30 days of completion of Mohave ground squirrel clearance surveys

Condition of Certification	Plan/Report to be Submitted	Timing
BIO-20	a. Written verification that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient(s) b. As an alternative to (b) above, written verification of Security in accordance with this condition of certification. c. If Security is provided, the project owner, or an approved third party, shall complete and provide written verification of the proposed compensation lands acquisition d. Management plan for the compensation lands and associated funds	a. No less than 90 days prior to acquisition of the compensation lands b. No later than 30 days prior to beginning project ground-disturbing activities c. No later than 30 days prior to beginning project ground-disturbing activities d. Within 180 days of the land or easement purchase, as determined by the date on the title
BIO-21	Report describing results of badger and kit fox surveys and compliance with mitigation measures	Within 30 days of completion of badger and kit fox surveys
BIO-22	Report describing results of roosting bat surveys and compliance with mitigation measures	Within 30 days of completion of roosting bat surveys
BIO-23	Written verification (i.e., through incorporation into the BRMIMP) that the best management practices outlined in BIO-23 will be implemented	No fewer than 30 days prior to the start of work potentially affecting waters of the state
BIO-24	Report describing measures to be implemented to monitor and reduce bird and bat collisions with facility structures	No more than 60 days prior to ground disturbance
BIO-26	a. Written verification that Security in accordance with this condition of certification.	a. No later than 30 days prior to beginning project ground-disturbing activities

PROPOSED CONDITIONS OF CERTIFICATION

With implementation of staff's proposed conditions of certification, construction and operation of the PHPP would comply with all federal, state, and local laws, ordinances, regulations, and standards relating to biological resources. Staff recommends adoption of the following conditions of certification to mitigate potential impacts to sensitive biological resources to less-than-significant levels.

DESIGNATED BIOLOGIST SELECTION[1]

BIO-1 The project owner shall assign at least one Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist, with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM) for approval in consultation with the California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS).

The Designated Biologist must meet the following minimum qualifications:

1. Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field;

2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society;

3. At least one year of field experience with biological resources found in or near the project area;

4. Meet the current USFWS Authorized Biologist qualifications criteria (USFWS 2008b) and demonstrate familiarity with protocols and guidelines for the desert tortoise, and be approved by the USFWS; and

5. Possess a recovery permit for desert tortoise and a California ESA Memorandum of Understanding pursuant to Section 2081(a) for desert tortoise and Mohave ground squirrel or have adequate experience and qualifications to obtain these authorizations.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, in consultation with CDFG and USFWS, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

Verification: The project owner shall submit the specified information at least 60 days prior to the start of any project-related site disturbance activities. No site or related facility activities shall commence until an approved Designated Biologist is available to be on site.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least 10 working days prior to

[1] USFWS <www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt> designates biologists who are approved to handle tortoises as “Authorized Biologists.” Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately, and have received USFWS approval. Authorized Biologists are permitted to then approve specific monitors to handle tortoises, at their discretion. The California Department of Fish and Game (CDFG) must also approve such biologists, potentially including individual approvals for monitors approved by the Authorized Biologist. Designated Biologists are the equivalent of Authorized Biologists. Only Designated Biologists and certain Biological Monitors who have been approved by the Designated Biologist would be allowed to handle desert tortoises.

the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.

Designated Biologists shall complete a USFWS Qualifications Form (USFWS 2008b) (www.fws.gov/ventura/speciesinfo/protocols_guidelines) and submit it to the USFWS and CPM within 60 days prior to ground breaking for review and final approval.

DESIGNATED BIOLOGIST DUTIES

BIO-2 The project owner shall ensure that the Designated Biologist performs the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist may be assisted by the approved Biological Monitor(s) but remains the contact for the project owner and CPM. The Designated Biologist duties shall include the following:

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources conditions of certification;

2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) to be submitted by the project owner;

3. Be available to supervise, conduct, and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special-status species or their habitat;

4. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;

5. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (e.g., parking lots) for animals in harm’s way;

6. Notify the project owner and the CPM of any non-compliance with any biological resources condition of certification;

7. Respond directly to inquiries of the CPM regarding biological resource issues;

8. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Compliance Report;

9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, and USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfo/protocols_guidelines>; and

10. Maintain the ability to be in regular, direct communication with representatives of CDFG and USFWS, including notifying these agencies of dead or injured listed species and reporting special-status species observations to the California Natural Diversity Data Base.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to the CPM copies of all written reports and summaries that document biological resources compliance activities. If actions may affect biological resources during operation a Designated Biologist shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless his/her duties cease, as approved by the CPM.

BIOLOGICAL MONITOR QUALIFICATIONS

BIO-3 The project owner's CPM-approved Designated Biologist shall submit the resume, at least three references, and contact information of the proposed Biological Monitors to the CPM for approval in consultation with CDFG and USFWS. The resume shall demonstrate, to the satisfaction of the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks. Biological Monitors involved in any aspect of desert tortoise surveys or handling must meet the criteria to be considered a USFWS Authorized Biologist (USFWS 2008b) and demonstrate familiarity with the most recent protocols and guidelines for the desert tortoise.

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the conditions of certification, BRMIMP, WEAP, USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfo/protocols_guidelines> and all permits.

Verification: The project owner shall submit the specified information to the CPM for approval at least 60 days prior to the start of any project-related site disturbance activities. The Designated Biologist shall submit a written statement to the CPM confirming that individual Biological Monitor(s) has been trained including the date when training was completed. If additional Biological Monitors are needed during construction, the specified information shall be submitted to the CPM for approval at least 10 days prior to their first day of monitoring activities.

BIOLOGICAL MONITOR DUTIES

BIO-4 The Biological Monitors shall assist the Designated Biologist in conducting surveys and in monitoring of mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist shall remain the contact for the project owner and CPM.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to the CPM copies of all written reports and summaries that document biological

resources compliance activities, including those conducted or monitored by Biological Monitors. If actions may affect biological resources during operation, a Biological Monitor, under the supervision of the Designated Biologist, shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless his/her duties cease, as approved by the CPM.

DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY

BIO-5 The project owner's construction/operation manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources conditions of certification.

The Designated Biologist shall have the authority to immediately stop any activity that is not in compliance with these conditions and/or order any reasonable measure to avoid take of an individual of a listed species. If required by the Designated Biologist and Biological Monitor(s) the project owner's construction/operation manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist. The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;

2. Inform the project owner and the construction/operation manager when to resume activities;

3. Notify the CPM if there is a halt of any activities and advise the CPM of any corrective actions that have been taken or will be instituted as a result of the work stoppage, and

4. If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

Verification: The project owner shall ensure that the Designated Biologist or Biological Monitor notifies the CPM immediately (and no later than the morning following the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure will be made by the CPM within five working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made.

WORKER ENVIRONMENTAL AWARENESS PROGRAM (WEAP)

BIO-6 The project owner shall develop and implement PHPP-specific Worker Environmental Awareness Program (WEAP) and shall secure approval for the

WEAP from USFWS, CDFG, and the CPM. The WEAP shall be administered to all on-site personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, subcontractors, and delivery personnel. The WEAP shall be implemented during site mobilization, ground disturbance, grading, construction, operation, and closure. The WEAP shall:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material and electronic media is made available to all participants;

2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas and explain the reasons for protecting these resources;

3. Place special emphasis on Swainson's hawk, arroyo toad, desert tortoise and Mohave ground squirrel, including information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures;

4. Present the meaning of various temporary and permanent habitat protection measures;

5. Identify whom to contact if there are further comments and questions about the material discussed in the program; and

6. Include a training acknowledgment form to be signed by each worker indicating that he/she received training and shall abide by the guidelines.

The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.

Verification: At least 60 days prior to the start of any project-related site disturbance activities, the project owner shall provide to the CPM a copy of the draft WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. At least 10 days prior to site and related facilities mobilization, the project owner shall submit two copies of the CPM-approved final WEAP.

Training acknowledgement forms signed during construction shall be kept on file by the project owner for at least six months after the start of commercial operation.

Throughout the life of the project, the worker education program shall be repeated annually for permanent employees, and shall be routinely administered within one week of arrival to any new construction personnel, foremen, contractors, subcontractors, and other personnel potentially working within the project area. Upon completion of the

orientation, employees shall sign a form stating that they attended the program and understand all protection measures. These forms shall be maintained by the project owner and shall be made available to the CPM upon request. Workers shall receive and be required to visibly display a hardhat sticker or certificate that they have completed the training.

During project operation, signed statements for operational personnel shall be kept on file for six months following the termination of an individual's employment.

BIOLOGICAL RESOURCES MITIGATION IMPLEMENTATION AND MONITORING PLAN

BIO-7 The project owner shall develop a Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) and submit two copies of the proposed BRMIMP to the CPM (for review and approval) and shall implement the measures identified in the approved BRMIMP. The BRMIMP shall incorporate impact avoidance and minimization measures described in final versions of the Mohave Ground Squirrel Translocation Plan; the Restoration Plan; the Hazardous Materials Plan; the Sensitive Plant Protection Plan; the Raven Monitoring, Management, and Control Plan; the Swainson's Hawk Monitoring and Mitigation Plan; the Burrowing Owl Monitoring and Mitigation Plan; the Streambed Avoidance and Mitigation Plan; and the Closure Plan.

The BRMIMP shall be prepared in consultation with the Designated Biologist and shall include the following:

1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;

2. All biological resources conditions of certification identified as necessary to avoid or mitigate impacts;

3. All biological resource mitigation, monitoring, and compliance measures required in federal agency terms and conditions;

4. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;

5. All required mitigation measures for each sensitive biological resource;

6. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;

7. All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;

8. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities; include one set <u>prior</u> to any site or related facilities mobilization disturbance and one set <u>subsequent</u> to completion of project construction. Provide planned timing of aerial

photography and a description of why times were chosen. Provide a final accounting of the before/after acreages and a determination of whether additional habitat compensation is necessary in the Construction Termination Report;

9. Duration for each type of monitoring and a description of monitoring methodologies and frequency;

10. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;

11. All remedial measures to be implemented if performance standards are not met;

12. A discussion of biological resources-related facility closure measures including a description of funding mechanism(s); and

13. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval.

Verification: The project owner shall submit the BRMIMP to the CPM at least 60 days prior to start of any project-related site disturbance activities. The CPM, in consultation with other appropriate agencies, will determine the BRMIMP's acceptability within 45 days of receipt. The BRMIMP shall contain all of the required measures included in all biological conditions of certification. No ground disturbance may occur prior to the CPM's approval of the final BRMIMP.

The project owner shall notify the CPM no less than five working days before implementing any modifications to the approved BRMIMP to obtain CPM approval. Any changes to the approved BRMIMP must also be approved by the CPM in consultation with appropriate agencies to ensure no conflicts exist.

Implementation of BRMIMP measures (construction activities that were monitored, species observed) will be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying which items of the BRMIMP have been completed; a summary of all modifications to mitigation measures made during the project's site mobilization, ground disturbance, grading, and construction phases; and which mitigation and monitoring items are still outstanding.

IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-8 The project owner shall undertake the following measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to biological resources:

1. Limit Disturbance Area. The boundaries of all areas to be disturbed (including staging areas, access roads, and sites for temporary placement of spoils) shall be delineated with stakes and flagging prior to construction activities in consultation with the Designated Biologist. Spoils shall be

stockpiled in disturbed areas lacking native vegetation and which do not provide habitat for special-status species. Parking areas, staging and disposal site locations shall also be located in areas without native vegetation or special-status species habitat. All disturbances, vehicles, and equipment shall be confined to the flagged areas.

2. Minimize Road Impacts. New and existing roads that are planned for construction, widening, or other improvements shall not extend beyond the flagged impact area as described above. All vehicles passing or turning around will do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads (e.g. new spur roads) or the construction zone, the route will be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.

3. Minimize Traffic Impacts. Vehicular traffic during project construction and operation shall be confined to existing routes of travel to and from the project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit shall not exceed 25 miles per hour within the project area, on maintenance roads for linear facilities, or on access roads to the PHPP site.

4. Monitor During Construction. The Designated Biologist or Biological Monitor shall be present at the construction site during all project activities that have potential to disturb soil, vegetation, and wildlife. In areas that could support desert tortoise, Mohave ground squirrel, or any other sensitive wildlife species, the USFWS-approved Designated Biologist or Biological Monitor shall walk immediately ahead of equipment during brushing and grading activities.

5. Salvage Wildlife during Clearing and Grubbing. The Designated Biologist or Biological Monitor shall salvage and relocate sensitive wildlife during clearing and grading operations. The species shall be salvaged when conditions will not jeopardize the health and safety of the monitor and relocated off-site habitat.

6. Minimize Impacts of Transmission/Pipeline Alignments, Roads, and Staging Areas. For construction activities outside of the plant site (transmission line, pipeline alignments) access roads, pulling sites, and storage and parking areas shall be designed, installed, and maintained with the goal of minimizing impacts to native plant communities and sensitive biological resources. Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Mitigating Bird Collisions with Power Lines* (APLIC 2004) to reduce the likelihood of bird electrocutions and collisions.

7. Avoid Use of Toxic Substances. Road surfacing and sealants as well as soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants. Anticoagulants shall not be used for rodent control.

8. Minimize Lighting Impacts. Facility lighting shall be designed, installed, and maintained to prevent side casting of light towards wildlife habitat.

9. Avoid Vehicle Impacts to Desert Tortoise. No vehicles or construction equipment shall be moved prior to an inspection of the ground beneath the vehicle for the presence of desert tortoise. If a desert tortoise is observed, it will be left to move on its own. If the tortoise does not move, the animal will be relocated to a safe location within 500 feet of the project area. No tortoise shall be moved without authorization from the CDFG, USFWS, and CPM.

10. Avoid Wildlife Pitfalls. At the end of each work day, the Designated Biologist shall ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) outside the permanently fenced area have been backfilled. If backfilling is not feasible, all trenches, bores, and other excavations shall be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, or covered completely to prevent wildlife access, or fully enclosed with tortoise-exclusion fencing. All trenches, bores, and other excavations shall be inspected periodically throughout and at the end of each workday by the Designated Biologist or a Biological Monitor. Should wildlife become trapped, the Designated Biologist or Biological Monitor shall remove and relocate the individual to a safe location. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed.

11. Avoid Entrapment of Desert Tortoise and Mohave Ground Squirrel. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches, stored less than 8 inches above ground and within desert tortoise or Mohave ground squirrel habitat for one or more days/nights, shall be inspected for tortoises or Mohave ground squirrel before the material is moved, buried, or capped. As an alternative, all such structures may be capped before being stored outside the fenced area, or placed on pipe racks. These materials would not need to be inspected or capped if they are stored within the permanently fenced area after the clearance surveys have been completed.

12. Minimize Standing Water. Water applied to dirt roads and construction areas (trenches or spoil piles) for dust abatement shall use the minimal amount needed to meet safety and air quality standards in an effort to prevent the formation of puddles, which could attract desert tortoises and common ravens to construction sites. A Biological Monitor shall patrol these areas to ensure water does not puddle and attract desert tortoise, common ravens, and other wildlife to the site and shall take appropriate action to reduce water application where necessary.

13. Minimize Spills of Hazardous Materials. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The Designated Biologist shall be informed of any hazardous spills immediately as directed in the project Hazardous Materials Plan. Hazardous spills shall be immediately cleaned up and the contaminated soil properly disposed of at a licensed facility. Servicing of construction equipment shall take place only at a designated area. Service/maintenance vehicles shall carry a bucket and pads to absorb leaks or spills.

14. Worker Guidelines. During construction all trash and food-related waste shall be placed in self-closing containers and removed daily from the site. Workers shall not feed wildlife or bring pets to the project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons.

15. Avoid Spread of Noxious Weeds. The project owner shall implement the following Best Management Practices during construction and operation to prevent the spread and propagation of noxious weeds:

    a. Limit the size of any vegetation and/or ground disturbance to the absolute minimum and limit ingress and egress to defined routes;

    b. Prevent spread of non-native plants via vehicular sources by implementing Trackclean™ or other methods of vehicle cleaning for vehicles coming and going from construction sites. Earth-moving equipment shall be cleaned prior to transport to the construction site;

    c. Use only weed-free straw, hay bales, and seed for erosion control and sediment barrier installations, and

    d. Avoid using invasive non-native species in landscaping plans and erosion control.

16. Stockpile Topsoil. To increase chances for revegetation success, topsoil shall be stockpiled from the project site and along project linear features for use in revegetation. The top six (6) to eight (8) inches of native topsoil from the least disturbed locations and only areas that are relatively free of noxious weeds shall be used as a source of topsoil. All other elements of topsoil use shall be as described in *Rehabilitation of Disturbed Lands in California* (Newton and Claassen 2003, pp. 39-40).

17. Implement Erosion Control Measures. Standard erosion control measures shall be implemented for all phases of construction and operation where sediment run-off from exposed slopes threatens to enter “Waters of the State”. Sediment and other flow-restricting materials shall be moved to a location where they shall not be washed back into the stream. All disturbed soils and roads within the project site shall be stabilized to reduce erosion potential, both during and following construction. Areas of

disturbed soils (access and staging areas) with slopes toward a drainage shall be stabilized to reduce erosion potential.

18. Monitor Ground-Disturbing Activities Prior to Site Mobilization. If ground-disturbing activities are required prior to site mobilization, such as for geotechnical borings or hazardous waste evaluations, a Designated Biologist or Biological Monitor shall be present to monitor any actions that could disturb soil, vegetation, or wildlife.

19. Control and Regulate Fugitive Dust. To reduce the potential for the transmission of fugitive dust the owner shall implement dust control measures. These shall include:

    a. The owner shall apply non-toxic soil binders, equivalent or better in efficiencies than the CARB- approved soil binders, to active unpaved roadways, unpaved staging areas, and unpaved parking area(s) throughout construction to reduce fugitive dust emissions.

    b. Water the disturbed areas of the active construction sites at least three times per day and more often if uncontrolled fugitive dust is noted.

    c. Enclose, cover, water twice daily, and/or apply non-toxic soil binders according to manufacturer's specifications to exposed piles with a 5% or greater silt content.

    d. Establish a vegetative ground cover (in compliance with biological resources impact mitigation measures above) or otherwise create stabilized surfaces on all unpaved areas at each of the construction sites within 21 days after active construction operations have ceased.

    e. Increase the frequency of watering, if water is used as a soil binder for disturbed surfaces, or implement other additional fugitive dust mitigation measures, to all active disturbed fugitive dust emission sources when wind speeds (as instantaneous wind gusts) exceed 25 mph.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures will be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

COMPLIANCE VERIFICATION

BIO-9 The project owner shall provide Energy Commission staff, CDFG, and USFWS with reasonable access to the project site and mitigation lands under the control of the project owner and shall otherwise fully cooperate with the Energy Commission's efforts to verify the project owner's compliance with, or the effectiveness of, mitigation measures set forth in the conditions of certification. The project owner shall hold harmless the Designated Biologist,

the Energy Commission and staff, and any other agencies with regulatory requirements addressed by the Energy Commission's sole permitting authority for any costs the project owner incurs in complying with the management measures, including stop work orders issued by the CPM or the Designated Biologist. The Designated Biologist shall do all of the following:

1. Notification. Notify the CPM, CDFG, and USFWS at least 14 calendar days before initiating ground-disturbing activities. Immediately notify the CPM, CDFG, and USFWS in writing if the project owner is not in compliance with any conditions of certification, including but not limited to any actual or anticipated failure to implement mitigation measures within the time periods specified in the conditions of certification. CDFG shall be notified at their Southern Region Headquarters Office, 4949 Viewridge Avenue, San Diego, CA 92123; (858) 467-4201. USFWS shall be notified at their Ventura office at 2493 Portola Road, Suite B, Ventura, CA 93003; (805) 644-1766.

2. Monitoring During Grading. Remain on site daily while grubbing and grading are taking place to avoid or minimize take of listed species, to check for compliance with all impact avoidance and minimization measures, and to check all exclusion zones to ensure that signs, stakes, and fencing are intact and that human activities are restricted in these protected zones.

3. Fence Monitoring. During construction maintain and check desert tortoise exclusion fences on a daily basis to ensure the integrity of the fence is maintained. The Designated Biologist shall be present on site to monitor construction and determine fence placement during fence installation. During operation of the project, fence inspections shall occur at least once per month throughout the life of the project, and more frequently after storms or other events that might affect the integrity and function of desert tortoise exclusion fences. Fence repairs shall occur within two days (48 hours) of detecting problems that affect the functioning of the desert tortoise exclusion fencing.

4. Monthly Compliance Inspections. Conduct compliance inspections at a minimum of once per month after clearing, grubbing, and grading are completed and until construction is completed and submit a monthly compliance report to the CPM, USFWS, and CDFG. All observations of listed species and their sign shall be reported to the Designated Biologist for inclusion in the monthly compliance report.

5. Annual Listed Species Status Report. No later than January 31 of every year the PHPP facility remains in operation, provide the CPM, USFWS, and CDFG an annual Listed Species Status Report, which shall include, at a minimum: 1) a general description of the status of the project site and construction/operation activities, including actual or projected completion dates, if known; 2) a copy of the table in the BRMIMP with notes showing the current implementation status of each mitigation measure; 3) an assessment of the effectiveness of each completed or partially completed

mitigation measure in minimizing and compensating for project impacts, and 4) recommendations on how effectiveness of mitigation measures might be improved.

6. Final Listed Species Mitigation Report. No later than 45 days after initiation of project operation, provide the CPM a Final Listed Species Mitigation Report that shall include, at a minimum: 1) a copy of the table in the BRMIMP with notes showing when each of the mitigation measures was implemented; 2) all available information about project-related incidental take of listed species; 3) information about other project impacts on the listed species; 4) construction dates; 5) an assessment of the effectiveness of conditions of certification in minimizing and compensating for project impacts; 6) recommendations on how mitigation measures might be changed to more effectively minimize and mitigate the impacts of future projects on the listed species; and 7) any other pertinent information, including the level of take of the listed species associated with the project.

7. Notification of Injured, Dead, or Relocated Listed Species. In the event of a sighting in an active construction area (e.g., with equipment, vehicles, or workers), injury, kill, or relocation of any listed species, the CPM, CDFG, and USFWS shall be notified immediately by phone. Notification shall occur no later than noon on the business day following the event if it occurs outside normal business hours so that the agencies can determine if further actions are required to protect listed species. Written follow-up notification via FAX or electronic communication shall be submitted to these agencies within two calendar days of the incident and include the following information as relevant:

    a. Injured Desert Tortoise. If a desert tortoise is injured as a result of project-related activities during construction, the Designated Biologist shall immediately take it to a CDFG-approved wildlife rehabilitation and/or veterinarian clinic. Any veterinarian bills for such injured animals shall be paid by the project owner. Following phone notification as required above, the CPM, CDFG, and USFWS shall determine the final disposition of the injured animal, if it recovers. Written notification shall include, at a minimum, the date, time, location, circumstances of the incident, and the name of the facility where the animal was taken.

    b. Desert Tortoise/Mohave Ground Squirrel Fatality. If a desert tortoise or Mohave ground squirrel is killed by project-related activities during construction or operation, or if a desert tortoise or Mohave ground squirrel is otherwise found dead, submit a written report with the same information as an injury report. These desert tortoises shall be salvaged according to guidelines described in *Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-Roaming Desert Tortoise* (Berry 2001). The project owner shall pay to have the desert tortoises transported and necropsied. The report shall include the date and time of the finding or incident.

8. Stop Work Order. The CPM may issue the project owner a written stop work order to suspend any activity related to the construction or operation of the project to prevent or remedy a violation of one or more conditions of certification (including but not limited to failure to comply with reporting, monitoring, or habitat acquisition obligations) or to prevent the illegal take of an endangered, threatened, or candidate species. The project owner shall comply with the stop work order immediately upon receipt thereof.

Verification: No later than two calendar days following the above-required notification of a sighting, kill, injury, or relocation of a listed species, the project owner shall deliver to the CPM, CDFG, and USFWS via FAX or electronic communication the written report from the Designated Biologist describing all reported incidents of the sighting, injury, kill, or relocation of a listed species, identifying who was notified and explaining when the incidents occurred. In the case of a sighting in an active construction area, the project owner shall, at the same time, submit a map (e.g., using Geographic Information Systems) depicting both the limits of construction and sighting location to the CPM, CDFG, and USFWS.

No later than January 31st of every year the PHPP facility remains in operation, provide the CPM an annual Listed Species Status Report as described above, and a summary of desert tortoise exclusion fence inspections and repairs conducted in the course of the year.

RESTORATION PLAN FOR IMPACTS TO NATIVE VEGETATION COMMUNITIES

BIO-10 The project owner shall provide restoration for impacts to native vegetation communities and develop and implement a Restoration Plan for all areas subject to temporary project disturbance. Upon completion of construction, all temporarily disturbed areas shall be revegetated, excluding the road and roadbed. The following measures shall be implemented for the revegetation effort areas not subject to the facility Landscape Plan. These measures will include:

1. Plan Details. The plans shall include at minimum: (a) the location of the mitigation site; (b) locations and details for top soil storage; (c) the plant species to be used; (d) seed collection guidelines; (e) a schematic depicting the mitigation area; (f) time of year that the planting will occur and the methodology of the planting; (g) a description of the irrigation methodology if used; (h) measures to control exotic vegetation on site; (i) success criteria; (j) a detailed monitoring program; and k) locations and impacts to all Joshua and Juniper Trees. All habitats dominated by non-native species prior to project disturbance shall be revegetated using appropriate native species.

2. Topsoil Salvage. Topsoil shall be stockpiled from the project site for use in revegetation of temporarily the disturbed soils. Six (6) to eight (8) inches of soil below shall be scraped and separately stockpiled for use in revegetation areas. All other elements related to the collection and

stockpiling of topsoil shall be conducted as described on pages 39-40 of *Rehabilitation of Disturbed Lands in California* (Newton and Claassen 2003)

3. Seed Stock. Only seed of locally occurring species shall be used for revegetation. Seeds shall contain a mix of short-lived early pioneer species such as native annuals and perennials and subshrubs (for example, squirreltail, cheesebush, matchweed, peppergrass, rabbitbrush, creosote bush, burro-weed, wolfberry, Nevada tea, needlegrass, rice grass, goldenhead). Seeding shall be conducted as described in Chapter 5 of *Rehabilitation of Disturbed Lands in California* (Newton and Claassen 2003). A list of plant species suitable for Mojave Desert region revegetation projects, including recommended seed treatments, are included in Appendix A-8 of the same report. The list of plants observed during the 2010 special-status plant surveys of the PHPP project area can also be used as a guide to site-specific plant selection for revegetation.

4. Monitoring Requirement and Success Criteria. Post-seeding and planting monitoring will be yearly from years one to five or until the success criteria are met. If the survival and cover requirements have not been met, the owner is responsible for replacement planting to achieve these requirements. Replacement plants shall be monitored with the same survival and growth requirements as previously mentioned. Remediation activities (e.g. additional planting, removal of non-native invasive species, or erosion control) shall be taken during the five-year period if necessary to ensure the success of the restoration effort. If the mitigation fails to meet the established performance criteria after the five-year maintenance and monitoring period, monitoring and remedial activities shall extend beyond the five-year period until the criteria are met or unless otherwise specified by the Energy Commission. If a fire occurs in a revegetation area within the five-year monitoring period, the owner shall be responsible for a one-time replacement. If a second fire occurs, no replanting is required, unless the fire is caused by the owner's activity.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Within 90 days after completion of project construction, the project owner shall provide to the CPM verification of the total vegetation and community subject to temporary and permanent disturbance. If habitat disturbance exceeded that described in this analysis, the CPM shall notify the project owner of any additional mitigation required to compensate for any additional habitat disturbances t. To monitor and evaluate the success of the restoration the owner shall submit annual reports of the restoration including the status of the site, percent cover of native and exotics, and any remedial actions conducted by the owner to the CPM.

SPECIAL-STATUS PLANT SURVEYS/PROTECTION PLAN

BIO-11 To avoid impacts to State and federally listed Threatened and Endangered, Proposed, Petitioned, and Candidate or California Native Plant Society List 1B or 2, plants that might occur on the PHPP site or along the proposed transmission line alignments, pre-construction surveys shall be conducted in

these areas in Spring 2010 for the power plant site and reclaimed water pipeline, and in the Spring prior to the commencement of ground disturbance for the transmission line and natural gas pipeline. If special-status plant species are detected within 100 feet of the project footprint, the qualified botanist shall prepare a Sensitive Plant Protection Plan to avoid direct and indirect impacts. The project owner shall implement the following measures:

1. Pre-Construction Floristic Surveys. A qualified botanist shall conduct floristic surveys on the PHPP project site and along linear facilities in all areas subject to ground-disturbing activity, including, but not limited to, tower pad preparation and construction areas, tower removal sites, pulling and tensioning sites, assembly yards, and areas subject to grading for new access roads. Surveys shall be conducted within 100 feet of all surface-disturbing activities at the appropriate time of year and according to guidelines from the California Department of Fish and Game (CDFG 2009) and the California Native Plant Society (CNPS 2001).

2. Sensitive Plant Protection Plan. If special-status plant species are detected during pre-construction surveys, a qualified botanist shall prepare a Sensitive Plant Protection Plan (Plan). Populations of rare plants shall be flagged and mapped prior to any ground disturbance. Where possible the owner shall modify the placement of structures, access roads, laydown areas, and other ground-disturbing activities in order to avoid the plants. The Plan shall include measures for avoiding direct impacts and accidental impacts during construction by identifying the plant occurrence location and establishing an appropriately sized buffer. The Plan shall also include measures to avoid indirect impacts including: sedimentation from adjacent disturbed soils; alterations of the site hydrology from changes in the drainage patterns; dust deposition; and displacement or degradation of the habitat from the introduction and spread of noxious weeds. The Plan shall also include a discussion of monitoring and reporting requirements during and after construction.

    a. Prior to any ground disturbance, any populations of listed plant species identified during the surveys shall be protected by a buffer zone if they can be avoided. The buffer zone shall be established around these areas and shall be of sufficient size to eliminate potential disturbance to the plants from human activity and any other potential sources of disturbance including human trampling, erosion, and dust. The size of the buffer will depend upon the proposed use of the immediately adjacent lands, and includes consideration of the plant's ecological requirements (e.g., sunlight, moisture, shade tolerance, edaphic physical and chemical characteristics) that are identified by the Designated Biologist. The buffer for herbaceous species shall be, at minimum, 50 feet from the perimeter of the population or the individual. A smaller buffer may be established, provided there are adequate measures in place to avoid the take of the species, with the approval of the USFWS, CDFG, and CPM.

b. Impacts to non-listed plant species (i.e., CNPS List 1 and 2, species) shall first be avoided where feasible, and, where not feasible, impacts shall be compensated through reseeding (with locally collected seed stock), or other CPM-approved methods. If Project activities will result in loss of more than 10% of the known individuals within an existing population of non-listed special-status plant species, the project owner shall preserve existing off-site occupied habitat that is not already part of the public lands in perpetuity at a 2:1 mitigation ratio. The CPM may reduce this ratio depending on the sensitivity of the plant. The preserved habitat shall be occupied by the plant species impacted, and be of superior or similar habitat quality to the impacted areas in terms of soil features, extent of disturbance, habitat structure, and dominant species composition, as determined by a qualified plant ecologist.

3. State or Federally Listed Plant Species: If impacts to listed plants are determined to be unavoidable, the USFWS shall be consulted for authorization and/or the CDFG shall be consulted for authorization through an Incidental Take Permit. Additional mitigation measures to protect or restore listed plant species or their habitat may be required by the CDFG before impacts are authorized.

4. Agency Notification and Avoidance: If State or federally listed plant species are detected during the pre-construction floristic surveys, the CPM, USFWS, and CDFG shall be notified in writing no more than 15 days from detection of the plants.

5. Review and Submittal of Plan: The project owner shall submit to the CPM, USFWS, and CDFG a draft Sensitive Plant Protection Plan. Prior to any ground-disturbing activities within 100 feet of the sensitive plant occurrences detected during the pre-construction floristic surveys, the project owner shall submit to the CPM a final Plan that reflects review and approval by Energy Commission staff in consultation with CDFG and USFWS.

Verification: No later than 60 days prior to ground disturbance the project owner shall submit a report describing the results of floristic surveys conducted on the PHPP power plant site and along the proposed transmission line alignment. The report shall be submitted to the CPM, USFWS, and CDFG and shall describe qualifications of the surveyor, survey methods including dates and times, a discussion of visits to reference sites, figures depicting the area(s) surveyed, figures depicting the locations of any special-status plants observed, and a list of all plant species detected.

If special-status plant species are detected during the surveys, the project owner shall submit to the CPM and CDFG a Sensitive Plant Protection Plan (Plan) at least 60 days prior to the start of any ground-disturbing activities within 100 feet of the sensitive plant occurrences detected during the pre-construction floristic surveys. The CPM will determine the Plan's acceptability in consultation with CDFG and USFWS within 15 days of receipt of the Plan. Any modifications to the approved Plan shall be made only after approval by Energy Commission staff in consultation with CDFG. The project

owner shall notify the CPM no fewer than 5 working days before implementing any CPM-approved modifications to the Plan.

Within 30 days after completion of construction the project owner shall provide to the CPM, USFWS, and CDFG a construction termination report discussing how mitigation measures described in the Plan were implemented.

AVOIDANCE MEASURES FOR ARROYO TOAD

BIO-12 The project owner shall conduct pre-construction surveys for arroyo toads at the Little Rock Creek transmission line crossing on Segment 2 and implement impact avoidance and minimization measure during all construction activities. These measures include, but are not limited to, the following:

1. Surveys. Prior to ground disturbance the project owner shall retain a biologist who is familiar with arroyo toads that occur in desert habitats to conduct clearance surveys prior to construction and monitor all construction activities at Little Rock Creek. Clearance surveys shall be completed within 24 hours of construction. If arroyo toads are detected a 500 foot disturbance free buffer shall be implemented and the area shall be avoided until the owner completes consultation with the USFWS.

2. Monitoring. The project owner shall conduct full time monitoring during ground disturbance and construction of the all areas within 500 feet of Little Rock Creek. Although this species is primarily nocturnal and aestivates during the winter monitoring shall occur year round whenever day time temperatures exceed 50 degrees Fahrenheit and during periods of rainfall. If arroyo toads are detected the Designated Biologist shall contact the CPM and USFWS within 24 hours. Work shall not occur within 500 feet of Little Rock Creek until approved by the CPM and USFWS.

Verification: Within 30 days of completion of arroyo toad clearance surveys the Designated Biologist shall submit a report to the CPM describing how mitigation measures described above have been satisfied. The report shall include the survey results and any other information needed to demonstrate compliance with the measures described above.

DESERT TORTOISE CLEARANCE SURVEYS AND EXCLUSION FENCING

BIO-13 The project owner shall undertake appropriate measures to manage construction at the plant site and linear facilities in a manner to avoid impacts to desert tortoise. Methods for clearance surveys, fence installation, and other procedures shall be consistent with those described in the *Guidelines for Handling Desert Tortoise During Construction Projects* (Desert Tortoise Council 1999) or more current guidance provided by CDFG and USFWS. These measures include, but are not limited to, the following:

1. Fence Installation. Prior to ground disturbance, the entire plant site shall be fenced with permanent desert tortoise-exclusion fence. To avoid impacts to desert tortoise during fence construction, the proposed fence alignment shall be flagged and the alignment surveyed within 24 hours

prior to fence construction. Surveys shall be conducted by the Designated Biologist using techniques approved by the USFWS and CDFG. Biological Monitors may assist the Designated Biologist under his or her supervision. These surveys shall provide 100% coverage of all areas to be disturbed during fence construction and an additional transect along both sides of the proposed fence line. This fence line transect shall cover an area approximately 90 feet wide centered on the fence alignment. Transects shall be no greater than 30 feet apart. All desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, shall be examined to assess occupancy of each burrow by desert tortoises and handled in accordance with USFWS-approved protocol.

a. Timing, Supervision of Fence Installation. The exclusion fencing shall be installed prior to the onset of site clearing and grubbing. The fence installation shall be supervised by the Designated Biologist and monitored by the Biological Monitors to ensure the safety of any tortoise present.

b. Fence Material and Installation. The permanent tortoise exclusionary fencing shall consist of galvanized hard wire cloth 1 by 2 inch mesh sunk 12 inches into the ground, and 24 inches above ground (USFWS 2008b, Appendix D).

c. Security Gates. Security gates shall be designed with minimal ground clearance to deter ingress by tortoises, including gates that would exclude public access to the PHPP site.

d. Tower Fencing. If tortoises are discovered during clearance surveys of the linear routes, the tower locations shall be temporarily fenced with tortoise exclusion fencing to prevent desert tortoise entry during construction. Temporary fencing must follow guidelines for permanent fencing and supporting stakes shall be sufficiently spaced to maintain fence integrity.

e. Fence Inspections. Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing in the utility corridors, the fencing shall be regularly inspected. Permanent fencing shall be inspected monthly and during/following all major rainfall events. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within two days of observing damage. Inspections of permanent site fencing shall occur for the life of the project. Temporary fencing must be inspected weekly and, where drainages intersect the fencing, during and immediately following major rainfall events. All temporary fencing shall be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the Designated Biologist shall inspect the utility corridor or tower site for tortoise.

2. Desert Tortoise Clearance Surveys. Following construction of the tortoise exclusionary fencing around the Plant Site, all fenced areas shall be cleared of tortoises by the Designated Biologist, who may be assisted by Biological Monitors. A minimum of two clearance surveys, with negative results, must be completed, and these must coincide with heightened desert tortoise activity from late March through May and during October. To facilitate seeing the ground from different angles, the second clearance survey shall be walked at 90 degrees to the orientation of the first clearance survey.

3. Relocation for Desert Tortoise. If desert tortoises are detected on the PHPP site the owner shall coordinate with the USFWS, CDFG, and CPM regarding the disposition of the animals. If located during clearance surveys within the transmission line project impact area the Designated Biologist shall move the tortoise the shortest possible distance, keeping it out of harm's way but still within its home range. Desert tortoise encountered during construction of any of the utility corridors shall be similarly treated in accordance with the techniques described in the *Guidelines for Handling Desert Tortoise during Construction Projects* (Desert Tortoise Council 1999) or more current guidance on the USFWS website. Any person handling tortoise must be trained and approved by the USFWS and CDFG and be on site during ground disturbance or construction. A site where tortoises will be moved must be pre-approved, and acquired prior to ground disturbing activities. The health of any tortoise to be translocated must be assessed prior to moving; a quarantine site located for any ill tortoise must be designated. The host population of tortoise surveyed prior to any translocated tortoise being moved, and a study to determine the efficacy of the translocation and impact to host population be conducted for a minimum of 5 years.

4. Burrow Inspection. All potential desert tortoise burrows within the fenced area shall be searched for presence. In some cases, a fiber optic scope may be needed to determine presence or absence within a deep burrow. To prevent reentry by a tortoise or other wildlife, all burrows shall be collapsed once absence has been determined. Tortoises excavated from burrows shall be translocated to unoccupied natural or artificial burrows immediately following excavation in an area approved by the Designated Biologist if environmental conditions warrant immediate relocation.

5. Burrow Excavation. Burrows inhabited by tortoises shall be excavated by the Designated Biologist using hand tools, and then collapsed or blocked to prevent re-occupation. If excavated during May through July, the Designated Biologist shall search for desert tortoise nests/eggs. All desert tortoise handling and removal, and burrow excavations, including nests, shall be conducted by the Designated Biologist in accordance with the USFWS-approved protocol (Desert Tortoise Council 1999) or more current guidance on the USFWS website.

6. Monitoring During Clearing. Following desert tortoise clearance removal from the plant site and translocation to a new site, heavy equipment shall be allowed to enter the project site to perform earth work such as clearing, grubbing, leveling, and trenching. A Biological Monitor shall be onsite during initial clearing and grading activities. Should a tortoise be discovered, it shall be translocated as described above in accordance with the Desert Tortoise Translocation Plan.

7. Reporting. The Designated Biologist shall record the following information for any desert tortoises observed or handled: a) the locations (narrative and maps) and dates of observation; b) general condition and health, including injuries, state of healing and whether desert tortoise voided their bladders; c) location moved from and location moved to (using GPS technology); d) gender, carapace length, and diagnostic markings (i.e., identification numbers or marked lateral scutes); e) ambient temperature when handled and released; and f) digital photograph of each handled desert tortoise as described in the paragraph below. Desert tortoise moved from within project areas shall be marked for future identification as described in *Guidelines for Handling Desert Tortoise during Construction Projects* (Desert Tortoise Council 1999) or more current guidance on the USFWS website. Digital photographs of the carapace, plastron, and fourth costal scute shall be taken. Scutes shall not be notched for identification. Any desert tortoises observed within the project area or adjacent habitat shall be reported to the USFWS, CDFG, and CPM by written and electronic correspondence within 24 hours.

Verification: No less than 60 days prior to start of any site mobilization or disturbance activities, the applicant shall submit to Energy Commission Staff, USFWS and CDFG a draft Desert Tortoise Translocation Plan. At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide the CPM with the final version of a Translocation Plan that has been approved by Energy Commission staff in consultation with USFWS and CDFG. The CPM will determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved Desert Tortoise Translocation Plan must be made only after approval by the Energy Commission staff in consultation with USFWS and CDFG. The project owner shall notify the CPM no fewer than 5 working days before implementing any CPM-approved modifications to the Translocation Plan.

Within 30 days after initiation of translocation activities, the Designated Biologist shall provide to the CPM for review and approval, a written report identifying which items of the Translocation Plan have been completed, and a summary of all modifications to measures made during implementation.

Within 30 days of completion of desert tortoise clearance surveys the Designated Biologist shall submit a report to the CPM, USFWS, and CDFG describing how each of the mitigation measures described above has been satisfied. The report shall include the desert tortoise survey results, capture and release locations of any relocated desert tortoises, and any other information needed to demonstrate compliance with the measures described above.

RAVEN FEE, MONITORING, MANAGEMENT, AND CONTROL PLAN

BIO-14 The project owner shall design and implement a Raven Monitoring, Management, and Control Plan (Raven Plan) that is consistent with the most current USFWS-approved raven management guidelines and that meets the approval of the USFWS, CDFG, and the CPM. Any subsequent modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG. The Raven Plan shall include but not be limited to a program to monitor increased raven presence in the Project vicinity and to implement raven control measures as needed based on that monitoring. The purpose of the plan is to avoid any Project-related increases in raven numbers during construction, operation, and decommissioning. The threshold for implementation of raven control measures shall be any increases in raven numbers from baseline conditions, as detected by monitoring to be proposed in the Raven Plan. Regardless of raven monitoring results, the project owner shall be responsible for all other aspects of the Raven Plan, including avoidance and minimization of project-related trash, water sources, or perch/roost sites that could contribute to increased raven numbers. In addition, to offset the cumulative contributions of the Project to desert tortoise from increased raven numbers, the Project owner shall also contribute to the USFWS Regional Raven Management Program. The Project owner shall do all of the following:

1. Prepare and Implement a Raven Management Plan that includes the following:

    a. Identify conditions associated with the Project that might provide raven subsidies or attractants;

    b. Describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities;

    c. Describe control practices for ravens;

    d. Address monitoring and nest removal during construction and for the life of the Project, and;

    e. Discuss reporting requirements.

2. Contribute to the REAT Regional Raven Management Program. The project owner shall submit payment to the project sub-account of the REAT Account held by the National Fish and Wildlife Foundation (NFWF) to support the REAT Regional Raven Management Program. The amount shall be a one-time payment of $105 per acre (458.5 acres) of permanent disturbance fee $48,142.50.

Verification: No later than 30 days prior to any construction-related ground disturbance activities, the Project owner shall provide the CPM, USFWS, and CDFG with the final version of a Raven Plan. All modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG.No later than 60 days prior to the start of construction, the project owner shall

provide written verification to the CPM that NFWF has received and accepted payment into the project's sub-account of the REAT Account to support the USFWS Regional Raven Management Program. On January 31st of each year following construction, the Designated Biologist shall provide a report to the CPM that includes: a summary of the results of raven management and control activities for the year; a discussion of whether raven control and management goals for the year were met; and recommendations for raven management activities for the upcoming year.

PRE-CONSTRUCTION NEST SURVEYS AND IMPACT AVOIDANCE MEASURES FOR MIGRATORY BIRDS

BIO-15 Pre-construction nest surveys shall be conducted if construction activities will occur from February 1 through August 15. The Designated Biologist or Biological Monitor conducting the surveys shall be experienced bird surveyors and familiar with standard nest-locating techniques such as those described in Martin and Guepel (1993). Surveys shall be conducted in accordance with the following guidelines:

1. Surveys shall cover all potential nesting habitat in the project site and within 500 feet of the boundaries of the plant site and linear facilities;

2. At least two pre-construction surveys shall be conducted, separated by a minimum 10-day interval. One of the surveys shall to be conducted within the 10 days preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed three weeks in any given area, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;

3. If active nests are detected during the survey, a no-disturbance buffer zone (protected area surrounding the nest, the size of which is to be determined by the Designated Biologist in consultation with CDFG, USFWS, and CPM) and a monitoring plan shall be developed. Nest locations shall be mapped using GPS technology and submitted, along with a weekly report stating the survey results, to the CPM; and

4. The Designated Biologist shall monitor the nest until he or she determines that nestlings have fledged and dispersed. Activities that might, in the opinion of the Designated Biologist and in consultation with the CPM, disturb nesting activities shall be prohibited within the buffer zone until such a determination is made.

5. If an occupied golden eagle nest is detected within one mile of the active construction, a one mile no activity buffer will be implemented. The prescribed buffers may be adjusted to reflect existing conditions including ambient noise, topography, and disturbance with the approval of the CPM. The biological monitor(s) shall conduct regular monitoring of the nest to determine success/failure and to ensure that project activities are not conducted within the buffer(s) until the nesting cycle is complete or the nest fails. The biological monitor(s) shall be responsible for documenting the results of the surveys and ongoing monitoring and will provide a copy

of the monitoring reports for impact areas to the respective agencies. The Project owner shall also prepare and implement a Golden Eagle Monitoring and Management Plan for the duration of construction to ensure that Project construction activities do not result in injury or disturbance to golden eagles. The monitoring methods shall be consistent with those described in the Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (Pagel et al. 2010) or more current guidance from the USFWS. The Monitoring and Management Plan shall be prepared in consultation with the USFWS. Triggers for adaptive management shall include any evidence of Project-related disturbance to nesting golden eagles, including but not limited to: agitation behavior (displacement, avoidance, and defense); increased vigilance behavior at nest sites; changes in foraging and feeding behavior, or nest site abandonment. The Monitoring and Management Plan shall include a description of adaptive management actions, which shall include, but not be limited to, cessation of construction activities that are deemed by the Designated Biologist to be the source of golden eagle disturbance.

Verification: At least 10 days prior to the start of any project-related ground disturbance activities, the project owner shall provide the CPM a letter-report describing the findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor(s); and a list of species observed. If active nests are detected during the survey, the report shall include a map or aerial photo identifying the location of the nest and shall depict the boundaries of the no-disturbance buffer zone around the nest.

SWAINSON'S HAWK IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-16 The project owner shall implement the following measures to avoid and offset impacts to Swainson's hawk:

1. Pre-Construction Surveys. To assure that nesting Swainson's hawks are not disturbed by construction activities, a qualified ornithologist approved by the CDFG and CPM shall conduct pre-construction surveys prior to commencement of ground disturbing activities. Survey results shall be provided to the CDFG and CPM in a written report, within 30 days of commencement of construction activities.

2. Swainson's Hawk Monitoring and Mitigation Plan. If a Swainson's hawk nest site is found within 0.5 mile of the project site, the Designated Biologist shall prepare a Swainson's Hawk Monitoring and Mitigation Plan in consultation with CDFG and Energy Commission staff. This plan shall include detailed measures to avoid and minimize impacts to Swainson's hawks in and near the construction areas and shall also include the following:

   a. If a nest site is found, no new disturbances or other project-related activities that may cause nest abandonment or forced fledging will be initiated within 0.5 mile of an active nest between 1 March and 15

September. These buffer zones may be adjusted in consultation with the CPM and CDFG.

b. During the nesting season (March 1 through September 15), the Designated Biologist shall be present daily, during any site mobilization, ground disturbance or construction on site, monitoring the behavior of any nesting Swainson's hawks within 0.5 mile of the project. The Designated Biologist shall have authority to order the cessation of all construction activities within 0.5 mile of any Swainson's hawk nest if the birds exhibit abnormal nesting behavior which may cause reproductive failure (nest abandonment and loss of eggs and/or young). Construction shall not resume until the Designated Biologist has consulted with the CDFG and CPM. The Designated Biologist, CPM, and CDFG must confirm that the bird's behavior has normalized prior to the initiation of construction.

c. If construction or other project-related activities cause nest abandonment by a Swainson's hawk or forced fledging, monitoring of the nest site by a qualified biologist shall be required to determine if the nest is abandoned. If the nest is abandoned and if the nestlings are still alive, the project owner shall fund the recovery and hacking (controlled release of captive reared young) of the nestling(s). Transport to the raptor center shall only be approved by the CPM and CDFG Regional Representative.

d. If relocation of nestlings is required, the project owner shall provide a written report documenting the relocation efforts. The report shall include what actions were taken to avoid the nest, the location of the nest, the number and condition of the eggs/nestlings taken from the nest, the location of where the eggs/nestlings are incubated, the survival rate, the location of the nests where the chicks are relocated, and whether the birds were accepted by the adopted parent.

e. Nest trees for Swainson's hawks in the project area shall not be removed unless avoidance measures are determined to be infeasible. If a nest tree for a Swainson's hawk must be removed from the PHPP project area, it shall occur between 1 October and 1 February.

3. Discovery of an Injured Swainson's Hawk. If a Swainson's hawk is found injured during project-related activities on the project site, it shall be immediately relocated to a raptor recovery center approved by the CDFG Regional Representative. Any costs associated with the care or treatment of such injured Swainson's hawks shall be borne by the project owner. The Designated Representative shall immediately notify the CDFG and CPM of the incident unless the incident occurs outside of normal business hours. In that event, the CDFG and CPM shall be notified no later than noon on the next business day. Notification to the CDFG and CPM shall be via telephone or email, followed by a written incident report. Notification shall include the date, time, location, and circumstances of the incident.

Verification: Survey results shall be provided to the CDFG and CPM in a written report, within 30 days of commencement of construction activities. If pre-construction surveys detect nesting Swainson's hawks within 0.5 mile of proposed construction activities, the Designated Biologist shall provide to CDFG and the CPM a Swainson's Hawk Monitoring and Mitigation Plan at least 30 days prior to the start of any project-related site disturbance activities. The project owner shall report monthly to CDFG and the CPM for the duration of construction on the implementation of Swainson's hawk avoidance and minimization measures described in the Swainson's Hawk Monitoring and Mitigation Plan. Within 30 days after completion of construction, the project owner shall provide to the CDFG and CPM a written construction termination report identifying how mitigation measures described in the plan have been completed.

No later than two calendar days following the above-required notification of a sighting, kill, injury, or relocation of a Swainson's hawk, the project owner shall deliver to the CPM and CDFG via FAX or electronic communication the written report from the Designated Biologist describing all reported incidents of the sighting, injury, kill, or relocation of a Swainson's hawk, identifying who was notified and explaining when the incident(s) occurred. In the case of a sighting in an active construction area, the project owner shall, at the same time, submit a map (e.g., using Geographic Information Systems) depicting both the limits of construction and sighting location to the CPM and CDFG.

SWAINSON'S HAWK HABITAT COMPENSATORY MITIGATION

BIO-17 The project owner shall either assume that Swainson's hawk nest within five miles of the project site and provide compensatory mitigation as described below or complete CFDG protocol surveys within five miles of project facilities that result in permanent impacts to Swainson's hawk foraging habitat. If surveys are completed they shall include the following components.

The survey periods shall follow a specified schedule: Period I occurs from 1 January to 31 March, Period II occurs from 1 April to 30 April, Period III occurs from 1 may to 30 May, and Period IV occurs from 1 June to 15 July. No fewer than three surveys per period in at least two survey periods shall be completed immediately prior to the start of project construction. All nest sites shall be recorded, mapped using GIS and provided to the CPM and CDFG. Compensatory mitigation at a 2:1 ratio shall be required for permanent impacts. If active Swainson's hawk nests (i.e., any nest active within five years) are not detected within 5 miles of the project site or linear facilities, the project owner will not be required to provide compensatory mitigation.

If the project owner assumes presence, the project owner shall provide compensatory mitigation acreage for 610 acres of Swainson's hawk habitat lands, adjusted to reflect the final project footprint, as specified in this condition. In addition, the project owner shall provide funding for initial improvement and long-term maintenance, enhancement, and management of

the acquired lands for protection and enhancement Swainson's hawk populations, and comply with other related requirements of this condition.

a. Loss of foraging habitat for Swainson's hawks shall be mitigated by providing Habitat Management (HM) lands at a ratio of 2:1 for any foraging habitat impacted within a 5-mile radius of active Swainson's hawk nest(s) (CDFG considers a nest active if it was used one or more times within the last 5 years). Foraging habitat includes but is not limited to alfalfa; fallow fields; beet, tomato, onions, and other low-growing row or field crops; dry-land and irrigated pasture; and cereal grain crops (including corn after harvest). Joshua tree woodland shall be considered foraging habitat in the Antelope Valley.

b. Lands which are currently in urban use or lands that have no existing or potential value for foraging Swainson's hawks will not require mitigation. The project owner will provide the CPM and CDFG a report of potential foraging lands impacted by the proposed project as determined by consultation with the CDFG and recent site-specific surveys conducted by a CDFG-qualified raptor biologist.

This acreage was calculated as follows: a ratio of 2:1 for the PHPP power plant site (610 acres) and a 2:1 ratio (10.22 acres) for the loss of agricultural lands associated with Segment 1 of the transmission line. Costs of these requirements are estimated to be $9,000,550.00 (see **Biological Resources Tables 4a** for a complete breakdown of costs and acreage). All costs are best estimates as of fall 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation based on changing land costs or management fees. Regardless of the estimates, the project owner is responsible for providing adequate funding to implement the required mitigation.

These impact acreages shall be adjusted to reflect the final project footprint. For purposes of this condition, the Project footprint means all lands disturbed in the construction and operation of the Palmdale Hybrid Power Plant Project Site and 10.22 acres of agricultural lands that occur on Segment 1.

This compensation acreage may be included ("nested") within the acreage acquired and managed as Mohave ground squirrel habitat compensation (Condition of Certification **BIO-20**) only if:

- A minimum of 610 acres of habitat including a minimum of 366.3 acres of Joshua tree woodland, 233.1 acres of Mojave creosote bush scrub and 10 acres of agricultural lands are present.
- The Mohave ground squirrel habitat compensation lands are acquired and dedicated as permanent conservation lands within 18 months of the start of project construction.

If these two criteria are not met, then the project owner shall provide the required number of acres of Swainson's hawk habitat compensation lands, adjusted to reflect the final project footprint and additional delineation of

suitable habitat, independent of any compensation land required under other conditions of certification, and shall also provide funding for the initial improvement and long-term maintenance and management of the acquired lands, and shall comply with other related requirements this condition.

The project owner shall provide financial assurances as described below in the amount of $9,000,550.00. In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by depositing funds into a Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described below. If the Project owner elects to establish a REAT NFWF Account and have NFWF and the agencies complete the required habitat compensation, then the total estimated cost of complying with this condition is $9,252,876.50. The amount of security or NFWF deposit shall be adjusted up or down to reflect any revised cost estimates recommended by REAT.

The actual costs to comply with this condition will vary depending on the final footprint of the project, the costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a Property Analysis Report or similar analysis (below). The 610 acre habitat requirement, and associated funding requirements based on that acreage, shall be adjusted up or down if there are changes in the final footprint of the project or the associated costs of evaluation, acquisition, management, and other factors listed in **Biological Resources Tables 4a**. Regardless of actual cost, the project owner shall be responsible for funding all requirements of this condition.

COMPENSATORY MITIGATION LAND ACQUISITION

1. Method of Acquisition. Compensation lands shall be acquired by either of the two options listed below. Regardless of the method of acquisition, the transaction shall be complete only upon completion of all terms and conditions described in this Condition of Certification.

    a. The project owner shall acquire lands and transfer title and/or conservation easement to a state or federal land management agency or to a third-party non-profit land management organization, as approved by the CPM in consultation with CDFG; or

    b. The Project owner shall deposit funds into a project-specific subaccount within the REAT Account established with the NFWF, in the amount as indicated in **Biological Resources Tables 4a** (adjusted to reflect final project footprint and any applicable REAT adjustments to costs).

2. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition to meet Energy Commission and CESA requirements shall be equal to or better than the quality and function of the habitat impacted and:

   a. Be within the Western Mojave Desert;

   b. Provide moderate to good quality foraging habitat for Swainson's hawk with capacity to improve in quality and value for this species; and

   c. Be near lands for which there is reasonable evidence (for example, recent (<15 years) CNDDB occurrences on or immediately adjacent to the proposed lands) suggesting current occupation by Swainson's hawk ideally with populations that are stable, recovering, or likely to recover.

   d. be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;

   e. not have a history of intensive recreational use or other disturbance that might cause future erosional damage or other habitat damage, and make habitat recovery and restoration infeasible;

   f. not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration; and

   g. not contain hazardous wastes that cannot be removed to the extent that the site could not provide suitable habitat; and

   h. have water and mineral rights included as part of the acquisition, unless the CPM, in consultation with CDFG, agrees in writing to the acceptability of land without these rights.

3. Review and Approval of Compensation Lands Prior to Acquisition. The project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for Swainson's hawk in relation to the criteria listed above and must be approved by the CPM. The CPM will share the proposal with and consult with CDFG before deciding whether to approve or disapprove the proposed acquisition.

4. Compensation Lands Acquisition Conditions: The project owner shall comply with the following conditions relating to acquisition of the compensation lands after the CPM, in consultation with CDFG approved the proposed compensation lands:

   a. Preliminary Report: The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM, in consultation with CDFG. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

   b. Title/Conveyance: The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM in consultation with CDFG. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to other public agency approved by the CPM in consultation with CDFG. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM, in consultation with CDFG, of the terms of any transfer of fee title or conservation easement to the compensation lands.

   c. Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM, in consultation with CDFG, before it can be used to establish funding levels or management activities for the compensation lands.

   5. Compensation Lands Acquisition Costs: The Project owner shall pay all other costs related to acquisition of compensation lands and conservation easements. In addition to actual land costs, these acquisition costs shall

include but shall not be limited to the items listed below. Management costs including site cleanup measures are described separately, in the following section.

a. Level 1 Environmental Site Assessment;

b. Appraisal;

c. Title and document review costs;

d. Expenses incurred from other state, federal, or local agency reviews;

e. Closing and escrow costs;

f. Overhead costs related to providing compensation lands to CDFG or an approved third party;

g. Biological survey(s) to determine mitigation value of the land; and

h. Agency costs to accept the land (e.g., writing and recording of conservation easements; title transfer).

COMPENSATORY MITIGATION LAND IMPROVEMENT

1. Land Improvement Requirements: The Project owner shall fund activities that the CPM, in consultation with the CDFG, requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include surveys of boundaries and property lines, installation of signs, trash removal and other site cleanup measures, construction and repair of fences, invasive plant removal, removal of roads, and similar measures to protect habitat and improve habitat quality on the compensation lands.

   The costs of these activities are estimated at $250 an acre, but will vary depending on the measures that are required for the compensation lands. A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

COMPENSATORY MITIGATION LAND LONG-TERM MANAGEMENT

1. Long-term Management Requirements: Long-term management is required to ensure that the compensation lands are managed and maintained to protect and enhance habitat for desert tortoise. Management activities may include maintenance of signs, fences, removal

of invasive weeds, monitoring, security and enforcement, and control or elimination of unauthorized use.

2. Long-term Management Plan. The project owner shall pay for the preparation of a Management Plan for the compensation lands. The Management Plan shall reflect site-specific enhancement measures on the acquired compensation lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG.

3. Long-Term Maintenance and Management Funding. The Project owner shall provide money to establish an account with a non-wasting capital that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. The amount of required funding is initially estimated to be $1,450 for every acre of compensation lands. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the Project owner shall provide initial payment of $854,500.00 calculated at $1,450 an acre for each compensation acre, as shown in **Biological Resources Tables 4a** (above) into an account for long-term maintenance and management of compensation lands. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project footprint as described above. If an initial payment is made based on the estimated per-acre costs, the project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $1,450 an acre will be required for long-term maintenance and management, the excess paid will be returned to the Project owner.

   The project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with the project owner and CDFG before deciding whether to approve an entity to hold the project's long-term maintenance and management funds on any lands. The CPM, in consultation with the project owner and CDFG, may designate another state agency or non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity.

   If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity such as NFWF to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following conditions:

i. Interest. Interest generated from the initial capital shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by CDFG designed to protect or improve the habitat values of the compensation lands.

ii. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFG designates NFWF or another entity to manage the long-term maintenance and management fee for CDFG.

iii. Pooling Funds. A CPM- approved non-profit organization qualified to hold long-term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the fund with other funds for the operation, management, and protection of the compensation lands for local populations of desert tortoise. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CDFG and CPM.

iv. Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State or State-approved federal agency reviews; and overhead related to providing compensation lands.

COMPENSATORY MITIGATION LAND SECURITY

1. Compensation Mitigation Security: The project owner shall provide security sufficient for funding acquisition, improvement, and long-term management of Swainson's hawk compensation land. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security.

   The security amount shall be based on the estimates provided in **Biological Resources Tables 4a.** This amount shall be updated and

verified prior to payment and shall be adjusted to reflect actual costs or more current estimates as agreed upon by the REAT agencies.

The Project owner shall provide verification that financial assurances have been established to the CPM with copies of the document(s) to CDFG, to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing activities described in Section A of this condition.

In the event that the project owner defaults on the Security, the CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition. Any amount of the Security that is not used to carry out mitigation shall be returned to the Project owner upon successful completion of the associated requirements in this condition.

Security for the requirements of this condition shall be provided in the amount of $9,252,876.50 if the project owner elects to use the REAT Account with NFWF pursuant to paragraph 4 of this condition, below). The Security is calculated in part from the items that follow but adjusted as specified below (consult **Biological Resources Tables 4a** for the complete breakdown of estimated costs). However, regardless of the amount of the security or actual cost of implementation, the project owner shall be responsible for implementing all aspects of this condition.

i. land acquisition costs for compensation land, calculated at $10,000/acre;

ii. Site assessments, appraisals, biological surveys, transaction closing and escrow costs, calculated as $18,000 total per parcel (presuming 60 acres per parcel)

iii. Initial site clean-up, restoration, or enhancement, calculated at $250/acre;

iv. Third-party and agency administrative transaction costs and overhead, calculated as percentages of land cost;

v. Long-term management and maintenance fund, calculated at $1,450 per acre;

vi. NFWF fees to establish a project-specific account; manage the sub-account for acquisition and initial site work; and manage the sub-account for long term management and maintenance.

2. The project owner may elect to comply with some or all of the requirements in this condition by providing funds to implement the requirements into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the

REAT Account in an amount equal to the estimated costs of implementing the requirement (as set forth in the Security section of this condition, paragraph 3, above). If the actual cost of the acquisition, initial protection and habitat improvements, long-term funding or other cost is more than the estimated amount initially paid by the project owner, the project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, the long-term funding requirements as established in an approved PAR or PAR-like analysis, or the other actual costs that are estimated in the table. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the project owner.

4. The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the project.

5. The project owner may request the CPM to provide it with all available information about any funds held by the Energy Commission, CDFG or NFWF as project security, or funds held in a NFWF sub-account for this project, or other project-specific account held by a third party. The CPM shall also fully cooperate with any independent audit that the project owner may choose to perform on any of these funds.

Verification: The project owner shall provide the CPM with either the results of the nesting surveys or written verification that the project owner shall assume presence no less than 60 days prior to ground disturbance or site mobilization. on the project site.

If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner shall provide verification to the CPM and CDFG that an approved Security has been established in accordance with this condition of certification no later than 30 days prior to beginning Project ground-disturbing activities. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security. The project owner, or an approved third party, shall complete and provide written verification to the CPM and CDFG of the compensation lands acquisition and transfer within 18 months of the start of Project ground-disturbing activities.

No later than 12 months after the start of any ground-disturbing project activities, the project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase, and shall obtain approval from the CPM, in consultation with CDFG prior to the acquisition. If NFWF or another approved third party is handling

the acquisition, the project owner shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM and CDFG of such completion, no later than 18 months after the issuance of the Energy Commission Decision.

The project owner shall complete and submit to the CPM a PAR or PAR-like analysis no later than 60 days after the CPM approves compensation lands for acquisition associated with any phase of construction. The project owner shall fully fund the required amount for long-term maintenance and management of the compensation lands for that phase of construction no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. Written verification shall be provided to the CPM and CDFG to confirm payment of the long-term maintenance and management funds.

No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands for any phase of construction, the project owner shall make funding available for those activities and provide written verification to the CPM of what funds are available and how costs will be paid. Initial protection and habitat improvement activities on the compensation lands for that phase of construction shall be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands.

The project owner, or an approved third party, shall provide the CPM and CDFG with a management plan for the compensation lands associated with any phase of construction within 180 days of the land or easement purchase, as determined by the date on the title. The CPM, in consultation with CDFG shall approve the management plan after its content is acceptable to the CPM.

Within 90 days after completion of all project related ground disturbance, the project owner shall provide to the CPM and CDFG an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction. If this analysis shows that more lands were disturbed than was anticipated in this condition, the project owner shall provide the Energy Commission with additional compensation lands and funding commensurate with the added impacts and applicable mitigation ratios set forth in this condition. A final analysis of all project related ground disturbance may not result in a reduction of compensation requirements if the deadlines established under this condition for transfer of compensation lands and funding have passed prior to completion of the analysis.

BURROWING OWL IMPACT AVOIDANCE, MINIMIZATION, AND COMPENSATION MEASURES

BIO-18 The project owner shall implement the following measures to avoid and offset impacts to burrowing owls:

1. Pre-Construction Surveys. Concurrent with desert tortoise clearance surveys the Designated Biologist shall conduct pre-construction surveys for burrowing owls within the project site and along all linear facilities in

accordance with CDFG guidelines (CBOC 1993). Pre-construction surveys for burrowing owls shall occur no more than 30 days prior to initiation of ground disturbance or site mobilization activities. The survey area shall include the Project Disturbance Area and surrounding 500 foot survey buffer where access is legally available.

2. Implement Avoidance Measures. If an active burrowing owl burrow is detected within 500 feet from the Project Disturbance Area the following avoidance and minimization measures shall be implemented:

   a. Establish Non-Disturbance Buffer. Fencing shall be installed at a 250-foot radius from the occupied burrow to create a non-disturbance buffer around the burrow. The non-disturbance buffer and fence line may be reduced to 160 feet if all Project-related activities that might disturb burrowing owls would be conducted during the non-breeding season (September 1st through January 31st). Signs shall be posted in English and Spanish at the fence line indicating no entry or disturbance is permitted within the fenced buffer.

   b. Monitoring: If construction activities would occur within 500 feet of the occupied burrow during the nesting season (February 1 – August 31st) the Designated Biologist or Biological Monitor shall monitor to determine if these activities have potential to adversely affect nesting efforts, and shall implement measures to minimize or avoid such disturbance.

3. Passive Relocation of Burrowing Owls. If pre-construction surveys indicate the presence of burrowing owls within the Project Disturbance Area (the Project Disturbance Area means all lands disturbed in the construction and operation of the PHPP Project), the Project owner shall prepare and implement a Burrowing Owl Relocation and Mitigation Plan, in addition to the avoidance measures described above. The final Burrowing Owl Relocation and Mitigation Plan shall be approved by the CPM, in consultation with USFWS and CDFG, and shall:

   a. Identify and describe suitable relocation sites within 1 mile of the Project Disturbance Area, and describe measures to ensure that burrow installation or improvements would not affect sensitive species habitat or existing burrowing owl colonies in the relocation area;

   b. Provide guidelines for creation or enhancement of at least two natural or artificial burrows per relocated owl, including a discussion of timing of burrow improvements, specific location of burrow installation, and burrow design. Design of the artificial burrows shall be consistent with CDFG guidelines (CDFG 1995) and shall be approved by the CPM in consultation with CDFG and USFWS;

   c. Passive relocation sites shall be in areas of suitable habitat for burrowing owl nesting, and be characterized by minimal human disturbance and access. Relative cover of non-native plants within the

proposed relocation sites shall not exceed the relative cover of non-native plants in the adjacent habitats;

d. Provide detailed methods and guidance for passive relocation of burrowing owls occurring within the Project Disturbance Area; and

4. Acquire Compensatory Mitigation Lands for Burrowing Owls. The following measures for compensatory mitigation shall apply only if burrowing owls are detected within the Project Disturbance Area. The Project owner shall acquire, in fee or in easement, 19.5 acres of land for each burrowing owl that is displaced by construction of the Project. This compensation acreage of 19.5 acres per single bird or pair of nesting owls assumes that there is no evidence that the compensation lands are occupied by burrowing owls. If burrowing owls are observed to occupy the compensation lands, then only 9.75 acres per single bird or pair is required, per CDFG (1995) guidelines. If the compensation lands are contiguous to currently occupied habitat, then the replacement ratio will be 13.0 acres per pair or single bird. The Project owner shall provide funding for the enhancement and long-term management of these compensation lands. The acquisition and management of the compensation lands may be delegated by written agreement to CDFG or to a third party, such as a non-governmental organization dedicated to habitat conservation, subject to approval by the CPM, in consultation with CDFG and USFWS prior to land acquisition or management activities. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat. In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by depositing funds into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described in Section 3.i. of Condition of Certification **BIO-20**.

   a. Criteria for Burrowing Owl Mitigation Lands. The terms and conditions of this acquisition or easement shall be as described in Paragraph 1 of **BIO-20** [Mohave ground squirrel Compensatory Mitigation], with the additional criteria to include: 1) the mitigation land must provide suitable habitat for burrowing owls, and 2) the acquisition lands must either currently support burrowing owls or be within dispersal distance from an active burrowing owl nesting territory (generally approximately 5 miles). The burrowing owl mitigation lands may be included with the Mohave ground squirrel mitigation lands ONLY if these two burrowing owl criteria are met. If the burrowing owl mitigation land is separate from the acquisition required for Mohave ground squirrel compensation lands, the Project owner shall fulfill the requirements described below in this condition.

   b. Security. If burrowing owl mitigation land is separate from the acreage required for Mohave ground squirrel compensation lands the Project owner or an approved third party shall complete acquisition of the proposed compensation lands prior to initiating ground-disturbing Project activities. Alternatively, financial assurance can be provided by

the Project owner to the CPM with copies of the document(s) to CDFG and the USFWS, to guarantee that an adequate level of funding is available to implement the mitigation measure described in this condition. These funds shall be used solely for implementation of the measures associated with the Project. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") prior to initiating ground-disturbing Project activities. Prior to submittal to the CPM, the Security shall be approved by the CPM, in consultation with CDFG and the USFWS to ensure funding. The estimated costs of enhancement and endowment (see subsection, Mohave ground squirrel, for a discussion of the assumptions used in calculating the Security, which are based on an estimate of $15,169 per acre to fund acquisition, enhancement, and long-term management). The final amount due will be determined by the PAR analysis conducted pursuant to **BIO-17**.

Verification: If pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities, the Designated Biologist shall provide to the CPM, CDFG and USFWS documentation indicating that non-disturbance buffer fencing has been installed at least 10 days prior to the start of any construction-related ground disturbance activities. The Project owner shall report monthly to the CPM, CDFG, and USFWS for the duration of construction on the implementation of burrowing owl avoidance and minimization measures. Within 30 days after completion of construction the Project owner shall provide to the CPM, CDFG and USFWS a written construction termination report identifying how mitigation measures described in the plan have been completed.

If pre-construction surveys detect burrowing owls within the Project Disturbance Area, the Project owner shall notify the CPM, CDFG and USFWS no less than 10 days of completing the surveys that a relocation of owls is necessary. The Project owner shall do all of the following if relocation of one or more burrowing owls is required:

a. Within 30 days of completion of the burrowing owl pre-construction surveys, submit to the CPM, CDFG and USFWS a Burrowing Owl Relocation and Mitigation Plan.

b. No less than 90 days prior to acquisition of the burrowing owl compensation lands, the Project owner, or an approved third party, shall submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the parcel intended for purchase. At the same time the Project owner shall submit a PAR or PAR-like analysis for the parcels for review and approval by the CPM, CDFG and USFWS.

c. Within 90 days of the land or easement purchase, as determined by the date on the title, the Project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG and USFWS, for the compensation lands and associated fund

d. No later than 30 days prior to the start of construction-related ground disturbing activities, the Project owner shall provide written verification of Security in accordance with this condition of certification.

e. No later than 18 months after the start of construction-related ground disturbance activities, the Project owner shall provide written verification to the CPM, CDFG and USFWS that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient.

f. On January 31st of each year following construction for a period of five years, the Designated Biologist shall provide a report to the CPM, USFWS, and CDFG that describes the results of monitoring and management of the burrowing owl relocation area. The annual report shall provide an assessment of the status of the relocation area with respect to burrow function and weed infestation, and shall include recommendations for actions the following year for maintaining the burrows as functional burrowing owl nesting sites and minimizing the occurrence of weeds.

MOHAVE GROUND SQUIRREL CLEARANCE SURVEYS

BIO-19 The project owner shall undertake appropriate measures to manage construction at the plant site and linear facilities in a manner to avoid or minimize impacts to Mohave ground squirrel. These measures include, but are not limited to, the following:

1. Clearance Survey. After the installation of the desert tortoise exclusion fence and prior to any ground disturbance, the Designated Biologist(s) shall examine the area to be disturbed for Mohave ground squirrels and their burrows. The survey shall provide 100% coverage of the project limits. Potentially occupied burrows as determined by a permitted MGS biologist authorized by the CDFG shall be fully excavated by hand by the Designated Biologist(s).

2. Translocation Plan. The project owner shall develop and implement a Mohave Ground Squirrel Translocation Plan to address the handling and disposition of any Mohave ground squirrels encountered during the clearance surveys. The Translocation Plan shall be approved by Energy Commission staff in consultation with CDFG. The Translocation Plan shall designate a translocation site as close as possible to the project, and which provides suitable conditions for long-term survival of the relocated Mohave ground squirrel. The plan shall include but not be limited to the following components.

   a. identify the appropriate time when translocation may occur

   b. the methods of capture, handling, and safe transfer

   c. methods of health assessment

   d. identify the proposed translocation site

   e. identify monitoring and post translocation survivorship

   f. identify remedial actions, and

   g. reporting procedures to document translocation success.

3. Records of Capture. If Mohave ground squirrels are captured via trapping or burrow excavation, the Designated Biologist shall maintain a record of each Mohave ground squirrel handled, including: a) the locations (Global Positioning System [GPS] coordinates and maps) and time of capture and/or observation as well as release; b) sex; c) approximate age (adult/juvenile); d) weight; e) general condition and health, noting all visible conditions including gait and behavior, diarrhea, emaciation, salivation, hair loss, ectoparasites, and injuries; and f) ambient temperature when handled and released. Any Mohave ground squirrels observed within the project area or adjacent habitat shall be reported to the CDFG and CPM by written and electronic correspondence within 24-hours.

Verification: No less than 60 days prior to any site mobilization the project owner shall provide the CPM and CDFG a draft Mohave Ground Squirrel Translocation Plan. At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide the CPM with the final version of a Mohave Ground Squirrel Translocation Plan that has been approved by Energy Commission staff in consultation with CDFG. The CPM will determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved Translocation Plan must be made only after approval of the Energy Commission staff in consultation with CDFG. The project owner shall notify the CPM no fewer than 5 working days before implementing any CPM-approved modifications to the Translocation Plan.

Within 30 days of completion of Mohave ground squirrel clearance surveys the Designated Biologist shall submit a report to the CPM and CDFG describing how mitigation measures described above have been satisfied. The report shall include the Mohave ground squirrel survey results, capture and release locations of any relocated squirrels, and any other information needed to demonstrate compliance with the measures described above.

Within 30 days after initiation of translocation activities, the Designated Biologist shall provide to the CPM for review and approval, a written report identifying which items of the Translocation Plan have been completed, and a summary of all modifications to measures made during implementation.

MOHAVE GROUND SQUIRREL HABITAT COMPENSATORY MITIGATION

BIO-20 The project owner shall provide compensatory mitigation acreage of 665 acres of Mohave ground squirrel habitat lands, adjusted to reflect the final project footprint, as specified in this condition. In addition, the project owner shall provide funding for initial improvement and long-term maintenance, enhancement, and management of the acquired lands for protection and enhancement Mohave ground squirrel populations, and comply with other related requirements of this condition.

This mitigation ratio is based on a 2:1 ratio for the power plant site and a 3:1 ratio for the transmission line route. Costs of these requirements are estimated to be $9,812,075.00 (see **Biological Resources Table 4b** for a

complete breakdown of costs and acreage). All costs are best estimates as of fall 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation based on changing land costs or management fees. Regardless of the estimates, the project owner is responsible for providing adequate funding to implement the required mitigation.

In lieu of acquiring lands itself, the project owner may satisfy the requirements of this condition by depositing funds into a Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described below. If the Project owner elects to establish a REAT NFWF Account and have NFWF and the agencies complete the required habitat compensation, then the total estimated cost of complying with this condition is $10,141,152.00. The amount of security or NFWF deposit shall be adjusted up or down to reflect any revised cost estimates recommended by REAT.

The actual costs to comply with this condition will vary depending on the final footprint of the project, the costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a Property Analysis Report or similar analysis (below). The 665 acre habitat requirement, and associated funding requirements based on that acreage, shall be adjusted up or down if there are changes in the final footprint of the project or the associated costs of evaluation, acquisition, management, and other factors listed in **Biological Resources Table 4b**. Regardless of actual cost, the project owner shall be responsible for funding all requirements of this condition.

COMPENSATORY MITIGATION LAND ACQUISITION

1. Method of Acquisition. Compensation lands shall be acquired by either of the two options listed below. Regardless of the method of acquisition, the transaction shall be complete only upon completion of all terms and conditions described in this Condition of Certification.

   a The project owner shall acquire lands and transfer title and/or conservation easement to a state or federal land management agency or to a third-party non-profit land management organization, as approved by the CPM in consultation with CDFG; or

   b. The project owner shall deposit funds into a project-specific subaccount within the REAT Account established with the NFWF, in the amount as indicated in **Biological Resources Table 4b** (adjusted to reflect final project footprint and any applicable REAT adjustments to costs).

2. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition shall:

   a. Be in the western Mojave Desert;

b. Provide moderate to good quality habitat for Mohave ground squirrel with capacity to improve in quality and value for this species;

c. Be a contiguous block of land (preferably) or located so they result in a contiguous block of protected habitat;

d. Be adjacent to larger blocks of lands that are already protected, or be in a location approved by the CDFG, such that there is connectivity between the acquired lands and the protected lands;

e. Be connected to lands for which there is reasonable evidence (for example, recent [<15 years] CNDDB occurrences on or immediately adjacent to the proposed lands) suggesting current occupation by Mohave ground squirrel, ideally with populations that are stable, recovering, or likely to recover;

f. Not have a history of intensive recreational use, grazing, or other disturbance that might make habitat recovery and restoration infeasible;

g. Not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration; and

h. Not be encumbered by easements or uses that would preclude fencing of the site or preclude or unacceptably constrain management of the site for the primary benefit of the species and their habitat for which mitigation lands were secured.

3. Review and Approval of Compensation Lands Prior to Acquisition. The project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for Mohave ground squirrel in relation to the criteria listed above and must be approved by the CPM. The CPM will share the proposal with and consult with CDFG before deciding whether to approve or disapprove the proposed acquisition.

4. Compensation Lands Acquisition Conditions: The project owner shall comply with the following conditions relating to acquisition of the compensation lands after the CPM, in consultation with CDFG approved the proposed compensation lands:

   a. Preliminary Report: The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM, in consultation with CDFG. For conveyances to the State, approval may

also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

b. Title/Conveyance: The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM in consultation with CDFG. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to other public agency approved by the CPM in consultation with CDFG. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM, in consultation with CDFG, of the terms of any transfer of fee title or conservation easement to the compensation lands.

c. Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM, in consultation with CDFG, before it can be used to establish funding levels or management activities for the compensation lands.

5. Compensation Lands Acquisition Costs: The Project owner shall pay all other costs related to acquisition of compensation lands and conservation easements. In addition to actual land costs, these acquisition costs shall include but shall not be limited to the items listed below. Management costs including site cleanup measures are described separately, in the following section.

a. Level 1 Environmental Site Assessment;

b. Appraisal;

c. Title and document review costs;

d. Expenses incurred from other state, federal, or local agency reviews;

e. Closing and escrow costs;

f. Overhead costs related to providing compensation lands to CDFG or an approved third party;

g. Biological survey(s) to determine mitigation value of the land; and

h. Agency costs to accept the land (e.g., writing and recording of conservation easements; title transfer).

COMPENSATORY MITIGATION LAND IMPROVEMENT

1. Land Improvement Requirements: The Project owner shall fund activities that the CPM, in consultation with the CDFG requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include surveys of boundaries and property lines, installation of signs, trash removal and other site cleanup measures, construction and repair of fences, invasive plant removal, removal of roads, and similar measures to protect habitat and improve habitat quality on the compensation lands.

   The costs of these activities are estimated at $250 an acre, but will vary depending on the measures that are required for the compensation lands. A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

COMPENSATORY MITIGATION LAND LONG-TERM MANAGEMENT

1. Long-term Management Requirements: Long-term management is required to ensure that the compensation lands are managed and maintained to protect and enhance habitat for desert tortoise. Management activities may include maintenance of signs, fences, removal of invasive weeds, monitoring, security and enforcement, and control or elimination of unauthorized use.

2. Long-term Management Plan. The project owner shall pay for the preparation of a Management Plan for the compensation lands. The Management Plan shall reflect site-specific enhancement measures on the acquired compensation lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG.

3. Long-Term Maintenance and Management Funding. The Project owner shall provide money to establish an account with a non-wasting capital that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. The amount of required funding is initially estimated to be $1,450 for every acre of compensation lands. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time

period specified for this payment (see the verification section at the end of this condition), the Project owner shall provide initial payment of $9,642,250.00calculated at $1,450 an acre for each compensation acre, as shown in **Biological Resources Table 4b** (above) into an account for long-term maintenance and management of compensation lands. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project footprint as described above. If an initial payment is made based on the estimated per-acre costs, the project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $1,450 an acre will be required for long-term maintenance and management, the excess paid will be returned to the Project owner.

The project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with the project owner and CDFG before deciding whether to approve an entity to hold the project's long-term maintenance and management funds on any lands. The CPM, in consultation with the project owner and CDFG, may designate another state agency or non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity.

If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity such as NFWF to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following conditions:

i. Interest. Interest generated from the initial capital shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by CDFG designed to protect or improve the habitat values of the compensation lands.

ii. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely

for the purpose to manage lands in perpetuity unless CDFG designates NFWF or another entity to manage the long-term maintenance and management fee for CDFG.

iii. Pooling Funds. A CPM- approved non-profit organization qualified to hold long-term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the fund with other funds for the operation, management, and protection of the compensation lands for local populations of desert tortoise. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CDFG and CPM.

iv. Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State or State-approved federal agency reviews; and overhead related to providing compensation lands.

COMPENSATORY MITIGATION LAND SECURITY

1. Compensation Mitigation Security: The project owner shall provide security sufficient for funding acquisition, improvement, and long-term management of desert tortoise compensation land. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security.

   The security amount shall be based on the estimates provided in **Biological Resources Table 4b.** This amount shall be updated and verified prior to payment and shall be adjusted to reflect actual costs or more current estimates as agreed upon by the REAT agencies.

   The Project owner shall provide verification that financial assurances have been established to the CPM with copies of the document(s) to CDFG, to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing activities described in Section A of this condition.

   In the event that the project owner defaults on the Security, the CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition. Any amount of the Security that is not used to carry out mitigation shall be returned to the Project owner upon successful completion of the associated requirements in this condition.

   Security for the requirements of this condition shall be provided in the amount of $10,141,152.00 if the project owner elects to use the REAT

Account with NFWF pursuant to paragraph 4 of this condition, below). The Security is calculated in part from the items that follow but adjusted as specified below (consult **Biological Resources Table 4b** for the complete breakdown of estimated costs). However, regardless of the amount of the security or actual cost of implementation, the project owner shall be responsible for implementing all aspects of this condition.

i. land acquisition costs for compensation land, calculated at $10,000/acre;

ii. Site assessments, appraisals, biological surveys, transaction closing and escrow costs, calculated as $18,000 total per parcel (presuming 60 acres per parcel)

iii. Initial site clean-up, restoration, or enhancement, calculated at $250/acre;

iv. Third-party and agency administrative transaction costs and overhead, calculated as percentages of land cost;

v. Long-term management and maintenance fund, calculated at $1,450 per acre;

vi. NFWF fees to establish a project-specific account; manage the sub-account for acquisition and initial site work; and manage the sub-account for long term management and maintenance.

2. The project owner may elect to comply with some or all of the requirements in this condition by providing funds to implement the requirements into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs of implementing the requirement (as set forth in the Security section of this condition, paragraph 3, above). If the actual cost of the acquisition, initial protection and habitat improvements, long-term funding or other cost is more than the estimated amount initially paid by the project owner, the project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, the long-term funding requirements as established in an approved PAR or PAR-like analysis, or the other actual costs that are estimated in the table. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the project owner.

3. The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG prior to land acquisition,

enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the start of project related ground disturbance.

4. The project owner may request the CPM to provide it with all available information about any funds held by the Energy Commission, CDFG or NFWF as project security, or funds held in a NFWF sub-account for this project, or other project-specific account held by a third party. The CPM shall also fully cooperate with any independent audit that the project owner may choose to perform on any of these funds.

Verification: The project owner shall provide the CPM with written notice of intent to start ground disturbance at least 30 days prior to the start of ground-disturbing activities on the project site.

If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner shall provide verification to the CPM and CDFG that an approved Security has been established in accordance with this condition of certification no later than 30 days prior to beginning Project ground-disturbing activities. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security. The project owner, or an approved third party, shall complete and provide written verification to the CPM and CDFG of the compensation lands acquisition and transfer within 18 months of the start of Project ground-disturbing activities.

No later than 12 months after the start of any phase of ground-disturbing project activities, the project owner shall submit a formal acquisition proposal to the CPM describing the parcels intended for purchase, and shall obtain approval from the CPM, in consultation with CDFG prior to the acquisition. If NFWF or another approved third party is handling the acquisition, the project owner shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM and CDFG of such completion, no later than 18 months after the start of project related ground disturbance activities. If NFWF or another approved third party is being used for all or part of the acquisition, the project owner shall ensure that funds needed to accomplish the acquisition are transferred in timely manner to facilitate the planned acquisition and to ensure the land can be acquired and transferred prior to the 18-month deadline.

The project owner shall complete and submit to the CPM a PAR or PAR-like analysis no later than 60 days after the CPM approves compensation lands for acquisition associated with any phase of construction. The project owner shall fully fund the required amount for long-term maintenance and management of the compensation lands for that phase of construction no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. Written verification shall be provided to the CPM and CDFG to confirm payment of the long-term maintenance and management funds.

No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands for any phase of construction, the project owner shall make funding available for those activities and provide written verification to the CPM of what funds are available and how costs will be paid. Initial protection and habitat improvement activities on the compensation lands for that phase of construction shall be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands.

The project owner, or an approved third party, shall provide the CPM and CDFG with a management plan for the compensation lands associated with any phase of construction within180 days of the land or easement purchase, as determined by the date on the title. The CPM, in consultation with CDFG shall approve the management plan after its content is acceptable to the CPM.

Within 90 days after completion of all project related ground disturbance, the project owner shall provide to the CPM and CDFG an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction. If this analysis shows that more lands were disturbed than was anticipated in this condition, the project owner shall provide the Energy Commission with additional compensation lands and funding commensurate with the added impacts and applicable mitigation ratios set forth in this condition. A final analysis of all project related ground disturbance may not result in a reduction of compensation requirements if the deadlines established under this condition for transfer of compensation lands and funding have passed prior to completion of the analysis.

AMERICAN BADGER AND DESERT KIT FOX IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-21 Prior to ground disturbance the owner shall conduct pre-construction surveys for American badgers and desert kit fox. These surveys may be conducted concurrent with the desert tortoise surveys. Surveys shall be conducted as described below:

Biological Monitors shall perform pre-construction surveys for badger and kit fox dens in the project area, including areas within 250 feet of all project facilities, utility corridors, and access roads. If dens are detected, each den shall be classified as inactive, potentially active, or definitely active.

Inactive dens that would be directly impacted by construction activities shall be excavated by hand and backfilled to prevent reuse by badgers or kit fox. Potentially active dens that would be directly impacted by construction activities shall be monitored by the Biological Monitor for three consecutive nights using a tracking medium (such as diatomaceous earth or fire clay) and/or infrared camera stations at the entrance. If no tracks are observed in the tracking medium or no photos of the target species are captured after three nights, the den shall be excavated and backfilled by hand.

If present, occupied badger dens shall be flagged and ground-disturbing activities avoided within 50 feet of the occupied den avoided. Maternity dens

shall be avoided during the pup-rearing season (15 February through 1 July) and a minimum 200-foot buffer established. Buffers may be modified with the concurrence of CDFG and CPM. Maternity dens shall be flagged for avoidance, identified on construction maps, and a biological monitor shall be present during construction.

If avoidance of a non-maternity den is not feasible, badgers shall be relocated by slowly excavating the burrow (either by hand or mechanized equipment under the direct supervision of the biologist, removing no more that 4 inches at a time) before or after the rearing season (15 February through 1 July). Any relocation of badgers shall occur only after consultation with the CDFG and CPM. A written report documenting the badger removal shall be provided to the CPM within 30 days of relocation.

Verification: The project owner shall submit a report to the CPM and CDFG within 30 days of completion of badger and kit fox surveys. The report shall describe survey methods, results, mitigation measures implemented, and the results of the mitigation.

BAT AVOIDANCE AND MINIMIZATION MEASURES

BIO-22 Prior to ground disturbance the project owner shall conduct a survey for roosting bats within 200 feet of project activities within 15 days prior to any grading of rocky outcrops or removal of trees (particularly trees 12 inches in diameter or greater at 4.5 feet above grade with loose bark or other cavities).

The project owner shall also conduct surveys for roosting bats during the maternity season (1 March to 31 July) within 300 feet of project activities. Trees and rocky outcrops shall be surveyed by a qualified bat biologist Surveys shall include a minimum of one day and one evening. The biologist shall be approved by the Designated Biologist. If active maternity roosts or hibernacula are found, the rock outcrop or tree occupied by the roost shall be avoided (i.e., not removed) by the project, if feasible. If avoidance of the maternity roost is not feasible, the bat biologist shall survey (through the use of radio telemetry or other CDFG/CPM-approved methods) for nearby alternative maternity colony sites. If the bat biologist determines in consultation with and with the approval of the CDFG, and CPM that there are alternative roost sites used by the maternity colony and young are not present, then no further action is required. However, if there are no alternative roosts sites used by the maternity colony, provision of substitute roosting bat habitat is required. If active maternity roosts are absent, but a hibernaculum (i.e., a non-maternity roost) is present, then exclusion of bats prior to demolition of roosts is required.

1. Provision of substitute roosting bat habitat. If a maternity roost will be impacted by the project, and no alternative maternity roosts are in use near the site, substitute roosting habitat for the maternity colony shall be provided on, or in close proximity to, the project site no less than three months prior to the eviction of the colony. Alternative roost sites will be constructed in accordance with the specific bats' requirements in coordination with CDFG and the CPM. Alternative roost sites must be of comparable size and proximal in location to the impacted colony. The

CDFG shall also be notified of any hibernacula or active nurseries within the construction zone.

2. Exclude bats prior to demolition of roosts. If non-breeding bat hibernacula are found in trees scheduled to be removed or in crevices in rock outcrops within the grading footprint, the individuals shall be safely evicted, under the direction of the qualified bat biologist, by opening the roosting area to allow airflow through the cavity or other means determined appropriate by the bat biologist (e.g., installation of one-way doors). In situations requiring one-way doors, a minimum of one week shall pass after doors are installed and temperatures should be sufficiently warm for bats to exit the roost. This action should allow all bats to leave during the course of one week. Roosts that need to be removed in situations where the use of one-way doors is not necessary in the judgment of the qualified bat biologist shall first be disturbed by various means at the direction of the bat biologist at dusk to allow bats to escape during the darker hours, and the roost tree shall be removed or the grading shall occur the next day (i.e., there shall be no less or more than one night between initial disturbance and the grading or tree removal).

   If an active maternity roost is located in an area to be impacted by the project, and alternative roosting habitat is available, the demolition of the roost site must commence before maternity colonies form (i.e., prior to 1 March) or after young are flying (i.e., after 31 July) using the exclusion techniques described above.

Verification: The project owner shall submit a report to the CPM and CDFG within 30 days of completion of roosting bat surveys and any subsequent mitigation. The report shall describe survey methods, results, mitigation measures implemented, and the results of the mitigation.

STREAMBED IMPACT MINIMIZATION AND COMPENSATION MEASURES

BIO-23 The project owner shall implement Best Management Practices and other measures described below to protect jurisdictional waters of the state occurring along the linear alignments. The project owner shall implement the following measures to minimize impacts to waters of the state:

1. Best Management Practices: The applicant shall comply with the following conditions:

   a. Prior to any activities that cross or have the potential to impact any jurisdictional drainage the owner shall provide a detailed map to the CDFG and CPM in a GIS format that identifies all potential crossings of jurisdictional habitats including bridges and culverts. The maps shall identify the type of crossing proposed by the owner such as bridges, culverts, or other mechanism and the best management practices that would be employed.

b. Precautions to minimize turbidity/siltation shall be taken into account during project planning and shall be installed prior to construction. Precautions may also include placement of silt fencing, weed-free straw bales, or sand bags, so that silt or other deleterious materials are not allowed to pass to downstream reaches. The method used to prevent siltation shall be monitored and cleaned/repaired weekly.

c. The project owner shall not operate vehicles or equipment in ponded or flowing water except as described in this condition. Diversion of any stream is not authorized. Bridging of Little Rock Wash is not authorized in this condition.

d. Dewatering is not authorized in this condition.

e. At the completion of construction all temporary bridges, culverts, or other structures shall be removed unless authorized by the CDFG and CPM.

f. When any activity requires moving of equipment across a flowing stream, such operations shall be conducted without substantially increasing stream turbidity. The project owner shall bridge by the use of railroad flat cars or other bridging material all ponded or flowing streams if vehicles where high flow levels occur.

g. Where drainages support sheet flow in direct response to rainfall for periods of less than 48 hours construction of bridges is not required. Vehicle use in these areas shall not result in silt/mud/turbid water from reaching downstream areas.

h. Vehicles driven across ephemeral drainages when water is present shall be completely clean of petroleum residue and water levels shall be below the vehicles axels.

i. Any equipment or vehicles driven and/or operated within or adjacent to the stream/lake shall be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life.

j. Installation of bridges, culverts, or other structures shall be such that water flow (velocity and low flow channel width) is not impaired. Bottoms of temporary culverts shall be placed at or below stream channel grade. A biological monitor shall be present during the installation of all bridges, culverts and BMPs.

k. Installation of bridges or culverts shall be done in a manner that shall prevent pollution and/or siltation and which shall provide flows to downstream reaches. Flows to downstream reaches shall be provided during all times.

l. The project owner shall not allow water containing mud, silt, or other pollutants from grading, aggregate washing, or other activities to enter a lake or flowing stream or be placed in locations that may be subjected to high storm flows.

m. If turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation, shall be halted until effective CPM approved control devices are installed, or abatement procedures are initiated.

n. The project owner shall comply with all litter and pollution laws. All contractors, subcontractors, and employees shall also obey these laws, and it shall be the responsibility of the project owner to ensure compliance.

o. If a stream's low flow channel, bed or banks/lake bed or banks have been altered, these shall be returned as nearly as possible to their original configuration and width, without creating future erosion problems. The gradient of the streambed shall be returned to pre project grade unless such operation is part of a restoration project, in which case, the change in grade must be approved by the Department prior to project commencement.

p. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, construction waste, cement or concrete or washings thereof, asphalt, paint, oil or other petroleum products or any other substances which could be hazardous to aquatic life, or other organic or earthen material from any logging, construction, or other associated project related activity shall be allowed to contaminate the soil and/or enter into or placed where it may be washed by rainfall or runoff into, waters of the State. Any of these materials, placed within or where they may enter a stream or lake, by the owner or any party working under contract, or with the permission of the owner, shall be removed immediately.

q. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.

r. Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to the stream/lake shall be positioned over drip pans. Stationary heavy equipment shall have suitable containment to handle a catastrophic spill/leak. Clean up equipment such as extra boom, absorbent pads, skimmers, shall be on site prior to the start of dredging.

s. No equipment maintenance shall be done within or near any stream channel where petroleum products or other pollutants from the equipment may enter these areas under any flow.

t. The cleanup of all spills shall begin immediately. The CDFG and CPM shall be notified immediately by the owner of any spills and shall be consulted regarding clean-up procedures.

2. Non-native Vegetation Removal. The owner shall remove any non-native vegetation (tree tobacco, castor bean, etc.) from any drainage that requires the placement of a bridge, culvert or other structure. Removal shall be done at least twice annually (Spring/Summer) during implementation of the PHPP project. The removal of riparian vegetation is not authorized under this condition. Should the removal of riparian vegetation become necessary temporary impacts will be mitigated at a ratio of 2:1 and permanent impacts will be mitigated at a ratio of 5:1.

3. Reporting of Special-Status Species: If any special-status species are observed on or in proximity to the project site, or during project surveys, the project owner shall submit California Natural Diversity Data Base (CNDDB) forms and maps to the CNDDB within five working days of the sightings and provide the regional CDFG office with copies of the CNDDB forms and survey maps. The CNDDB form is available online at: www.dfg.ca.gov/whdab/pdfs/natspec.pdf. This information shall be mailed within five days to: California Department of Fish and Game, Natural Diversity Data Base, 1807 13th Street, Suite 202, Sacramento, CA 95814, (916) 324-3812. A copy of this information shall also be mailed within five days to CDFG and the CPM.

4. Notification: The project owner shall notify the CPM and CDFG, in writing, at least five days prior to initiation of project activities in jurisdictional areas and at least five days prior to completion of project activities in jurisdictional areas. The project owner shall notify the CPM and CDFG of any change of conditions to the project, the jurisdictional impacts, or the mitigation efforts, if the conditions at the site of the proposed project change in a manner which changes risk to biological resources that may be substantially adversely affected by the proposed project. The notifying report shall be provided to the CPM and CDFG no later than seven days after the change of conditions is identified. As used here, change of condition refers to the process, procedures, and methods of operation of a project; the biological and physical characteristics of a project area; or the laws or regulations pertinent to the project, as described below. A copy of the notifying change of conditions report shall be included in the annual reports.

   a. Biological Conditions: a change in biological conditions includes, but is not limited to, the following: 1) the presence of biological resources within or adjacent to the project area, whether native or non-native, not previously known to occur in the area; or 2) the presence of biological resources within or adjacent to the project area, whether native or non-native, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

b. Physical Conditions: a change in physical conditions includes, but is not limited to, the following: 1) a change in the morphology of a river, stream, or lake, such as the lowering of a bed or scouring of a bank, or changes in stream form and configuration caused by storm events; 2) the movement of a river or stream channel to a different location; 3) a reduction of or other change in vegetation on the bed, channel, or bank of a drainage, or 4) changes to the hydrologic regime such as fluctuations in the timing or volume of water flows in a river or stream.

c. Legal Conditions: a change in legal conditions includes, but is not limited to, a change in Regulations, Statutory Law, a Judicial or Court decision, or the listing of a species, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

5. Code of Regulations: The project owner shall provide a copy of the Energy Commission Decision to all contractors, subcontractors, and the applicant's project supervisors. Copies shall be readily available at work sites at all times during periods of active work and must be presented to any CDFG personnel or personnel from another agency upon demand. The CPM reserves the right to issue a stop work order or allow CDFG to issue a stop work order after giving notice to the project owner and the CPM, if the CPM, in consultation with CDFG, determines that the project owner has breached any of the terms or conditions or for other reasons, including but not limited to the following:

   a. The information provided by the applicant regarding streambed conditions is incomplete or inaccurate;

   b. New information becomes available that was not known to it in preparing the terms and conditions;

   c. The project or project activities as described in the Final Staff Assessment have changed; or

   d. The conditions affecting biological resources changed or the CPM, in consultation with CDFG, determines that project activities will result in a substantial adverse effect on the environment.

Verification: No fewer than 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall implement the mitigation measures described above. No fewer than 30 days prior to the start of work potentially affecting waters of the state, the project owner shall provide written verification (i.e., through incorporation into the BRMIMP) to the CPM that the above best management practices will be implemented and provide a discussion of work in waters of the state in Compliance Reports for the duration of the project. Compliance Reports shall be submitted every six months.

AVIAN AND BAT PROTECTION PLAN / MONITORING BIRD AND BAT IMPACTS FROM SOLAR TECHNOLOGY

BIO-24 The project owner shall prepare and implement an Avian and Bat Protection Plan to monitor bird and bat collisions with facility features (study described below). The Project owner shall use the monitoring data to inform and develop an adaptive management program that would avoid and minimize Project-related avian and bat impacts. Project-related bird and bat deaths or injuries shall be reported to the CPM, CDFG and USFWS. The CPM, in consultation with CDFG and USFWS, shall determine if the Project-related bird or bat deaths or injuries warrant implementation of adaptive management measures contained in the Avian and Bat Protection Plan. The study design for the Avian and Bat Protection Plan shall be approved by the CPM in consultation with CDFG and USFWS, and, once approved, shall be incorporated into the project's BRMIMP and implemented. The Plan shall include adaptive management strategies that include the placement of bird flight diverters, aerial markers, or other strategies to minimize collisions with the solar arrays

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The Avian and Bat Protection Plan shall include a Bird and Bat Monitoring Study to monitor the death and injury of birds from collisions with facility features such as reflective mirror-like surfaces. The study design shall be approved by the CPM in consultation with CDFG and USFWS, and shall be incorporated into the project's BRMIMP and implemented. The Bird Monitoring Study shall be based upon prior studies by McCrary et al. (1986) or other applicable literature, and shall include detailed specifications on data and carcass collection protocol and a rationale justifying the proposed schedule of carcass searches. The study shall also include seasonal trials to assess bias from carcass removal by scavengers as well as searcher bias and proposed disposition of dead or injured birds.

Verification: No more than 60 days prior to ground disturbance the project owner shall submit to the CPM, USFWS and CDFG a final Avian and Bat Protection Plan. Modifications to the Avian Protection Plan shall be made only after approval from the CPM.

For one year following the beginning of power plant operation, the Designated Biologist shall submit quarterly reports to the CPM, CDFG, and USFWS describing the methods, dates, durations, and results of monitoring. The quarterly reports shall provide a detailed description of any project-related bird or wildlife deaths or injuries detected during the monitoring study or at any other time. Following the completion of the fourth quarter of monitoring the Designated Biologist shall prepare an Annual Report that summarizes the year's data, analyzes any project-related bird fatalities or injuries detected, and provides recommendations for future monitoring and any adaptive management actions needed. The Annual Report shall be provided to the CPM, CDFG, and USFWS. Quarterly reporting shall continue until the CPM, in consultation with CDFG and USFWS determine whether more years of monitoring are needed, and whether mitigation and adaptive management measures are necessary. After the Bird and Bat Monitoring Study is determined by the CPM to be complete, the project owner or contractor shall prepare a paper that describes the study design and monitoring results to be submitted

to the CPM, CDFG, USFWS, and a peer-reviewed scientific journal. Proof of submittal shall be provided to the CPM within one year of concluding the monitoring study.

CLOSURE PLAN MEASURES

BIO-25 The project owner shall implement and incorporate into the facility closure plan measures to address the local biological resources related to facility closure. A funding mechanism shall be developed in consultation with the Energy Commission staff to ensure sufficient funds are available for revegetation, reclamation, and decommissioning if the project site will not be re-powered or developed. The facility closure plan shall address biological resources-related mitigation measures. In addition to these measures, the plan shall include the following:

1. Removal of transmission conductors when they are no longer used and useful;

2. Removal of all above-ground and subsurface power plant site facilities and related facilities;

3. Methods for restoring wildlife habitat and promoting the re-establishment of native plant and wildlife species;

4. Revegetation of the project site and other disturbed areas utilizing appropriate methods for establishing native vegetation if the site will not be repowered or developed; and

5. A cost estimate to complete closure-related activities.

In addition, the project owner shall secure funding to ensure implementation of the plan and provide to the CPM written evidence of the dedicated funding mechanism(s).

Verification: Prior to initiating ground-disturbing project activities, the project owner shall provide financial assurances to the CPM to guarantee that an adequate level of funding will be available to implement decommissioning and closure activities described above. The financial assurances may be in the form of an irrevocable letter of credit, a performance bond, a pledged savings account, or another equivalent form of security, as approved by the CPM.

At least 12 months prior to commencement of planned closure activities, the project owner shall address all biological resources-related issues associated with facility closure, and provide final measures, in a Biological Resources Element. The draft planned permanent or unplanned closure measures shall be submitted to the CPM for comment by staff, CDFG, and USFWS. After revision, final measures shall comprise the Biological Resources Element, which shall include the items listed above as well as written evidence of the dedicated funding mechanism(s) for these measures. The final Biological Resources Element shall become part of the facility closure plan, which is submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

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 (see **Compliance** Conditions of Certification).

Upon facility closure, the project owner shall implement measures in the Biological Resources Element and provide written status updates on all closure activities to the CPM at a frequency determined by the CPM.

REFERENCES

The tn: 00000 in the references below indicates the transaction number under which the item is catalogued in the Energy Commission's Docket Unit. The transaction number allows for quicker search and retrieval of individual items docketed for a case or used for ease of reference and retrieval of exhibits cited in briefs and used at Evidentiary Hearings.

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CULTURAL RESOURCES

Testimony of Beverly E. Bastian and Pamela Daly

SUMMARY OF CONCLUSIONS

Energy Commission cultural resources staff has analyzed cultural resources data provided in the Application for Certification (AFC) and acquired from other sources to determine the consistency of the Palmdale Hybrid Power Project (PHPP), proposed by the City of Palmdale (applicant), with applicable state and local laws, ordinances, regulations, and standards (LORS). Staff has also assessed the potential for the PHPP to have significant adverse impacts on cultural resources. In addition, staff has assessed the potential for mitigation proposed by the applicant and conditions developed by staff to reduce any impacts on significant cultural resources to a less-than-significant level, and staff has also considered the feasibility and enforceability of the recommended conditions of certification.

Staff identified no known cultural resources that the construction or operation of the proposed PHPP would significantly impact. To provide appropriate treatment for cultural resources encountered during construction, however, staff recommends that the Energy Commission adopt cultural resources Conditions of Certification **CUL-1** through **CUL-8**. These measures are intended to facilitate the identification and assessment of previously unidentified archaeological resources encountered during construction and to mitigate, to the extent feasible, any significant impacts from the project on any newly found resources assessed as eligible for the California Register of Historical Resources (CRHR). To accomplish this, the conditions provide for the hiring of a Cultural Resources Specialist and archaeological monitors; for cultural resources awareness training for construction workers; for archaeological and Native American monitoring of ground-disturbing activities in specified areas; for the recovery of data from discovered archaeological deposits determined eligible for the CRHR; for the preparation of a technical archaeological report on all archaeological activities and findings; for curation of recovered artifacts and other data; and for a cultural resources survey of any borrow or disposal areas the project may need to use, and the determination of the appropriate treatment of any CRHR-eligible resources identified in that survey. When properly implemented and enforced, staff believes that these conditions of certification would reduce any potential impacts to previously unknown CRHR-eligible cultural resources encountered during construction to a less-than-significant level. Additionally, with the adoption and implementation of these conditions, the PHPP would be consistent with all applicable state and local laws, ordinances, regulations, and standards (LORS).

INTRODUCTION

This cultural resources assessment identifies the potential impacts of the PHPP on cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, and historic districts. Three kinds of cultural resources, classified by their origins, are considered in this assessment: prehistoric, ethnographic, and historic.

Prehistoric archaeological resources are associated with the human occupation and use of California prior to prolonged European contact. These resources may include sites

and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In California, the prehistoric period began over 12,000 years ago and extended through the eighteenth century until 1769, when the first Europeans settled in California.

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

Historic-period resources, both archaeological and architectural, are associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Groupings of historic-period resources are also recognized as historic districts and as historic vernacular landscapes. Under federal and state historic preservation law, cultural resources must be at least 50 years old to have sufficient historical importance to merit consideration of eligibility for listing in the CRHR. A resource less than 50 years of age must be of exceptional historical importance to be considered for listing.

For the PHPP, staff provides an overview of the environmental setting and history of the project area, an inventory of the cultural resources identified in the project vicinity, and an analysis of the project's potential impacts to historically significant cultural resources, using criteria from the California Environmental Quality Act (CEQA).

If cultural resources are identified, staff determines which are historically significant (defined as eligible for the CRHR) and whether the PHPP would have a significant impact on those that are CRHR eligible. Staff's primary concern is to ensure that all potentially CRHR-eligible cultural resources are identified, that all potential PHPP impacts to those resources are identified and assessed, and that conditions are proposed that ensure that all significant impacts to CRHR-eligible resources that cannot be avoided are mitigated to a less-than-significant level.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects licensed by the Energy Commission are reviewed to ensure their compliance with all applicable laws. For this project, in which there is no federal involvement,[1] the applicable laws are primarily state laws (see **Cultural Resources Table 1)**.

[1] In addition to provisions in state law, cultural resources in California are protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, Section 431, et seq.) and subsequent related legislation, policies, and enacting responsibilities, e.g., federal agency regulations and guidelines for implementation of the Antiquities Act.

CULTURAL RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
State	
Public Resources Code 5097.98(b) and (e)	Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until he/she confers with the Native American Heritage Commission-identified Most Likely Descendents (MLDs) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to reinter the remains elsewhere on the property in a location not subject to further disturbance.
California Health and Safety Code, Section 7050.5	Makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Local	
County of Los Angeles General Plan (Los Angeles County 2008)	• Policy C/OS 12.2: Support the preservation and rehabilitation of historic buildings. • Policy C/OS 12.3: Ensure proper notification procedures to Native American tribes in accordance with Senate Bill 18 (2004). • Policy C/OS 12.4:
City of Palmdale General Plan (City of Palmdale 1993)	GOAL ER7: Protect historical and culturally significant resources which contribute to the community's sense of history. Objective ER7.1: Promote the identification and preservation of historic structures, historic sites, archaeological sites, and paleontological resources in the City. • Policy ER7.1.1: Identify and recognize historic landmarks from Palmdale's past. • Policy ER7.1.3: Require that new development protect significant historic, paleontological, or archaeological resources, or provide for other appropriate mitigation. • Policy ER7.1.5: When human remains, suspected to be of Native American origin are discovered, cooperate with the Native American Heritage Commission and any local Native American groups to determine the most appropriate disposition of the human remains and any associated grave goods. • Policy ER7.1.8: Discourage historic landmark properties from being altered in such a manner as to significantly reduce their cultural value to the community. (General Plan Amendment 04-01, adopted by City Council April 14, 2004.)

SETTING

Information provided regarding the setting of the proposed project places it in its geographical and geological context and specifies the technical description of the project. Additionally, the prehistoric, ethnographic, and historical background provides the context for the evaluation of the CRHR eligibility of any identified cultural resources within staff's area of analysis for this project.

REGIONAL SETTING

Most of the components of the proposed PHPP are in the lower Antelope Valley, in the western Mojave Desert, within the greater Mojave Desert Geomorphic Province of California. The western part of segment 2 of the proposed PHPP transmission line is in the Transverse Ranges Province. The San Gabriel and San Bernardino Mountains border the Mojave Desert Province on the south and west, and the Tehachapi Mountains border it on the northwest. These surrounding mountains have filled the province's low, wide basins with alluvium. The Antelope Valley is bounded by two fault zones, the Garlock Fault running northeast-southwest, and the San Andreas, running southeast-northwest along the northern San Gabriel Mountain foothills (COP 2008a, vol. 1, pp. 5.5-2–5.5-3; p. 5.9-5).

The City of Palmdale shares the Antelope Valley with a number of adjacent population centers. The City of Lancaster and the unincorporated community of Quartz Hill are located to the north. The unincorporated communities of Lake Los Angeles and Littlerock are east of Palmdale. The unincorporated community of Acton is located to the south, and the unincorporated community of Leona Valley is to the west. The City of Palmdale has planning jurisdiction over approximately 174 square miles between the San Gabriel and Sierra Pelona foothills, on the south and west, and the Mojave Desert, to the north and east (COP 2008a, vol. 1, pp. 5.3-7–5.3-8).

PROJECT, SITE, AND VICINITY DESCRIPTION

The proposed PHPP site and its natural gas and water pipelines are on an alluvial plain whose sand and silt deposits are estimated to be 500 feet thick. The project site is generally flat, sloping upward to the southwest, with an elevation ranging from 2,490 to 2,555 feet (COP 2008a, vol. 1, p. 2-30) above mean sea level. Segment 1 of the transmission line is on the same plain, but the western part of segment 2 obliquely crosses the northeastern edge of the San Gabriel Mountains.

The proposed project site is located at 950 East Avenue M in the northern part of the city of Palmdale. To the west of the City-owned 333-acre project site is Sierra Highway, to the north is East Avenue M, and to the south and east is the military-industrial property known as U. S. Air Force Plant 42. The proposed plant site has been vacant undeveloped desert from at least the early 1900s to the present (ENSR/AECOM 2008, p. ii), and remains so. Most of the proposed project components are located within the city of Palmdale, but the eastern and southern parts of the transmission line and a small part of the reclaimed water pipeline are located in unincorporated Los Angeles County (COP 2008a, vol. 1, p. 5.5-3; pp. 2-1–2-4).

On the proposed plant site the project would combine a field of solar collectors with

natural-gas-fired, combined-cycle generating equipment to produce a nominal 570 megawatts (MW) of electricity. Off-site, the project would construct a transmission line, a natural gas pipeline, a reclaimed water pipeline, a potable water pipeline, and a wastewater pipeline. The solar field would require 251 acres, and the power block would require 26 acres. Detention basins, roads, and slopes and setbacks would take up 56 acres. The construction laydown area would require an additional 50 acres (AECOM 2009e, p. PD-2). The proposed equipment and temporary construction facilities include (COP 2008a, vol. 1, pp. 2-1–2-5, 2-14, 2-17, 2-22, 2-29, 2-30, fig. 2-4; L&W 2008c, p. 5.14-44; AECOM2009a, rev. table 5.16-6R, response to Data Request 82; AECOM 2009e, pp. PD-1–PD-5, rev. figs. 2-4, 2-5; AECOM 2009q, 8/27/09 Carroll e-mails):

- combustion turbine generators (2)
- heat recovery steam generators (2), with stacks 18.5 feet in diameter and 145 feet tall;
- steam turbine generator
- wet cooling tower
- operations building
- natural gas-metering station
- generator step-up transformers (3)
- auxiliary transformers (2)
- 230-kV switchyard
- water treatment building and associated tanks and piping
- infiltration basins (4)
    - one approximately oval-shaped basin at the northwest corner of the plant site, northwest of the access road where it comes off East Avenue M and tucked into the curve of the road
    - one elongated, canal-like basin along the north boundary of the plant site
    - one elongated, canal-like basin along the south boundary of the power block
    - one elongated, canal-like basin south of the W-E segment of the access road that turns south where the road hits the power block
- 251-acre field of diurnal, single-axis-tracking, parabolic-trough Solar Energy Generating System (SEGS) solar collectors (number of units unspecified)
- solar boiler
- heat transfer fluid (HTF) equipment (heater, tanks, ullage system, piping)
- 35.6-mile-long, 230-kV gen-tie transmission line, with monopoles 105–135 feet tall and 60.5–86 inches in diameter, connecting to the existing (Southern California Edison (SCE) Vincent Substation, south of Palmdale
- 8.7 mile-long, 20-inch-diameter natural gas pipeline
- 7.4-mile-long, 14-inch-diameter, reclaimed water pipeline

- 1.0-mile-long potable water pipeline
- 1.0-mile-long, 6-inch-diameter wastewater pipeline
- 50-acre temporary construction laydown area to the west of the proposed plant site;
- pulling sites (22) (WSA 2009a, p. 1), for gen-tie construction (10.6 acres); and
- staging areas (3) (WSA 2009a, p.1), for gen-tie construction (4.5 acres).

Environmental Setting

Identifying the kinds and distribution of resources necessary to sustain human life in an environment, and the changes in that environment over time, is central to understanding whether and how an area was used during prehistory and history. During the time that humans have lived in California, the region in which the proposed project is located, the western Mojave Desert, has undergone changes due to geologic processes and climatic shifts. These have resulted in landscape changes and in variable availability of vital resources. That variability has influenced the scope and scale of human use of the vicinity of the project site over time. Consequently, it is important to consider the historical character of local geologic and climatic changes on the physical development of the area and its ecology.

The western Mojave Desert is near the southern end of the Sierra Nevada mountain range, which rises just to the north and east of the project area. In the rain shadow of this range, the region at present averages less than 8 inches of rainfall a year. The mean summer temperature is above 80°F, and the average temperatures in December and January are below freezing (COP 2008a, vol. 1, p. 5.17-8). During prehistory, this region fluctuated between cool-and-moist and warm-and-arid periods of climate. During the last glacial period of the geologic epoch known as the Pleistocene (25,000–10,000 years BC), the climate was relatively cool and moist, and the Mojave region had many lakes with abundant plant and animal resources. Toward the end of the Pleistocene, the climate resembled that of today. At that time, a large but shallow perennial lake, Lake Thompson, occupied the central part of the Antelope Valley, remnants of which now are known as Lake Rosamond, Lake Rogers, and Lake Buckhorn (Orme 2008, p. 261; fig. 1). Lake Thompson began to dry up at the beginning of the next geologic epoch, the Holocene, when conditions became warmer in the valleys, with less precipitation occurring in the adjacent mountains. During the early Holocene (10,000–8,000 BC), the climate was still slightly cooler and moister than the present (Sutton 1996, p. 231). During the middle Holocene (8,000–3,000 BC), the climate became much warmer and drier. Finally, in the late Holocene (3,000 BC–present), it became moderately cooler and wetter, punctuated by episodes of drought.

Vegetation regimes, and the animals dependent on them, responded to the fluctuations in moisture in the Mojave. In the wetter periods, the valley floors and lake margins supported more plants and animals, both in kind and in number. But in the drier periods, the vegetation zones moved off the valley floors and up the slopes of the mountains. The relative abundance or scarcity of water, plants, and animals strongly influenced Native American use of the Mojave as the climatic changes cycled back and forth (COP 2008a, vol. 1, p. 5.4-7).

Based on pollen and packrat midden studies, desert vegetation replaced the late Pleistocene low-elevation woodlands between 6,000 and 10,000 BC. After 2,300 BC, modern plant and animal communities were established. The modern plant communities in the Antelope Valley consist primarily of Desert saltbush scrub, Mojave creosote bush scrub, and Joshua tree woodland (Lloyd 2007, p. 6). The saltbush scrub community occupies the lowest elevations in the project vicinity, adapted to high soil salinity and occurring near the margins of the dry lakes. The community is characterized by low-growing, grayish shrubs, with some succulent species. The creosote bush scrub community occurs on the valley floor and is composed of widely-spaced shrubs of about 2–10 feet in height, dominated by creosote bush and white bursage. The Joshua tree woodland community occurs in the higher elevations on gentle slopes. This community is dominated by Yucca spp., evergreen shrubs, semi-deciduous shrubs, semi-succulents, and succulents. These communities provided Native Americans with food (beavertail cactus, chia, mesquite, yucca) and materials (Joshua tree, yucca) and also provided habitat for animals that Native Americans hunted, such as small rodents, rabbits and hares, coyotes, skunks, kit foxes, bobcats, and mule deer (Lloyd 2007, p. 6; COP 2008a, vol. 1, p. 5.3-14–17).

Project Area Geomorphology

Over time precipitation in the San Gabriel Mountains has sculpted the landscape of the proposed project areas. Run-off has eroded the foothills, carved the canyons of Big Rock Creek, Little Rock Creek, Anaverde Creek, and Amargosa Creek, and deposited alluvium in fans spreading out from the canyon mouths to merge into a bajada that gradually slopes northeast to the beaches of Rosamond Dry Lake and Rogers Dry Lake (DeVries 2009, p. 2). Segment 2 of the project's proposed gen-tie transmission line would be located in the foothills of the San Gabriel Mountains, and the remaining project components would be located on the bajada.

Prehistoric Background

The archaeological remains of the western Mojave Desert's prehistory are relatively scarce. Isolated artifacts and sparse scatters of chipped stone tools and associated manufacturing debris—resources that typically yield information of marginal value—account for 40 to 60% of the archaeological remains found in the Mojave and Colorado Deserts. The paucity of intact buried archaeological deposits contributes further to the dearth of information on the prehistory of the region (Lyneis and Macko 1986, p. 52). The availability of water and the location of high-value resource patches in otherwise unproductive habitats appear to influence the distribution of the archaeological sites that are on the desert landscape (Lyneis and Macko 1986, p. 57; Sutton et al. 2007, p. 230). The broad trajectory of cultural development in the Mojave Desert appears to be a steady decline in residential mobility as local populations come to occupy increasingly larger valley or basin-bottom base camps, in a few preferred locations, over longer periods of time, rather than working out of temporary camps in particularly productive environmental zones (Bamforth 1990, p. 74).

Over the past seven decades, Mojave Desert archaeologists have developed and refined a broad sequence of artifact assemblages or complexes, each with distinctive types of stone projectile points, that represents the material record of the peoples who once lived in the proposed PHPP project area (Bamforth 1990, p. 72; Campbell 1936;

Lyneis 1982; Rogers 1939; Sutton et al. 2007; Warren 1984; Warren and Crabtree 1986).

Terminal Pleistocene Period (prior to 10,000 BC)

Evidence for a Paleo-Indian occupation in the western Mojave Desert appears in the form of fluted points, generally considered to represent the Clovis complex. It should be noted, however, that not every fluted point can necessarily be attributed to Clovis, and that the western Mojave Desert finds could be associated with later cultures using a similar technology. Archaeologists have found these points in the Antelope Valley's Lake Thompson drainage (a larger lake encompassing present-day Rosamond, Buckhorn, and Rogers Lakes during the wetter periods of the Pleistocene and Holocene epochs) (Sutton et al. 2007, pp. 233–234). Prehistorians believe that during this period highly mobile groups relied heavily upon resources available in and near lake environments. This pattern of subsistence and settlement has been collectively described as the Western Pluvial Lakes Tradition (WPLT) (Moratto 1984, pp. 90–103). Evidence for this pattern also occurs throughout the western Great Basin, continuing briefly into the Early Holocene.

Early Holocene (8,000–6,000 BC)

During the Early Holocene, as the climate got warmer and dryer, the Mojave region's lakes began to slowly dry up, and groups had to adapt to the changing environment. The Lake Mojave complex is the pattern characteristic of this period, marked by projectile points of the Lake Mojave and Silver Lake types (Sutton et al. 2007, p. 234). Other characteristic artifacts include bifaces, steep-edged unifaces, and crescents in quantity, with some cobble-core tools and ground stone tools also represented. Archaeological evidence indicates that Native Americans continued to exploit lake environment resources during this period, but evidence of groups obtaining resources from beyond the lake basins, such as rabbits and hares, rodents, and certain reptiles, has also been reported from sites in the vicinity of Fort Irwin (Sutton et al. 2007; Basgall 1993; Douglas et al. 1988).

Middle Holocene (6,000–2,000 BC)

The Pinto complex has become the widely accepted cultural complex for the Middle Holocene in this region. Most archaeologists accept that the Pinto complex succeeded the Lake Mojave complex, but some argue that the Lake Mojave and the Pinto complexes overlap, with the Pinto complex being introduced toward the end of the Early Holocene. Artifacts identified with this complex include stemmed, indented-base Pinto series projectile points, probably used as thrusting spears rather than darts. The numbers of ground stone tools dramatically increase during this period, with these implements appearing in almost every Pinto site that archaeologists have identified. The procurement of faunal resources appears to be much the same in the Middle Holocene as in the Early Holocene, with a slight increase in small fauna and a decrease in deer and mountain sheep. Pinto complex sites have been found in varying environmental zones, including within pluvial lake basins, in the vicinity of springs and streams, and in upland areas (Sutton et al. 2007, p. 238). The dramatic increase in ground stone implements suggests that access to plant foodstuffs was probably of high importance in the selection of habitation location. At the end of this period, ca. 3,000–2,000 BC, a

hotter, drier climate seems to have coincided with a significant decrease in the numbers of sites in the western Mojave Desert. This suggests a possible “occupational hiatus” at this time—abandonment of the region, or at least a very low population density (Sutton et al. 2007, p. 241).

Late Holocene (2,000 BC–AD 1100)

The Gypsum complex appeared during the earliest part of the Late Holocene (2,000 BC–AD 200). During this time, the climate turned wetter and cooler again. Diagnostic Gypsum complex artifacts include Elko-series corner-notched points, Humboldt-series concave base points, Gypsum-series shouldered, contracting-stemmed points, and numerous bifaces. Artifactual evidence of ritual activities also occurs—quartz crystals, paint, and rock art. The locations of Gypsum complex sites are arrayed over a more diverse topography and suggest an emphasis on exploitation of areas near streams, with deer, rabbits, and rodents being taken for food (Sutton et al. 2007, p. 241).

The Rose Spring complex followed the Gypsum complex, appearing in the period AD 200–1100, the time during which the bow and arrow was introduced in the Mojave region. The Rose Spring complex shows a drastic change in artifact assemblage, with Eastgate and Rose Spring series projectile points, drills, bone awls, stone pipes, ground stone milling implements, marine shell ornaments, and much use of one type of obsidian, indicating travel to the Coso Volcanic Field or a trade network. Rose Spring sites evidence more substantial middens, suggesting a dramatic increase in population. Hunting emphasized the taking of small game—rabbits and rodents. The Medieval Climatic Anomaly—an extended period of relative drought between AD 850 and 1350—occurred in the middle of the Rose Spring complex. Lakes again dried up, and Native American settlement patterns changed as a result, with habitation sites moving from permanent water sources—lakes—to ephemeral ones, such as springs and washes. The greater efficiency of the bow and arrow, in combination with drought, could have overstressed the game populations near the shrinking lakes and motivated this change in settlement pattern (Sutton et al. 2007, pp. 241–242).

Late Prehistoric (AD 1100–1776)

During this period, Mojave populations decreased but several new archaeological complexes appeared that probably represent the prehistoric forebears of the known ethnographic groups of the region (Sutton et al. 2007, p. 242). New technologies, such as pottery, also appeared. The marker artifacts of this period include Desert side-notched and Cottonwood projectile points, several varieties of ceramics, shell beads, and mortars and pestles (Warren and Crabtree, 1986; Sutton 1991, p. 19). The prolific use of obsidian, seen in the Rose Spring complex, declined in this period, but archaeologists identify more varied site types for this period. Food resources include deer, rabbits, and rodents (Sutton et al. 2007, p. 242).

Ethnographic Setting

The proposed project areas are located within the territories traditionally claimed by four Native American groups (COP 2008a, vol. 1, p. 5.4-13), with the plant site, the western end of the transmission line, and the water, natural gas, and sewer pipelines in territory claimed by the Kitanemuk, and the remainder of the transmission line running through the territories claimed by the Vanyume to the northeast, the Serrano to the southeast, and the Tataviam to the southwest (COP 2008a, vol. 1, fig. 5.4-2). These groups spoke related dialects of the Takic language family (Bean and Smith 1978, p. 570). Early Spanish visitors to the Mojave region, Lieutenant Pedro Fages and Father Francisco Garcés (on separate expeditions in 1772 and 1776, respectively), considered these groups similar in dress and political organization, as well as language (King and Blackburn 1978, p. 535).

Tataviam

The traditional territory most strongly identified with the Tataviam was the Liebre and Sawmill Mountains, but it also included the southern fringe of the Antelope Valley (King and Blackburn 1978, p. 535). Tataviam population at the time of historic contact has been estimated at less than 1,000 persons, occupying two or three widely spaced large villages of perhaps 200 persons each, with a number of medium-sized (20–60 persons) and small (10–15 persons) villages interspersed (King and Blackburn 1978, p. 536). By the early nineteenth century, all the Tataviam had been taken into the Mission San Fernando Rey. After the mission was secularized in 1834, the Tataviam neophytes dispersed, intermarrying and residing with other groups, in particular the Kitanemuk, with whom they had previously interacted most intensively if not always amicably (Blackburn and Lowell 1978, p. 564). The last speaker of the Tataviam dialect died in 1916 (King and Blackburn 1978, p. 536).

With this scanty history, the Tataviam are poorly known ethnographically, documented only in the information provided by their surviving neighbors (King and Blackburn 1978, p. 537). The Kitanemuk referred to the Tataviam as the “people facing the sun” because the Tataviam’s traditional territory was mostly sunny, south-facing mountain slopes (King and Blackburn 1978 , p. 537). Consequently, the Tataviam diet, while in all other ways similar to that of neighboring groups, emphasized the yucca plant (Yucca whipplei), abundantly available on the sunny slopes of their traditional territory. The Tataviam baked the yucca buds in earth ovens, and also consumed acorns, sage seeds, juniper and islay berries, deer, antelope, and small mammals. Their social organization probably was similar to that of the Kitanemuk, but their ritual practices apparently were similar to those of the Chumash and Gabrielino (King and Blackburn 1978, p. 536).

Kitanemuk

The principle territory traditionally claimed by the Kitanemuk were the Tehachapi Mountains, but they made seasonal use of the northwestern Antelope Valley, as well. Their pre-contact population is estimated at 500–1,000 persons, based on the population size of Native American groups living in territories of similar size and character. Apparently all the Kitanemuk were assimilated into Missions San Fernando Rey, San Gabriel, and San Buenaventura early in the mission period. In the post-

mission period, Kitanemuks lived at Fort Tejon in the 1850s and later probably at the Tule River Reservation, as well. When interviewed by an ethnographer in 1917, the last surviving Kitanemuks were living at Tejon Ranch (Blackburn and Bean 1978, p. 564). The Kitanemuk subsistence technology was similar to that of their neighbors to the north (the Yokuts) and west (the Chumash), and their ritual practices and belief system were influenced by those neighbors as well (Blackburn and Bean 1978, pp. 567, 568). Kitanemuk social organization was patrilineal, but lineages were not totemic. They had a well-developed social ranking system. Political leadership was vested in a chief, with other community services provided by a manager of ceremonies, two messengers, shamans, diviners, and other ritual practitioners (Blackburn and Bean 1978, p. 567). Kitanemuk villages had extensive interactions among themselves and often participated in coordinated activities, such as a mourning anniversary, held every four or five years, at which those from several villages who had died in the intervening interval were mourned collectively (Blackburn and Bean 1978, pp. 566–567).

Serrano and Vanyume

The Serrano (from “sierra,” Spanish for mountain range), were so named by the Spanish because they lived in and around the San Bernardino Mountains. A linguistically related group, the Vanyume (also known as the Desert Serrano), occupied the Mojave Desert north of the mountain territory of the Serrano. The name, Vanyume, was derived from “Beñeme,” which was the Mojave Indian name for these people, as recorded in Spanish by Father Francisco Garcés, who traveled through the region in 1776 (Coues 1900, vol. I, p. 240). While a substantial amount of information exists about the Serrano, ethnographers know little about the Vanyume, describing them as “a sparse and poor population living along the Mojave River.” Due to the deleterious effects of missionization and their assimilation by other native groups during the early-to-mid–1800s, the Vanyume were extinct before 1900 (Bean and Smith 1978, p. 570). The interactions between the Serrano and the Vanyume were not documented, but the ethnographic record appears to suggest that Serrano “desert groups” (perhaps the Vanyume) annually traveled to the foothills to gather nuts and to trade desert foodstuffs “with their kindred” for resources not available in the desert (Bean and Smith 1978, p. 571), indicating an established trading relationship.

Prior to the time of historic contact, the Serrano (and presumably the Vanyume) were hunters and gatherers. Large mammals, such as deer, mountain sheep, and pronghorn antelope, were hunted with bow and arrows, and smaller animals, such as rabbits and various rodents, were taken with throwing sticks, nets, and snares. Acorns, piñon nuts, yucca roots, and mesquite beans were among the staple foods, supplemented by chia seeds, roots, tubers, and greens. Food preparation techniques included baking in earth ovens, boiling with heated stones and water in water-tight baskets, parching in trays with hot coals, and sun-drying for later use (Bean and Smith 1978, p. 571).

The Serrano were not organized on a tribal basis. Rather, the patrilineal clan was the autonomous political and landholding unit, with bonds between clans based on marriage, ceremonial reciprocity, and participation in ritual. Clan alliances were formed among the Serrano, but also with the clans of other neighboring groups, such as the Cahuilla, Chemehuevi, Gabrielino, and Cupeño. The clan leader, who was much revered, had an economic role—determining when and where to hunt and collect—and

a religious one—setting the times for ceremonies and presiding over them. The office was hereditary and included residence in the clan's large ceremonial house (Bean and Smith 1978, p. 572).

The accessibility of water was the determining factor in the location of Serrano villages. The structures of the villages included family houses, each with a ramada, a large ceremonial house, granaries and sweathouses. The family homes, occupied by extended families, were circular, willow-framed and tule-thatched domed structures used mostly for sleeping and storage, while the ramadas provided open, thatched-roofed, pole-supported, shaded work space adjacent to the dwellings. The circular sweathouses, partially dug into the earth and with a central fire hearth, had willow framing and thatch covering, like the dwellings, but with an additional covering of earth. They were located near the village water source so that the sweathouse users could wash themselves after their time in the sweathouse. The ceremonial house was the religious center of the village and of the clan or clan alliance, with the annual mourning ceremony (similar to that of the Kitanemuk) being one of the more important (Bean and Smith 1978, p. 571).

A population estimate for the pre-contact Serrano was 1,500–2,500 (Bean and Smith 1978, p. 573). Entries in the diaries of two early Spanish missionaries provide some evidence on, presumably, Vanyume settlement pattern, since the priests limited their travel in the Mojave Desert region to the Mojave River. Father Garcés traveled the Mojave River in March, 1776 (Coues 1900, vol. I, pp. 241–248; Walker 1986, p. 79), and Father Joaquín Nuez later traveled the river in 1819 (Beattie 1955, pp. 55–56). Both priests recorded villages encountered and the distances between villages. From these accounts, it appears that aboriginal settlements along the Mojave River contained up to 70 persons and were situated approximately ten miles apart along the river. Although no Serrano (or Vanyume) name for the entire Mojave River as a single geographic feature is known, the Indians had names for particular segments of the river, which appear to have corresponded with clan or lineage territories (Bean et al. 1981).

Despite their early exposure, the Serrano were not much affected by the Spanish soldiers and missionaries until the Mission San Gabriel established in 1819 an asistencia (cattle-grazing station) near what is today the city of Redlands. Thereafter, most of the Serrano were removed bodily to the various missions, and too few remained to reestablish their traditional mode of living after the dismantling of the missions. But some Serrano survived in remote parts of their former territory and preserved some Serrano traditional culture. Today, Native Americans of Serrano heritage live with other southern California Native Americans on the Morongo and San Mañuel reservations (Bean and Smith 1978, p. 573).

Historic Setting

The Spanish army came north from Mexico into Alta California as early as 1769 and, with Father Junipero Serra, established a string of Franciscan missions from San Diego northward to Sacramento. Trails and paths across the eastern area of the Antelope Valley had been created by the native peoples and continued to be used by the Spanish explorers. One of these trails that ran between the Great Salt Lake and the Pacific Ocean became known as the "Old Spanish Trail." This is the trail that Jedediah Strong

Smith, the first European-Anglo explorer into the Mojave River region of California, used for travel in the mid-1820s (Earle et. al. 1998, p. 6).

In 1844, Lt. John C. Fremont was sent into the Alta California territory, as hostilities escalated between the Mexican government and the United States after the annexation of Texas. Other military expeditions were sent to California, and early transportation routes were created between the established cities along the Mississippi River and the new settlements on the Pacific Coast. San Diego, Los Angeles, Monterey, San Francisco, and Sacramento were the largest towns and commercial centers before the Gold Rush in 1849 (Earle et. al. 1998, p. 6).

Not long after California joined the Union in 1850, Congress directed the U.S. Army to send teams of skilled land surveyors to investigate potential railroad routes, not only to connect the east to the west, but other routes within the western region as well. For two years, from 1853 to 1854, Lt. Robert Stockton Williamson of the U.S. Army Corps of Topographical Engineers and his team surveyed all the potential wagon road and railroad routes on the Pacific Coast between the Columbia River and San Diego.

One of the men traveling from Washington, D.C. with Williamson was Edward Fitzgerald Beale who had been appointed by President Millard Fillmore to be the Superintendent of Indian Affairs for California and Nevada. Beale established Fort Tejon in the rough terrain of the southwestern end of the Tehachapi Mountains, near Lebec, in 1854. The fort became a major stopping point for travelers going between northern and southern California (Kane 2008, p. 1). In later years it also served as a junction for routes heading east into the Mojave Desert region towards Barstow, or southeast towards Palmdale, Harold, and the Cajon Pass. The Old Spanish Trail was now known as the Mormon Road, from its use by missionary groups of the Mormon Church migrating south from Salt Lake City to establish a settlement in San Bernardino (Bancroft 1863). In the 1850s and 1860s, the Antelope Valley was home to ranchers raising cattle and sheep, to gold, silver, lead, and borax miners, and to small settlements of homesteaders and merchants.

After the Central Pacific and Union Pacific Railroads constructed a transcontinental line to connect the eastern U.S. to the west in 1869, the newly formed Southern Pacific Railroad ran a line from its terminal in Lathrop (south of Sacramento) through the Tehachapi Mountains east to Barstow and then south through the Cajon Pass to the switching station in Colton, in San Bernardino County. Charles Crocker, the president of the Southern Pacific Railroad Company, “drove the last golden spike near present-day Palmdale in the Antelope Valley on September 5, 1876” (Orsi 2005, p. 19). The golden spike was placed to mark the meeting of the northern and southern sections of the line that connected Los Angeles to Bakersfield, and thence to the northern San Joaquin Valley. To build the main line south from Bakersfield, the Southern Pacific engineers had designed and built the Tehachapi Loop through the Tehachapi Mountains. From Los Angeles, the Southern Pacific had constructed the 7,000-foot -long San Fernando

Tunnel, recognized as the second longest railroad tunnel in the United States. To have the two parts of the main line meet in Palmdale was a great feat of engineering and human labor.

Local folklore states that, in 1886, a group of Swiss and German settlers from the Midwest mistakenly got off the train in Harold thinking they were near the coast of Southern California. The families named their small settlement Palmenthal, but by 1890 the town was going by the name of Palmdale. The inhabitants of Palmenthal/Palmdale moved their settlement north a few miles along the path of the Southern Pacific railroad line in 1899 and established the town of Palmdale in its current location (WSA 2008a, p. 18).

Immigrants from the mid-west and eastern regions of the nation were encouraged to homestead and farm the lower Antelope Valley by the cheap land available under the federal Homestead Act of 1862 and Desert Land Act of 1877, and through private sales promoted by the Southern Pacific Railroad on excess railroad lands (Daly and Puckett 2004, p. 16).

Between the 1880s and early 1890s, homesteaders in the Antelope Valley were successfully growing large crops of wheat, barley, and other grains. Orchards of fruit trees were planted on the cooler, northern slopes of the San Gabriel Mountains above the desert floor. These years proved to be a wet period for southern California. Settlers were falsely led to believe that the wet growing conditions were typical, and that the land could support normal agricultural endeavors. The wet period was followed by severe drought which had a serious impact upon the agricultural and homesteading history of the area (Daly and Puckett, 2004, p. 27).

Farmers and growers in the valley petitioned the County Board of Supervisors for the establishment of irrigation districts under California's Wright Act to save their farms from the drought conditions. In the Antelope Valley between 1890 and 1895, six irrigation districts were established at Littlerock, Manzana, Fairmont, Big Rock, Almondale, and Llano del Rio. The new community of Palmdale created the Palmdale Irrigation District, and an irrigation canal was constructed in 1890 by the Palmdale Irrigation Company to divert water from Little Rock Creek to Palmdale. The approximately 7-mile-long ditch was used to irrigate alfalfa, fruit trees, and other crops (WSA 2008a, p. 17; Newell 1890, p. 60). Harold Reservoir (now Palmdale Lake) was constructed by the Antelope Valley Irrigation Company in 1895. A ditch connecting Little Rock Creek to Harold Lake was dug alongside the earlier irrigation canal (WSA 2008a, p. 18).

Ranchers and farmers outside these irrigation districts supplemented their water needs with artesian and shallow water wells. Experts were brought in to teach the local farmers about dry-farming techniques (Daly and Puckett, 2004, pp. 28–29.) In 1911, Harvey R. Johnson of the United States Geological Survey published a paper entitled "Water Resources of the Antelope Valley." He reported that 353 wells had been constructed between 1885 and 1908 in the valley and noted that most of these were shallow wells, 20 to 70 feet deep, used for watering livestock or domestic purposes (Earle et. al. 1998, p. 40).

In the 1890s, Fred Eaton of Owens Valley began to promote the construction of an aqueduct that would bring water from the Owens River to the Los Angeles basin. Construction began in 1907 on aqueducts, tunnels, dams, reservoirs, and other irrigation-related features, extending from the Owens Valley, past Mojave, and southward through Elizabeth Lake to the San Fernando Reservoirs (Daly and Puckett 2004, p. 28).

An outbreak of hoof-and-mouth disease in California in the 1920s caused a curtailment of the beef cattle industry, which, in the Antelope Valley, shifted to the dairy and poultry industry (Daly and Puckett, 2004, p. 26). But all agricultural and livestock industries were affected by drought conditions in the 1920s and 1930s. The lack of rain combined with dependence upon pumped well water in the Antelope Valley caused the water table in the valley to drop so precipitously that it never recovered. Those farmers and ranchers unable to finance digging wells 500–700 feet deep either sold their land for pennies on the dollar, or abandoned it altogether.

In 1940, the U.S. Army Air Corps established the Muroc Bombing and Gunnery Range at Rogers Dry Lake. As early as the 1920s, military and civilian aircraft developers tested aircraft on the lakebeds of Rogers and Rosamond Dry Lakes. The Army sent out an appraiser in 1938 to value the homes, farms, and land that it would begin to buy up in order to create an airbase. By 1940, the Army Air Corps had acquired more than 156,000 acres of land. The base was renamed as Edwards Air Force Base (AFB) in 1949. Following WWII, the federal government began conducting peacetime weapons research on the base.

In 1961, in response to the space race, astronautics and aerospace training programs were added to the base along with advanced aircraft testing and flight programs. With the expansion of programs at the base, commercial contractors constructed their own aircraft engineering and testing operations to coincide with military projects. These military activities and jobs associated with supporting the military drew new residents to the area (Daly and Puckett 2004; Earle et. al. 1998, p. 120).

Besides the activities at Edwards AFB, the military purchased the Palmdale airport, which had been the Palmdale Army Air Corps Field during World War II. The federal government contracted with Lockheed in 1951 to construct a facility to produce military aircraft on an industrial scale, and the Air Force used the airport for the flight testing of experimental jet aircraft. In 1954, the Air Force took ownership of the site that became known as Air Force Plant 42. Air Force Plant 42 was the birth place of the B1 and B2 bombers, and later, the Space Shuttle aircraft. The work at Air Force Plant 42 was supported by an influx of private contractors that specialized in the aeronautics industry. These included Rockwell Aviation, Grumman Aviation, Lockheed Martin, McDonnell Douglas, and Northrop Aircraft. The community of Palmdale grew as the companies built operations (WSA 2008a, p. 20.)

CULTURAL RESOURCES INVENTORY

A project-specific cultural resources inventory is a necessary step in staff's effort to determine whether the proposed project may cause significant impacts to historically significant cultural resources and would therefore, under CEQA, have an adverse effect on the environment.

The development of a cultural resources inventory entails working through a sequence of investigatory phases. Generally the research process proceeds from the known to the unknown. These phases typically involve doing background research to identify known cultural resources, conducting fieldwork to collect requisite primary data on not-yet-identified cultural resources in the vicinity of the proposed project, assessing the results of any geotechnical studies or environmental assessments completed for the proposed project site, and compiling recommendations or determinations of historical significance (see "Determining the Historical Significance of Cultural Resources," below) for any cultural resources that are identified.

This subsection describes the research methods used by the applicant and Energy Commission staff for each phase and provides the results of the research, including literature and records searches (California Historical Resources Information System (CHRIS) and local records), archival research, Native American consultation, and field investigations. Staff provides a description of each identified cultural resource, its historical significance, and the basis for its significance evaluation. Assessments of the project's impacts on historically significant cultural resources, potential impacts on previously unidentified, buried archaeological resources, and proposed mitigation measures for all significant impacts are presented in a separate subsection below.

Project Area of Analysis

The inventorying of cultural resources within what staff defines as the appropriate area for the analysis of a project's potential impacts is the first step in the assessment of whether the proposed project may cause a significant impact to an important cultural resource and therefore have an adverse effect on the environment. The area that staff considers when identifying and assessing impacts to important cultural resources, called the "project area of analysis," is a composite geographic area that accommodates the analysis of each type of cultural resource that is present. The project area of analysis can vary depending on the type of cultural resources under analysis and is usually defined as a specific area within and surrounding the project site and associated linear facility corridors. Staff identified no ethnographic resources, historic districts, or cultural landscapes in the vicinity of the proposed PHPP and therefore defined no project areas of analysis for these kinds of cultural resources. Staff defined, however, a project area of analysis for the following two cultural resources types:

- For archaeological resources, the project area of analysis is minimally defined as the project site footprint, plus a buffer of 200 feet, and the project linear facilities routes, plus 50 feet to either side of the routes. Staff has used the minimum specifications for its archaeological project area of analysis for the proposed PHPP, plus the maximum depth that would be reached by all foundation excavations and by all pipeline installation trenches.

- For built-environment resources, the project area of analysis is minimally defined as one parcel deep from the project site footprint in urban areas, but in rural areas is expanded to include a 0.5-mile buffer from the project site, and from any above-ground linear facilities (to encompass resources whose setting could be adversely affected by industrial development). Staff has used these minimum specifications for its built-environment project area of analysis for the proposed PHPP.

As used by staff, the term "project areas" means the footprints of the several project components, including the plant site, the laydown area(s), and the several linear facility corridors, plus any new access roads and any borrow and disposal sites.

Background Inventory Research

Various repositories in California hold compilations of information on the locations and descriptions of cultural resources older than 45 years that have been identified and recorded in past cultural resources surveys. The Energy Commission's data adequacy Regulations require applicants to acquire information specific to the vicinity of their project from certain repositories and to provide it to staff as part of the AFC. Additionally, to acquire further information on potential cultural resources in the vicinity of a proposed project, the applicant is required to make inquiries of knowledgeable individuals in local agencies and organizations and to consult Native Americans who have expressed an interest in being informed about development projects in areas to which they have traditional ties.

Literature and Records Searches

To compile information on known cultural resources and previously conducted cultural resources studies pertinent to the location of the proposed project, the applicant requested several records searches at the South Central Coastal Information Center (SCCIC) (part of the California Historical Resources Information System, or CHRIS) at California State University, Fullerton. SCCIC staff conducted searches on June 4, 2007, May 27, 2008, June 25, 2008, and June 26, 2008 for the area within a 1.0-mile radius of the proposed plant site and within a 0.25-mile radius of the routes of all proposed linear facilities (COP 2008a, vol. 1, p. 5.4-20). SCCIC staff conducted an additional records search in September 26, 2008, to extend the area searched to that within a 0.5-mile radius of the route of the proposed transmission gen-tie, and a further search on February 4, 2009, to cover the area within a 0.25-mile radius of two proposed transmission line route realignments (WSA 2008b, p. 10; WSA 2009a, p. 1).

The searches were to identify all recorded cultural resources, including (WSA 2008a, p. 29):

- Previously recorded prehistoric and historical archaeological sites;
- Previously recorded historic standing structures;
- California Points of Historical Interest;
- California Historic Landmarks;
- California State Historic Resources Inventory;

- Resources listed for Los Angeles County in the Office of Historic Preservation's Historic Property Data File;
- Resources listed in the California Register of Historical Resources (CRHR); and
- Resources listed in the National Register of Historic Places (NRHP).

To identify any sites or structures older than 45 years, the applicant also reviewed historic maps, including :

- Alpine Butte U. S. Geological Survey (USGS) 15' quadrangle, 1945;
- Lancaster USGS 15' quadrangle, 1933 and 1958;
- Tujunga USGS 15' quadrangle, 1900 and 1944; and
- Elizabeth Lake USGS 30' quadrangle, 1941.

Inquiries to Local Agencies, Historical and Archaeological Organizations, and Others

On June 17 and 18, or on July 21, 2008, the applicant contacted various public agencies and historical and archaeological societies requesting information regarding historic or other cultural resources within or adjacent to the PHPP:

- Los Angeles County Department of Regional Planning;
- City of Palmdale Planning Department;
- Palmdale City Library;
- Antelope Valley Genealogical Society
- Antelope Valley Indian Museum;
- Hi-Desert Genealogical Society;
- West Antelope Valley Historical Society;
- Historical Society of Southern California; and
- City of Lancaster Planning Department.

In response, Asoka Herath, Director of Planning for the City of Palmdale Planning Department, provided a copy of a 1993 cultural resources study for the proposed Palmdale Business Park Center Specific Plan project (COP 2008a, vol. 1, pp. 5.4-20–21). From the City of Palmdale General Plan (1993), the applicant also obtained a list of 23 built-environment resources recognized as potentially significant (WSA2008a, pp. 26–27). The list was compiled by the Antelope Valley Historical Society, using only the criterion of age (50 years old in 1993), but the listed resources were not formally evaluated for eligibility for either the NRHP or the CRHR (WSA 2008a, att. 3, p. ER-40). Also in the City of Palmdale General Plan was a general archaeological sensitivity map, based on topographic zones, reproduced in the AFC (COP 2008a, vol. 1, fig. 5.4-1). This indicated that the all of the proposed project components had at least a moderately high sensitivity for archaeological resources, and the southwestern part of the transmission gen-tie route had a high sensitivity (COP 2008a, vol. 2, app. I, p. 50).

The applicant had received no other responses to its inquires to local agencies and organizations by July 10, 2008 (COP 2008a, vol. 1, p. 5.4-21).

The applicant also contacted Tom Taylor and Adam Spiro of Southern California Edison on June 26 and 27, 2008, to obtain information on construction dates for the Vincent Substation and the Pearblossom-Vincent 230-kV transmission line (the PHPP proposes to replace the latter in order to install its transmission gen-tie line). On July 10, 2008, Mr. Spiro provided the date of 1967 for the start of service for the Vincent Substation (COP 2008a, vol. 1, p. 5.4-21).

Native American Coordination

On June 17, 2008, the applicant asked the Native American Heritage Commission (NAHC) to search its Sacred Lands File for any Native American traditional cultural properties and to send to the applicant a list of Native Americans who wanted to be informed about new development projects in Los Angeles County. The NAHC responded on June 20, 2008, indicating a negative return from the search of their Sacred Lands File and providing contact information for eight Native Americans individuals or groups. The applicant sent letters to these contacts on June 23, 2008, describing the proposed PHPP and requesting information on known cultural resources that could be affected by the project. On July 10, 2008, the applicant made follow-up telephone calls to these persons:

- Charles Cooke (Chumash, Fernandeño, Tataviam, Kitanemuk);
- Ron Andrade, Director, Los Angeles City/County Native American Indian Commission;
- Beverly Salazar Folkes (Chumash, Tataviam, Fernandeño);
- Delia Dominguez (Kitanemuk & Yowlumne Tejon Indians);
- James Ramos, Chairperson, San Manuel Band of Mission Indians;
- John Valenzuela, Chairperson, San Fernando Band of Mission Indians;
- William Gonzalaes, Cultural/Environmental Department, Fernandeño Tataviam Band of Mission Indians; and
- Randy Guzman-Folkes (Chumash, Fernandeño, Tataviam, Shoshone Paiute, Yaqui).

On July 10, 2008, Beverly Salazar Folkes expressed concern over the potential for the project to encounter Native American burials, even in areas that have previously been developed, stating that previous projects in the surrounding area have found burials in undisturbed soils beneath disturbed soils. She requested that all ground-disturbing activities be monitored (COP 2008a, vol. 1, p. 5.4-22; vol. 2, app. I, att. 2).

On October 28, 2008, Energy Commission staff also requested from the NAHC a list of Native Americans interested in development in Los Angeles County, and on November 3, 2008, staff received a list of six contacts from the NAHC, including all of the above individuals and groups except Ron Andrade and James Ramos. On April 1, 2009, staff sent letters informing the six Native American individuals or groups about the proposed

PHPP and requested that they contact staff if they had any concerns about the project affecting cultural resources. To date, staff has received no responses.

Geoarchaeology Literature Study

As a data request, staff asked for a literature study to review the available data on the geomorphology and geoarchaeology of the project areas. The purpose of the study was to assess the likelihood of the presence of buried prehistoric archaeological deposits in those areas that the proposed project would impact. In April, 2009, the applicant undertook a two-phase literature study to provide the requested data and assessment. The first phase considered the geoarchaeology of the southern Antelope Valley region, and the second phase focused on the geomorphology and geoarchaeology of the project areas. The first phase entailed (WSA 2009, pp. 1–5):

- Identifying and reviewing previous archaeological studies that had data on subsurface deposits;
- Identifying and reviewing records for known archaeological sites that were likely to contain subsurface deposits; and
- Consulting with the archaeologists most active in investigating prehistory in the project areas.

The results of the first phase showed that available data on subsurface archaeological deposits were concentrated in the area north of Palmdale, but were sparse for the project areas. One area of high sensitivity for buried deposits is the foothills above the San Andreas Fault, identified by an archaeologist who excavated sites buried from 5 to 8 feet deep by landslides associated with movement along the fault (WSA 2009c, p. 5).

During the first phase, maps of the project areas depicting 1922 and 1970 soils data were prepared and provided to a geomorphologist for use during the second phase. Considering the geoarchaeological results, the geomorphologist generated a five-tiered scale ranking the sensitivity of the soils of the project areas for buried archaeological deposits, based on both cultural and geomorphological factors. The cultural factors included proximity to crucial resources, and the geomorphological factors included the stability of soil surfaces, both with respect to human use and with respect to the beneficial or deleterious effects of erosion or alluvial deposition subsequent to human use. The five rankings of the scale were high, high-to-moderate, moderate, moderate-to-low, and low in sensitivity for buried archaeological deposits. The highest sensitivity soils of the project areas and vicinity were along the routes of the proposed linear facilities, with most of segment 1 of the transmission gen-tie having either a high or high-to-moderate ranking, with parts of the natural gas pipeline and the recycled water pipeline also having high or high-to-moderate ranking, and with parts of segment 2 of the gen-tie having high-to-moderate to moderate ranking. The proposed plant site's ranking was moderate to moderate-to-low (WSA 2009c, fig. 5). The geomorphologist, however, noted one soil type on the project plant site as possibly representing a terrace landform, which type has a high archaeological sensitivity. He also noted that this identification cannot be positively made on the basis of soil survey data alone (L&W 2009h, p. 5).

Summary of Previously Known Cultural Resources

As a result of the above searches and inquiries, the applicant identified the following previously known cultural resources, located within or near the proposed project components:

- 10 prehistoric archaeological sites (WSA 2008a, p. 42; WSA 2009a, p. 3; fig. 1);
- 65 historical archaeological sites (WSA 2008a, p. 42; WSA 2009a, p. 3);
- 80 built-environment resources (WSA 2008b, pp. 23, 26, 28; WSA 2009a, p. 3); and
- 0 ethnographic resources.

Of these known resources, 18 were located in or near the project areas. Thirteen known archaeological resources (three prehistoric and ten historical archaeological sites) were located in or near the project areas, making them potentially subject to physical impact. Five known built-environment resources and no ethnographic resources were located in or near the project areas, making them potentially subject to either physical impact or an impact to their integrity of setting or integrity of feeling. Table 2 provides summary information on these resources, including potential project impacts.

CULTURAL RESOURCES Table 2
Known Cultural Resources Located in or Near the Project Areas of the Proposed PHPP Project

Resource Type and Designation	Type of Resource	Project Area	Information Source
Prehistoric Archaeological Resources			
CA-LAn-805	prehistoric archaeological site: sparse scatter of flaking waste	gen-tie corridor	WSA 2008a, table 10; Toren and Wessel 1978
CA-LAn-878	prehistoric archaeological site: milling stones and flaking waste; midden	gas pipeline	WSA 2008a, table 10; Duran 1972
CA-LAN-1332	prehistoric archaeological site: flake, core, and mano	gen-tie corridor	WSA 2009a, pp. 3–4
Historic-Period Archaeological Resources			
19-1709	historical archaeological site: remains of stone house foundation and walls and associated refuse deposit; early 20th century	gas pipeline	WSA 2008a, table 10; Norwood 1990
19-2713	historical archaeological site: refuse deposit	gen-tie corridor	WSA 2008a, table 10; p. 60
19-2717	historical archaeological site: refuse deposit probably associated with a former house site that was bulldozed	gen-tie corridor	WSA 2008a, table 10; Shaver 1996
19-2723	historical archaeological site: refuse deposit	plant site	WSA 2008a, table 10; pp. 58–59
19-2726	historical archaeological site: refuse deposit	plant site	WSA 2008a, table 10; pp. 58–59
CA-LAn-2772	historical archaeological site: refuse deposit	gas pipeline	WSA 2008a, table 10; Ferraro and Maxon 1999
CA-LAN-2774	historical archaeological site: refuse deposit	gas pipeline	WSA 2008a, table 10; p. 60
19-3703	historical archaeological site: refuse deposit	gas or water pipeline	WSA 2008a, table 10; p. 59
19-3704	historical archaeological site: refuse deposit	gas or water pipeline	WSA 2008a, table 10; p. 59

Resource Type and Designation	Type of Resource	Project Area	Information Source
19-3705	historical archaeological site: refuse deposit	gas or water pipeline	WSA 2008a, table 10; p. 59
Built-Environment Resources			
19-180680	Air Force Plant 42:Building 15(150) (c. 1958) Building 21(145) (c. 1954)	plant site	WSA 2008a, table 10, pp. 63, 76
LAN-1534H	Palmdale Ditch (1918–1919), ditch, bridge, tunnels	gen-tie corridor	WSA 2008a, table 10; pp. 60–61, 76
19-180638	Southern Pacific Railroad (1876), grade, tracks	gen-tie corridor; gas pipeline	WSA 2008a, table 10; p. 59
19-187713	Angeles Forest Highway (1930–1940)	gen-tie corridor	WSA 2008a, table 10; p. 61; WSA 2009a, table 1; p. 4
19-186876	SCE Eagle Rock-Pardee Transmission Line (1928)	gen-tie corridor	WSA 2009b, pp. 2–3; fig. 2

Field Research

Archaeological Field Survey

Between June 25 and June 29, 2008, the applicant conducted a pedestrian, archaeological surface survey of:

- The proposed plant site (plus 200 feet around the site perimeter);
- The laydown area (plus 200 feet around the perimeter); and
- 100-foot-wide corridors along the routes of the recycled water pipeline, the natural gas pipeline, the sewer pipeline, and the transmission gen-tie line.

The survey entailed walking these areas at 20-meter intervals looking for archaeological remains (COP 2008a, vol. 1, p. 5.4-22). The surveyors sought to relocate previously recorded sites and assess their current condition. The surveyors undertook no ground disturbance and collected no artifacts, but took digital photographs of sites and topography. They used a Trimble GeoXT handheld GPS receiver to plot the locations of features, sites, and artifacts to submeter accuracy and to obtain GIS shapefiles for forms and reports. Finally, they recorded all sites and architectural resources over 45 years of age on Department of Parks and Recreation (DPR) series 523 forms. Several factors limited the survey, including conditions that obscured ground visibility, such as

paving and vegetation (landscaping), restricted access to private property, and steep terrain along the southern end of the gen-tie route (COP 2008a, vol. 2, app. I, pp. 54–55).

Between March 3 and March 5, 2009, the applicant conducted further pedestrian surface archaeological survey of additional aspects of the proposed gen-tie transmission line: the 22 pulling sites, the 3 staging areas, and two realignments at the beginning and end of segment 2. The applicant used the same survey methods as were used for previous project-related archaeological survey and noted the same obstacles. Additionally, considerable disturbance of the surveyed areas, due to power line construction, dirt access roads, off-road vehicle traffic, trash dumping, agriculture, and residential construction, was observed (WSA 2009a, p. 2).

As a result of these pedestrian archaeological surveys, the applicant relocated three previously known historical archaeological sites (19-3703, 19-3704, and 19-3705, all refuse deposits) on the reclaimed water pipeline route and one previously known prehistoric archaeological site (CA-LAn-1332, consisting of a flake, a core, and a mano) in the gen-tie corridor. The applicant reported that no artifacts remained at the latter site (WSA 2009a, table 1). Two previously known historical archaeological sites (19-2723 and 19-2726), both refuse deposits located near but beyond the plant site boundary, were not field-checked due to restricted access to the adjacent property. Two additional historical archaeological sites (19-2713 and CA-LAn-2774), both refuse deposits, located, respectively, on segment 1 of the transmission line route and on the natural gas pipeline route, could not be relocated during the applicant's survey. The applicant concluded that these sites were destroyed by development activities (WSA 2008a, table 10). The applicant ultimately determined that only three previously known archaeological sites, 19-3703, 19-3704, and 19-3705, could be subject to project impacts.

In addition, in or near the project areas, the applicant identified no new prehistoric archaeological sites and nine new historical archaeological sites, all of which were refuse deposits, and all of which, with one exception, were located in the gen-tie transmission line corridor. The applicant recorded these resources but recommended none of them as eligible for the CRHR (WSA 2008a, table 10; WSA 2009a, table 1). After reviewing the information on these sites recorded by the applicant, staff agrees that all are ineligible for the CRHR (see "Archaeological Resources, Potentially Subject to Impacts, Evaluated for Historical Significance," below) and therefore does not discuss them at length in this analysis.

With the addition of the nine new archaeological sites the applicant recorded (PHP-1, PHP-2, PHP-3, PHP-4, PHP-5, PHP-6, PHP-7, PHP-8, and PHP-9) to the 13 known archaeological sites (listed in **Cultural Resources Table 2**, above), 22 archaeological sites could be present in or near the project areas. The applicant's field check on the 13 known sites determined that three (CA-LAn-1332, 19-2713, and CA-LAn-2774) are no longer extant, two (CA-LAn-2723 and CA-LAn-2726) could not be field checked due to access restrictions, and five (CA-LAn-805, CA-LAn-878, 19-1709, 19-2717, and CA-LAn-2772) were identified by the applicant as not potentially subject to impacts and so were not field checked

Consequently, staff must address the CRHR eligibility of 12 archaeological sites in or near the project areas: 19-3703, 19-3704, 19-3705 (on or near the natural gas and reclaimed water pipelines), PHP-1 on the plant site), and PHP-2, PHP-3, PHP-4, PHP-5, PHP-6, PHP-7, PHP-8, and PHP-9 (all on or near the gen-tie route).

Applicant's Built-Environment Survey

The applicant's built-environment field survey entailed three phases and focused on field-checking known built-environment resources and identifying and recording built-environment resources that had not previously been recorded but that appeared to meet the age criterion for CRHR eligibility (45 years of age or older). Recordation consisted of digital photography and notes on those previously unrecorded resources that appeared to meet the age criterion. In the initial phase, between June 25 and June 26, 2008, a 1.0-mile-radius area around the plant site and laydown area and a 0.25-mile-radius area around the routes of the linear facilities were subject to a "windshield" survey for the presence of historic structures (COP 2008a, vol. 1, table 5.4-3; WSA 2008a, pp. 55–62). For the second phase, the 0.25-mile-radius area around the route of the transmission line was expanded to a 0.5-mile-radius area, and the county assessor's records for the enlarged area were checked for built-environment resources pre-dating 1963. Between September 27 and September 28, 2008, the additional area was subject to a "windshield" survey, limited to the access afforded from public roads (WSA 2008b, pp. 29–31). The third phase was focused on "Area B," the realignment where segment 2 of the transmission line route enters the Vincent Substation. County assessor's records were again checked, and "windshield" survey of Area B was conducted on March 5, 2009 (WSA 2009b, pp. 1–2).

As a result of these surveys, in and near the project areas (primarily along the route of the gen-tie transmission line), the applicant identified 67 new built-environment resources that met or appeared to meet the CRHR age requirement of 45 years or older. The applicant recorded these resources but recommended none of them as eligible for the CRHR (WSA 2008b, table 8). After reviewing the information recorded by the applicant on these sites, staff agrees that all are ineligible for the CRHR (see "Built Environment Resources, Potentially Subject to Impacts, Evaluated for Historical Significance," below) and therefore does not discuss them at length in this analysis.

Also as a result of these surveys, the applicant ascertained that five previously known, potentially significant, built-environment resources (see **Cultural Resources Table 2**, above) are still present in and near the project areas. These resources are:

1. Air Force Plant 42 (19-180680) (one building),
2. Palmdale Ditch (LAn-1534H),
3. Southern Pacific Railroad (19-180638),
4. Angeles Forest Highway(19-187713), and
5. Eagle Rock-Pardee transmission line (19-186876).

Air Force Plant 42, Building 15 (150)

Building 15 (150) at Air Force Plant 42 was constructed in 1958. The first six shuttles used for the Space Transportation System under NASA were completed in Building 15 (150) in the early 1980s.

Palmdale Ditch

The approximately 7-mile-long Palmdale Ditch was constructed in the period 1918–1919 to convey water from Little Rock Creek to Palmdale Lake, for the agricultural use of the area's farmers. Originally an open earthen ditch, it has been lined with concrete over the period of its use, which continues to the present day (Palmdale Water District n.d.). The applicant identified and recorded one of the features of the Palmdale Ditch that had not previously been recorded, a stone and concrete bridge over the ditch (WSA 2008a, p. 64).

Southern Pacific Railroad

Charles Crocker, the president of the Southern Pacific Railroad Company, "drove the last golden spike near present-day Palmdale in the Antelope Valley on September 5, 1876." The golden spike was placed to mark the meeting of the northern and southern sections of the main line that connected Los Angeles to Bakersfield, and to the northern San Joaquin Valley. To build the main line south from Bakersfield, the Southern Pacific engineers had designed and built the Tehachapi Loop through the Tehachapi Mountains. North of Los Angeles, the 7,000-foot-long San Fernando Tunnel, recognized as the second longest railroad tunnel in the United States, had to be constructed. To have the two sections meet near what would later become Palmdale was a great feat of engineering design and human labor (Orsi 2005).

The Southern Pacific Railroad line that runs through Palmdale is historically significant not only as the meeting place of the Los Angeles and Bakersfield sections, but as the first railroad line that connected southern and northern California. The Union Pacific Railroad controlled the Southern Pacific Railroad temporarily from 1901 to 1913, and then took over permanently in 1996. The railroad line through Palmdale is now identified as the Union Pacific rail line (Orsi 2005).

Angeles Forest Highway

This road crosses the San Gabriel Mountains, connecting the Los Angeles Basin and the Antelope Valley. The Angeles Forest Highway has been important in regional development and in the political and cultural consolidation of Los Angeles County. The road is approximately 25 miles long and was constructed by Los Angeles County, beginning in the late 1930s and completed in 1941. It is a two-lane road surfaced with asphaltic concrete that winds through steep, rocky terrain. Considerable digging and blasting were required in the construction of the road. It features a tall, concrete arch bridge over Mill Creek, a stone-portaled tunnel 500 feet long, and several stone masonry drainage culverts. Its northern terminus is in Soledad Pass, where it meets the Sierra Highway north of the Vincent Substation (Sander 2003).

Eagle Rock-Pardee Transmission Line

The Eagle Rock-Pardee transmission line was part of SCE's 220-kV line, built in 1923, to convey power from Big Creek Power House No. 3, in the mountains east of Fresno, to the Gould Substation in Pasadena, from which it was distributed to greater Los Angeles. The Eagle Rock-Pardee line, which traversed the rough terrain of the San Gabriel Mountains, was originally called the Vincent line, and its 18.7-mile length features steel lattice H-frame towers of a heavier design than those elsewhere in the system (Arrigoni 2009), perhaps because of the greater strain on the conductors imposed by the terrain the Vincent line crossed.

SCE's Big Creek Hydroelectric System was the first large-scale hydroelectric development in the United States. This generating and transmission system, over much of the twentieth century, has assured a reliable power supply for Los Angeles. The power provided by this system has been vital to the growth of Los Angeles over the past 100 years. Construction of the Big Creek System began in 1911 and occurred in four phases: from 1911–1913; from 1917–1929; from 1948–1960; and from 1980–1995 (SCE n. d.).

Staff's Built-Environment Survey

On April 23, 2009, Energy Commission staff visited the proposed project's impact areas to review the reported built-environment resources and to preliminarily assess potential impacts on them from proposed project construction. Staff identified no additional cultural resources that could be subject to PHPP impacts, but noted potential project impacts to the Southern Pacific Railroad line and to a tunnel associated with the Palmdale Ditch. Staff subsequently made data requests to the applicant regarding these potential impacts.

With the completion of the applicant's built-environment survey and staff's follow-up survey, a total of five previously known built-environment resources are present in or near the project areas. Staff must next consider the CRHR eligibility of these resources.

DETERMINING THE HISTORICAL SIGNIFICANCE OF CULTURAL RESOURCES

CEQA requires the Energy Commission, as a lead agency, to evaluate the historical significance of cultural resources by determining whether they meet several sets of specified criteria. Under CEQA, the definition of a historically significant cultural resource is that it is eligible for listing in the CRHR, and such a cultural resource is referred to as a "historical resource," which is a "resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR", or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of section 5024.1 (g) of the Public Resources Code," or "any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record" (Cal. Code Regs., tit. 14, § 15064.5(a)). The term, "historical resource," therefore, indicates a cultural resource

that is historically significant and eligible for the CRHR.

Consequently, under the CEQA Guidelines, to be historically significant, a cultural resource must meet the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old,[2] a resource must meet at least one (and may meet more than one) of the following four criteria (Pub. Resources Code, § 5024.1):

- Criterion 1, is associated with events that have made a significant contribution to the broad patterns of our history;
- Criterion 2, is associated with the lives of persons significant in our past;
- Criterion 3, embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values; or
- Criterion 4, has yielded, or may be likely to yield, information important to history or prehistory.

Historical resources must also possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance (Cal. Code Regs., tit. 14, § 4852(c)).

Additionally, cultural resources listed in or formally determined eligible for the National Register of Historic Places (NRHP) and California Registered Historical Landmarks numbered No. 770 and higher are automatically listed in the CRHR and are therefore also historical resources (Pub. Resources Code, § 5024.1(d)). Even if a cultural resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows a lead agency to make a determination as to whether it is a historical resource (Pub. Resources Code, § 21084.1).

The assessment of potentially significant impacts to historical resources and the mitigation that may be required of a proposed project to ameliorate any such impacts depend on CRHR-eligibility evaluations.

CRHR Evaluations

Under CEQA, only CRHR-eligible cultural resources that the proposed project could potentially impact need be considered in staff's recommendations for mitigation measures for project impacts. Consequently staff seeks CRHR eligibility recommendations for those cultural resources subject to possible project impacts. The existing documentation for previously known cultural resources may include CRHR eligibility recommendations, and the applicant's cultural resources specialists often make CRHR eligibility recommendations for newly identified cultural resources they discover and record in their project-related surveys. Staff considers these prior CRHR eligibility evaluations and may accept them or conclude that additional information is needed before making its own recommendations.

[2] The Office of Historic Preservation's Instructions for Recording Historical Resources (1995) endorses recording and evaluating resources over 45 years of age to accommodate a potential five-year lag in the planning process.

When the available information on known or newly identified resources that could be impacted by the proposed project is not sufficient for staff to make a recommendation on CRHR eligibility, staff may ask an applicant to conduct additional research to gather the information needed to make such a recommendation, or staff may gather the additional information. For an archaeological resource, the additional research usually entails some degree of field excavation, called a "Phase II" investigation. For an ethnographic resource, the additional research may be an ethnographic study. For built-environment resources, the additional research would probably be archival. The object of this additional research is to obtain sufficient information to enable staff to validate or make a recommendation of CRHR eligibility for each cultural resources that the proposed project could impact.

Archaeological Resources, Potentially Subject to PHPP Impacts, Evaluated for Historical Significance

Staff identified 12 sites, previously known or newly identified, on or near the project areas, for which staff needs to make recommendations of CRHR eligibility. The applicant recommended none of these resources as eligible for the CRHR (WSA 2008a, table 10; WSA 2009a, table 1). These 12 sites are all historical archaeological sites (consisting of refuse deposits, as discussed below.

The three previously known refuse deposits, 19-3703, 19-3704, and 19-3705, were dated by the applicant as mid-to-late twentieth century and interpreted as representing numerous roadside dumping events (WSA 2008a, p. 59). The applicant recommended each of them as ineligible for the CRHR (apparently under CRHR Criterion 4) because each "does not appear to have the potential for buried historic features and deposits that would cause it to be considered a significant resource" (WSA 2008a, pp. 71–72).

As reported by the applicant, variation among the nine newly identified refuse deposits, PHP-1, PHP-2, PHP-3, PHP-4, PHP-5, PHP-6, PHP-7, PHP-8, and PHP-9 (most located near a road), exists primarily in the density of the deposit (sparse to dense), in the age range indicated by the artifacts (early-to-mid twentieth century, mid-twentieth century, or mid-to-late twentieth century), and in whether a single dumping episode is evidenced or multiple ones.

The applicant did not conduct test excavations to determine whether a subsurface component existed at any of the above 12 refuse deposit sites, but indicated that none of these sites appears to have buried historic features or deposits (WSA 2008a, pp. 69–72; WSA 2009a, pp. 6–7). The applicant reported no evidence of structural remains at any of these sites, so staff believes the applicant's conclusion that these sites contain no buried deposits is probably correct. Since a randomly dumped, anonymous, and probably looted refuse deposit has a poor likelihood of yielding information important to history (CRHR Criterion 4— that historical archaeological sites typically must meet), staff concurs with the applicant's recommendation of CRHR ineligibility for all of these 12 sites.

Based on this recommendation, staff does not need to identify and evaluate project impacts to the above 12 refuse deposit sites.

Built-Environment Resources, Potentially Subject to PHPP Impacts, Evaluated for Historical Significance

The applicant identified 67 new built-environment resources that met or appeared to meet the CRHR age requirement of 45 years or older. All but seven of these resources were single-family houses, the exceptions being a church, a trailer park, a commercial property, and four other buildings whose use was not determined. The applicant recorded these resources but recommended none of them as eligible for the CRHR because they were not associated with important historical events or persons (Criteria 1 and 2) or were not distinctive in design, construction, or style (Criterion 3) (WSA 2008b, table 8). After reviewing the information recorded by the applicant on these sites, staff agrees that all are ineligible for the CRHR and so require no further consideration with respect to project impacts to them.

The applicant also identified five previously known built-environment resources—a building, a railroad, a canal, a highway, and a transmission line—as present in or near the project areas. These resources were either CRHR listed, CRHR eligible, or of the required age to be listed for the CRHR, but at this time unevaluated. Therefore, project impacts to these five resources could be significant. For these resources, staff needs to make recommendations of CRHR eligibility and to evaluate their integrity.

Air Force Plant 42, Building 15 (150)

This building was determined eligible for listing in the NRHP under Criterion 1 because of its association with the U. S. Space Shuttle Program. The building has retained a high level of integrity (Earthtech1996).

Palmdale Ditch

A historic district consisting of Little Rock Dam and associated water systems, to which the Palmdale Ditch was a contributor, was determined eligible for the NRHP, but was delisted in 1994 for loss of integrity. As an individual resource, the Palmdale Ditch is listed on the CRHR under CRHR Criterion 1 for its association with the Little Rock Dam and the development of an early irrigation system necessary for the settlement and prosperity of Palmdale and Littlerock (WSA 2008a, p. 76). The Palmdale Ditch has retained sufficient integrity to continue to be considered a historical resource under CEQA.

Southern Pacific Railroad

The criteria for evaluating the NRHP eligibility of linear built-environment resources, such as a railroad line, recognize that these kinds of resources are going to undergo routine maintenance. Staff thus evaluated the Southern Pacific/Union Pacific railroad, as a linear resource, with less emphasis on its architecture or physical attributes, and more on its role in helping to establish new towns and communities in California, and the economic, social, and political contributions it made in local, state, and national transportation history.

Staff recommends that the Southern Pacific/Union Pacific Railroad line that runs through Palmdale is eligible for listing in the NRHP and the CRHR under Criterion A/1 and Criterion B/2. Under NRHP Criterion A and CRHR Criterion 1, the railroad is eligible

for its significant contribution to the history of the nation and to the history of the state of California as the first railroad line to connect northern and southern California. Additionally, the part of the line that runs through Palmdale includes the place where the Los Angeles and Bakersfield sections joined in 1876 to complete this important line. The railroad also made a significant contribution to the history of Palmdale, as Palmdale's founders established the town to be close to the railroad (Orsi 2005).

Under Criterion B/2, the Southern Pacific/Union Pacific Railroad line that runs through Palmdale is also eligible for listing in the NRHP and the CRHR for its association with the Southern Pacific Railroad Company and the four Californians who played a vital role in the railroad's success through their political, financial, and social connections in the state and nationally. Collis P. Huntington, Charles Crocker, Leland Stanford, and Mark Hopkins formed the Southern Pacific Railroad Company in 1861, and soon became known as the "Big Four" for their combined business clout. This partnership led to the building of the Southern Pacific Railroad and later to the noteworthy success of each of these men in private and public ventures in California (Orsi 2005).

While the Southern Pacific Railroad line that runs through Palmdale cannot on the whole be recommended as eligible for the NRHP and the CRHR under Criterion B/3, one part of it has attained other recognition and listing: The Tehachapi Loop is a National Historic Civil Engineering Landmark and a California Historical Landmark.

Staff concludes that the Southern Pacific/Union Pacific railroad line has retained its linear integrity through Palmdale, as it is still on the same route on which the original rails were laid in 1876, and from which the founders of Palmdale exited the passenger cars to start a new life in the Antelope Valley (Orsi 2005).

Angeles Forest Highway

Jay K. Sander states that Caltrans, in 2001, determined that Mill Creek Bridge and the Angeles Forest Highway Tunnel were not eligible for the NRHP. Sander recommends that the entire highway is also not eligible for the NRHP because it lacks historical associations (Criteria A and B) and distinctive engineering achievements (Criterion C). Sander also notes, regarding the highway's integrity, that it has been repaved, and parts have been widened in recent years (Sander 2003). Although cultural resources that are listed or determined eligible for the NRHP are automatically also eligible for the CRHR, those determined or recommended ineligible for the NRHP are not automatically ineligible for the CRHR. Thus staff considers the Angeles Forest Highway potentially eligible under Criterion A for its contribution to regional development and to the political, economic and cultural consolidation of Los Angeles County. The highway's route is unchanged, therefore, as explained above regarding the application of evaluation criteria to linear resources, the improvements noted by Sander do not significantly adversely affect the highway's ability to convey its historical significance under Criterion A. Staff recommends that the Angeles Forest is thus a potential historical resource under CEQA.

Eagle Rock-Pardee Transmission Line (19-186876)

In April, 2007, SCE, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer agreed that the Big Creek System, of which the

Eagle Rock-Pardee transmission line is a part, was eligible for the NRHP and signed a programmatic agreement for the management of the associated transmission lines (SHPO 2007). Thus, although the Eagle Rock-Pardee Transmission Line individually has not been determined eligible for the CRHR, the applicant states that it may be CRHR eligible, and staff recommends that it is potentially eligible. According to the applicant, its integrity south of Vincent Substation maintains a "higher" level of integrity than the two dead-end towers by means of which the line enters the substation (Arrigoni 2009).

Summary of CRHR-Eligible Cultural Resources Subject to Potential Impacts from the Proposed Project

Staff identified two CRHR-eligible built-environment resources and recommended three additional built-environment resources as potentially CRHR eligible. As these five resources could be impacted by the project, staff must assess these impacts, and, if staff determines they are significant, must provide mitigation for them. The eligibility of the five built-environment resources is summarized in **Cultural Resources Table 3**.

CULTURAL RESOURCES Table 3
CRHR-Eligible Cultural Resources Potentially Subject to PHPP Impacts

Resource Designation	Resource	CRHR Eligibility	Integrity
19-180680	Air Force Plant 42: Building 15(150) (circa 1958)	NRHP eligible and CRHR Eligible	Yes
LAN-1534H	Palmdale Ditch (1918–1919)	CRHR listed	Yes
19-180638	Southern Pacific Railroad (1876)	NRHP eligible and CRHR Eligible	Yes
19-187713	Angeles Forest Highway (1930–1940)	CRHR eligible	Yes
19-186876	SCE Eagle Rock-Pardee Transmission Line (1928)	NRHP eligible and CRHR Eligible	Yes

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE OF IMPACTS TO HISTORICAL RESOURCES

Under CEQA, "a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment" (Pub. Resources Code, § 21084.1). Thus, staff analyzes whether a proposed project would cause a substantial adverse change in the significance, that is,

the CRHR eligibility, of all historical resources identified in the Cultural Resources Inventory as CRHR eligible. The degree of significance of an impact depends on:

- The cultural resource impacted;
- The nature of the resource's historical significance;
- How the resource's historical significance is manifested physically and perceptually;
- Appraisals of those aspects of the resource's integrity that figure importantly in the manifestation of the resource's historical significance; and
- How much the impact will change those integrity appraisals.

DIRECT/INDIRECT IMPACTS AND MITIGATION

In the abstract, direct impacts to cultural resources are those associated with project development, construction, and co-existence. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. Construction can have direct impacts on historic standing structures when those structures must be removed to make way for new structures or when the vibrations of construction impair the stability of historic structures nearby. New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, and when the new structures produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Generally speaking, indirect impacts to archaeological resources are those which may result from changed circumstances that result from project activities, such as increased erosion due to site clearance and preparation, or inadvertent damage or outright vandalism to exposed cultural resources due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction causes obsolescence and demolition or creates improved accessibility with consequent vandalism and/or greater weather exposure.

Ground disturbance accompanying construction at a proposed plant site, along proposed linear facilities, and at a proposed laydown area has the potential to directly impact archaeological resources, unidentified at this time. The potential direct, physical impacts of the proposed construction on unknown archaeological resources are commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. Placing the proposed plant into this particular setting could have a direct impact on the integrity of association, setting, and feeling of nearby standing historic structures.

Construction Impacts and Mitigation

For the construction activities listed above under "Project, Site, and Vicinity Description," staff has analyzed the potential impact of the activities to known, CRHR-eligible resources.

Identification and Assessment of Direct Impacts and Recommended Mitigation

Archaeological Resources

Staff determined that all the known archaeological sites potentially impacted by the proposed PHPP's construction are not eligible for the CRHR, therefore none of the project's impacts on known archaeological sites would be significant, and no mitigation for those impacts would be required.

Construction, however generally entails the subsurface disturbance of the ground, which can affect unidentified, potentially CRHR-eligible, buried archaeological resources (eligible under CRHR Criterion 4: "likely to yield information important in history or prehistory"). Consequently, ground disturbance accompanying construction at the proposed PHPP plant site and along the proposed linear facilities has the potential to directly impact archaeological resources, buried in the sediments of the project areas, and unidentified at this time,

Due to the possibility that archaeological deposits could be encountered during construction, CEQA advises a lead agency to make provisions for archaeological resources unexpectedly encountered during construction. A project owner may be required to train workers to recognize cultural resources, fund mitigation, and delay construction in the area of the find (Pub. Resources Code, § 21083.2; Cal. Code Regs., tit. 14, §§ 15064.5(f) and 15126.4(b)). Consequently, staff recommends that procedures for identifying, evaluating, and possibly mitigating impacts to archaeological resources discovered during construction be put in place through conditions of certification to reduce those impacts to a less-than-significant level.

In consideration of that possibility, the applicant has also suggested a number of measures intended to mitigate potential impacts to archaeological resources that could be discovered during the construction of the proposed PHPP, including the following (COP 2008a, pp. 5.4-37–5.4-38):

1. To avoid impacts to a significant historic-period archaeological site LAN-1534H (the Palmdale ditch, including the associated concrete and stone bridge), this cultural feature should be protected from damage by avoidance. The project owner's construction manager, or person designated by the construction manager, will cordon off the resource at a distance of at least 100 feet to either side of the resource to ensure that the site is not impacted by construction activities.

2. [If] Project construction cannot avoid LAN-1534H (the Palmdale ditch); an archaeologist meeting the Secretary of the Interior's Standards will be retained to develop and implement a data recovery program for the site. This program might include at least a level of recordation that meets the minimum Historic American Engineering Record requirements for this type of resource.

3. The project owner will develop, submit for Energy Commission staff review and approval, and implement an approved Cultural Resources Monitoring and Mitigation Plan (CRMMP), prepared under the direction of a qualified cultural resources specialist. The CRRMP will identify general and specific measures that will be implemented to minimize potential impacts to sensitive cultural resources.

4. The project owner will provide Worker Environmental Awareness Program (WEAP) training prior to construction to assist in worker compliance with cultural resource identification and protection procedures. The training will consist of illustrations and/or photographs of common types of historic and prehistoric artifacts that may be encountered during construction activities, and provide a protocol to be followed in the event of an unanticipated discovery of archaeological materials and/or human remains.

5. Should any previously unknown historic or prehistoric resources be discovered during grading, trenching, or other on-site excavation(s), ground-disturbing construction activities within 100 feet of these resources shall be stopped until a [sic] the Project's designated cultural resources specialist or another professional archaeologist meeting the Secretary of the Interior's Standards has an opportunity to evaluate the significance of the find.

6. If a find is determined to not be potentially significant by the Project's designated cultural resources specialist, construction activities within the area can continue.

7. If a find is determined to be potentially significant by the Project's designated cultural resources specialist, a mitigation plan meeting State requirements will be developed and implemented in consultation with the California Energy Commission staff. If the resource cannot be avoided, a data recovery plan, aimed at collecting sufficient data to address prehistoric or historic research questions, will be prepared and carried out.

8. A professional technical report detailing the data recovery methods and results, and a discussion of the findings in terms of the research questions provided in the data recovery plan, will be prepared by the consulting archaeologist. Copies of the report will be provided to the California Energy Commission staff, the South Central Coastal Information Center, and the curation facility for the artifacts.

9. All collected prehistoric and historic artifactual material will be curated at a qualified curation facility. Copies of field notes, and other relevant documentation, will also be provided with the artifact collection.

10. All prehistoric and historic discoveries will be documented on appropriate Department of Parks and Recreation forms (Form DPR 523) and filed with the South Central Coastal Information Center in Fullerton.

11. In the event that Native American human remains or funerary objects are discovered, the provisions of the California Health and Safety Code should be followed. Section 7050.5(b) of the California Health and Safety Code states that all excavation or disturbance of the site or nearby area cease, and that the coroner of the county in which the human remains are discovered be contacted. If the remains are determined by the coroner to be Native American, the coroner must contact the Native American Heritage Commission.[3] The Native American Heritage Commission

[3] Public Resources Code 5097.98(b) and (e) outline the actions required once the coroner has determined the remains to be Native American.

will assign a Most Likely Descendant, who will make recommendations regarding the treatment of the remains.

The geoarchaeological literature study indicated that much of the land in the project areas has a high-to-moderate sensitivity for the presence of buried archaeological sites, with the lowest sensitivity (moderate to moderate-to low) indicated for the proposed plant site. A particular part of that site, however, has a high sensitivity (WSA 2009c, fig. 5). The applicant recognized the possibility that intact prehistoric and historical archaeological deposits could be present in undisturbed sediments on the proposed PHPP site (COP 2008a, pp. 5.4-34–5.4-36), and staff agrees with this assessment.

The applicant, in the above proposed mitigation measures, did not include archaeological monitoring, apparently preferring to rely on workers who have received some cultural resources training to identify any buried archaeological deposits that might be encountered during construction. The geoarchaeological literature study, however, did not dismiss the possibility that buried archaeological deposits could be present in all project areas. Staff thus recommends full-time archaeological monitoring along the linear facilities routes (including transmission line access and spur roads), at laydown areas, roads, and other ancillary areas, and on those parts of the project site that the geoarchaeological report identified as representing a terrace landform (having a high archaeological sensitivity).

To the applicant's suggested mitigation measures, staff has added additional recommendations or expanded upon the applicant's suggestions to ensure that all impacts to cultural resources are mitigated to below the level of significance. The applicant's suggested mitigation measures and staff's additional recommendations are incorporated into the proposed Conditions of Certification **CUL-1** through **CUL-8**, below, intended to provide for the contingency of discovering archaeological resources during PHPP construction and related activities. Staff's proposed **CUL-1** requires the project owner to retain and have available during PHPP construction-related excavations a Cultural Resources Specialist (CRS) who can evaluate any discovered buried resources and, if necessary, conduct data recovery as mitigation for the project's unavoidable impacts on them. **CUL-2** requires the owner to provide the CRS with all relevant cultural resources information and maps. **CUL-3** requires the owner to have CRS write and submit to the Energy Commission Compliance Project Manager (CPM) a Cultural Resources Monitoring and Mitigation Plan (CRMMP). **CUL-4** requires the owner to have the CRS write and submit to the CPM a final report on all PHPP cultural resources monitoring and mitigation activities. **CUL-5** requires the owner to train workers to recognize cultural resources and instruct them to halt construction if cultural resources are discovered. **CUL-6** prescribes construction monitoring, by an archaeologist and, possibly, by a Native American, intended to identify buried archaeological deposits. **CUL-6** also requires the owner, in the event that the project should unavoidably impact the Palmdale Ditch, to have the CRS provide a plan for the mitigation of those impacts. **CUL-7** requires the owner to halt ground-disturbing activities in the area of an archaeological discovery and to fund data recovery, if the discovery is evaluated as CRHR-eligible. **CUL-8** would cover the possibility that the proposed project would need to use off-site borrow or disposal areas that had not been surveyed for cultural resources in the past five years and provide for the treatment of any cultural resources

discovered during the course of that required survey.

Built-Environment Resources

Four of the five built-environment resources identified by the applicant and staff as listed in, eligible for, or potentially eligible for the CRHR would not be significantly impacted by the proposed project. Significant physical impacts on the remaining resource, the Palmdale Ditch, could occur. The applicant intends to avoid such impacts, but if impacts cannot be avoided and are significant, staff's recommended Condition of Certification **CUL-6** provides a means to mitigate such impacts to a less-than-significant level.

Air Force Plant 42 Building 15 (150)

Building 15 (150) would not be physically impacted by the project as the PHPP plant site and transmission lines are located outside the fenced boundary of the secure military facility. The building's integrities of setting and feeling would not be reduced by the addition to its setting of the PHPP because the ambient setting is already an industrial one. Since staff has identified no project impacts to this NRHP-eligible and potentially CRHR-eligible resource, no mitigation would be required.

Palmdale Ditch

A stone and concrete bridge associated with the Palmdale Ditch is located in or near the construction zone of the proposed gen-tie transmission line, which would cross the Palmdale Ditch at a perpendicular angle. The applicant expects to avoid physical impacts to the ditch and/or the bridge by spacing monopoles to span them, limiting construction activity to just the immediate monopole locations, and not extending a monopole access road across the gap that separates the two spanning poles (AECOM 2010b, att. CR-1).The ditch's integrity of setting and integrity of feeling would not be impacted by the replacement of the existing power poles and transmission lines with those of the proposed PHPP gen-tie line because other transmission lines are already present. Staff finds the project, as proposed, would have no significant impacts on the Palmdale Ditch, and so no mitigation would be required. **CUL-6** provides a means to mitigate any unanticipated and unavoidable impacts to the Palmdate ditch to a less-than-significant level.

Southern Pacific Railroad

The proposed project would not physically impact the railroad berm which parallels Sierra Highway, which staff believes to be, at least in part, the original 1876 berm. The applicant expects to construct the natural gas and reclaimed water pipelines parallel to the railroad right-of-way underneath Sierra Highway, from Avenue M south to Lockheed Way ,and to use horizontal drilling under the railroad and berm at the two locations where the pipelines intersect them, avoiding an impact (AECOM 2010a, p. 50; AECOM 2010b, p. 8). The applicant also provided historic aerial photography to show that the part of the Southern Pacific railroad that is intersected by the proposed gen-tie transmission line route, segment 1, is a spur that is not old enough to qualify for the CRHR. Consequently, any impact to the berm from the installation of the monopole would not be significant (AECOM 2010b, p. 8). Staff finds the project would have no significant impacts on the Southern Pacific Railroad, and so no mitigation would be required.

Eagle Rock-Pardee Transmission Line

In its documentation of this built-environment resource, the applicant indicated that the two H-frame supports located near the place where the proposed gen-tie transmission line would enter the Vincent Substation are not original to the 1928 Vincent Line, but were installed in 1967 (WSA 2009a, pp. 2–3). Therefore the project could physically impact only a part of the old transmission line that already lacks integrity of materials, integrity of design, and integrity of workmanship. The new gen-tie transmission line's impacts to the old line's integrity of setting and integrity of feeling would be negligible because the setting already includes infrastructure. Staff finds the project would have no significant impacts on the Eagle Rock-Pardee Transmission Line, and so no mitigation would be required.

Angeles Forest Highway

In its approach to the Vincent Substation, segment 2 of the proposed gen-tie transmission line runs up to the Angeles Forest Highway's right-of-way from the east and turns south, then west, to cross the highway before turning north to enter the substation (WSA 2009a, fig. 1, map 11). The transmission line would have no physical impact on the highway. The new gen-tie transmission line's impacts to the highway's integrity of setting and integrity of feeling would be negligible because the setting already includes infrastructure. Staff finds the project would have no significant impacts on the Angeles Forest Highway, and so no mitigation would be required.

Ethnographic Resources

No ethnographic resources were identified by the applicant or staff, so no mitigation measures for proposed PHPP impacts would be required for this kind of cultural resources.

Indirect Impacts

Neither the applicant nor staff identified any indirect impacts to any identified cultural resources in the project areas of the proposed PHPP, and so no mitigation measures for indirect impacts would be required for any class of cultural resources.

Summary of Significant Impacts to CRHR-Eligible Cultural Resources Requiring Mitigation

Staff identified no significant impacts to known archaeological resources, ethnographic resources, or built-environment resources. No mitigation for PHPP construction impacts to known resources would be required. Staff has recommended the adoption of conditions of certification that would provide for the appropriate treatment of any cultural resources encountered during construction and for the mitigation of unanticipated cultural resources impacts occurring during construction.

Operation Impacts and Mitigation

Staff has identified no cultural resources that would be impacted by the normal operation of the proposed project. Consequently, at this time, staff has recommended no conditions of certification addressing operation impacts. If, during operation of the PHPP, the owner should plan any changes or additions entailing ground disturbance,

the owner would have to petition the Energy Commission to review the environmental impacts of those activities and approve the plan. Cultural resources staff would then determine if previously undisturbed sediments would be affected by the planned activities and, if so, recommend the application of existing conditions or devise and recommend new ones to mitigate any impacts to known or newly identified CRHR-eligible cultural resources.

Cumulative Impacts and Mitigation

A cumulative impact refers to a proposed project's incremental effects considered over time and together with those of other, nearby, past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code sec. 21083; Cal. Code Regs., tit. 14, secs. 15064(h), 15065(a)(3), 15130, and 15355). Cumulative impacts to cultural resources in the PHPP vicinity could occur if any other existing or proposed projects, in conjunction with the proposed PHPP, had or would have impacts on cultural resources that, considered together, would be significant. The previous ground disturbance from prior projects and the ground disturbance related to the future construction of the PHPP and other proposed projects in the vicinity could have a cumulatively considerable effect on subsurface archaeological deposits, both prehistoric and historic. The alteration of the PHPP setting which could be caused by the construction and operation of the proposed PHPP and other proposed projects in the vicinity could be cumulatively considerable, but may or may not result in a significant impact, depending on the integrity of the ambient setting.

The applicant identified four reasonably foreseeable projects within a three-mile radius around the plant site (COP 2008a, pp. 5.1-2–5.1-3) that could contribute to a cumulatively considerable impact on cultural resources.

The Fairway Business Park is located approximately 1.3 miles southwest of the PHPP plant site in the City of Palmdale. Created by the Palmdale Community Redevelopment Agency in 1998 as a commercial and industrial park to attract large-scale industrial users, the Fairway Business Park occupies 120 acres on the south side of Avenue O between 7th Street West and Division Street. The Fairway Business Park is approximately 60% complete, with nine parcels totaling 39 acres vacant and available for development (COP 2008a, p. 5.1-2).

The Palmdale Transit Village Specific Plan is part of Palmdale's Multi-Modal Transportation Center development, putting housing, retail, and office space near the City's newly constructed Metrolink commuter rail and Antelope Valley Transit Authority bus transfer station. Located approximately 2.5 miles southwest of the PHPP plant site, the Transit Village site occupies approximately 100 acres to the south and west of the Multi-Modal Transportation Center. Construction has not yet begun. Development of the village will require removal of certain existing residential, commercial/industrial and public/school uses (COP 2008a, p. 5.1-2.

The Amargosa Creek Specific Plan is a 152-acre development of retail and office uses, a hotel, and a medical facility within the City's Commercial District and Medical District. It is located approximately 2.0 miles northwest of the PHPP plant site in the City of

Lancaster, at 10th Street West between Avenue L and Avenue K-8. The project's EIR was approved in 2007 (COP 2008a, p. 5.1-3).

The 30th Street West and Avenue K Projects include at this intersection a commercial development on the southwest corner (approximately 4.4 acres) and a commercial and townhome development on the southeast corner (approximately 8.5 acres). The projects are located approximately 3.0 miles northwest of the PHPP plant site in Lancaster. Approval was given to the southeast project site (COP 2008a, p. 5.1-3).

The applicant identified no planned projects any closer than 1.3 miles from the proposed PHPP (COP 2008a, p. 5.7-23). The construction of other projects in the same vicinity as the proposed PHPP could affect unknown subsurface archaeological deposits (both prehistoric and historic-period). These four planned projects must be considered as contributing to potential cumulative impacts on the cultural resources within this area. Cumulative impacts to cultural resources in the project vicinity could occur if impacts on cultural resources from the proposed PHPP, when added to those of these four projects, would be cumulatively considerable.

Staff assumes that cultural resources studies have been completed for these four projects as part of the local lead agency's CEQA review. Consequently, staff assumes that these studies identified any significant cultural resources and potential project impacts to these cultural resources, and that any impacts would either be avoided or mitigated to a less-than-significant level. Staff, however, has not reviewed the cultural resources studies for these projects.

This Preliminary Staff Assessment has identified cultural resources near the proposed PHPP site, assessed potential PHPP impacts to these cultural resources, and recommended conditions of certification to mitigate any significant impacts to known CRHR-eligible resources so that the construction of the proposed PHPP would not result in any significant impacts to historical resources, as defined in CEQA. Staff has also provided conditions of certification to mitigate any significant impacts to significant archaeological resources discovered during PHPP construction. Proponents of future projects in the vicinity of PHPP can mitigate impacts to as yet undiscovered CRHR-eligible, subsurface archaeological resources to less-than-significant levels by requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery. Impacts to human remains can be mitigated by following the protocols established by state law in Public Resources Code section 5097.98.

Since any impacts from the proposed PHPP to significant cultural resources discovered during PHPP construction would be mitigated to a less-than-significant level by the project's compliance with staff's proposed Conditions of Certification **CUL-1** through **CUL-8**, and since similar protocols can be applied to other current and future projects in the area, staff does not expect any incremental effects of the proposed PHPP to be cumulatively considerable, when viewed in conjunction with other projects.

COMPLIANCE WITH LORS

If the conditions of certification (below) are properly implemented, the proposed PHPP

would result in a less-than-significant impact on known cultural resources and on any new archaeological resources discovered during construction. The proposed PHPP would therefore be in compliance with the applicable state laws, ordinances, regulations, and standards listed in Table 1. Similarly, the project would be in compliance with Los Angeles County's General Plan, which requires CEQA review of project impacts to cultural resources within the county, and in compliance with the City of Palmdale's General Plan Objective ER7.1

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no agency or public comments on the cultural resources section of the Preliminary Staff Assessment.

CONCLUSIONS AND RECOMMENDATIONS

Staff identified no known CRHR-eligible cultural resources that the construction of the proposed PHPP would significantly impact. To facilitate the identification and assessment of previously unidentified archaeological resources encountered during construction and to mitigate any significant impacts from the project on any newly found resources assessed as CRHR-eligible, staff recommends that the Commission adopt the following cultural resources Conditions of Certification, **CUL-1** through **CUL-8**. These conditions provide for the hiring of a Cultural Resources Specialist and archaeological monitors, for cultural resources awareness training for construction workers, for the archaeological and Native American monitoring of ground-disturbing activities in specified areas, for the recovery of data from discovered CRHR-eligible archaeological deposits, for the writing of a technical archaeological report on all archaeological activities and findings, for the curation of recovered artifacts and other data, and for the cultural resources survey of any borrow or disposal areas the project later needs to use and the appropriate treatment of any CRHR-eligible resources identified in that survey. When properly implemented and enforced, staff believes that these conditions of certification would reduce any impacts to previously unknown CRHR-eligible cultural resources encountered during construction to a less-than-significant level. Additionally, with the adoption and implementation of these conditions, the PHPP would be consistent with all applicable state and local LORS.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance (includes "preconstruction site mobilization," "construction-related ground disturbance," and "construction-related grading, boring, and trenching," as defined in the General Conditions for this project), the project owner shall obtain the services of a Cultural Resources Specialist (CRS) and one or more alternate CRSs (at the project owner's option).

The CRS shall manage all cultural resources monitoring, mitigation, curation, and reporting activities in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural Resources

Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility for listing in the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner. No ground disturbance shall occur prior to Compliance Project Manager (CPM) approval of the CRS and alternates, unless such activities are specifically approved by the CPM.

Approval of a CRS may be denied or revoked for reasons including but not limited to non-compliance on this or other projects licensed by the Energy Commission. After all ground disturbance is completed and the CRS has fulfilled all responsibilities specified in these cultural resources conditions, the project owner may discharge the CRS, if the CPM approves. With the discharge of the CRS, these cultural resources conditions no longer apply to the activities of this power plant.

CULTURAL RESOURCES SPECIALIST

The project owner shall submit the resumes and qualifications for the CRS, CRS alternates, and all technical specialists to the CPM for review and approval. The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the CPM that their training and backgrounds conform to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61 (36 C.F.R., part 61). In addition, the CRS shall have the following additional qualifications:

1. The CRS's qualifications shall be appropriate to the needs of the project and shall include a background in anthropology, archaeology, history, architectural history, or a related field;

2. At least three years of archaeological or historical, as appropriate (per nature of predominant cultural resources on the project site), resource mitigation and field experience in California; and

3. At least one year of experience in a decision-making capacity on cultural resources projects in California and the appropriate training and experience to knowledgably make recommendations regarding the significance of cultural resources.

The resumes of the CRS and alternate CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS/alternate CRS on referenced projects and demonstrate to the satisfaction of the CPM that the CRS/alternate CRS has the appropriate training and experience to implement effectively the Conditions.

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. a B.S. or B.A. degree in anthropology, archaeology, historical archaeology or a related field and one year experience monitoring in California; or

2. an A.S. or A.A. degree in anthropology, archaeology, historical archaeology or a related field, and four years experience monitoring in California; or

3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology or a related field, and two years of monitoring experience in California.

CULTURAL RESOURCES TECHNICAL SPECIALISTS

The resume(s) of any additional technical specialist(s), e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

Verification:

1. At least 45 days prior to the start of ground disturbance, the project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval.

2. At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval. At the same time, the project owner shall also provide to the proposed new CRS the AFC and all cultural resources documents, field notes, photographs, and other cultural resources materials generated by the project. If there is no alternate CRS in place to conduct the duties of the CRS, a previously approved monitor may serve in place of a CRS so that ground disturbance may continue up to a maximum of 3 days without a CRS. If cultural resources are discovered then ground disturbance will remain halted until there is a CRS or alternate CRS to make a recommendation regarding significance.

3. At least 20 days prior to ground disturbance, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resources monitoring required by this Condition.

4. At least 5 days prior to additional CRMs beginning on-site duties during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to their qualifications.

5. At least 10 days prior to any technical specialists beginning tasks, the resume(s) of the specialists shall be provided to the CPM for review and approval.

6. At least 10 days prior to the start of ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources conditions.

CUL-2 Prior to the start of ground disturbance, if the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the

AFC, data responses, confidential cultural resources reports, all supplements, and the Energy Commission's Final Staff Assessment (FSA) for the project. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprints of the power plant, all linear facility routes, all access roads, and all laydown areas. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting cultural features or materials. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review map submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless such activities are specifically approved by the CPM.

If construction of the project would proceed in phases, maps and drawings not previously provided shall be provided to the CRS and CPM prior to the start of each phase. Written notice identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

Weekly, until ground disturbance is completed, the project construction manager shall provide to the CRS and CPM a schedule of project activities for the following week, including the identification of area(s) where ground disturbance will occur during that week.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

Verification:

1. At least 40 days prior to the start of ground disturbance, the project owner shall provide the AFC, data responses, confidential cultural resources documents, all supplements, and the Energy Commission FSA to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

2. At least 15 days prior to the start of ground disturbance, if there are changes to any construction-related footprint, the project owner shall provide revised maps and drawings for the changes to the CRS and CPM.

3. At least 15 days prior to the start of each phase of a phased project, the project owner shall submit the appropriate maps and drawings, if not previously provided, to the CRS and CPM.

4. Weekly, during ground disturbance, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, e-mail, or fax.

5. Within 5 days of changing the scheduling of phases of a phased project, the project owner shall provide written notice of the changes to the CRS and CPM.

CUL-3 Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by or under the direction of the CRS, to the CPM for review and approval. The CRMMP shall follow the content and organization of the draft model CRMMP, provided by the CPM, and the authors' name(s) shall appear on the title page of the CRMMP. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Implementation of the CRMMP shall be the responsibility of the CRS and the project owner. Copies of the CRMMP shall reside with the CRS, alternate CRS, each CRM, and the project owner's on-site construction manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless such activities are specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures:

1. The following statement included in the Introduction: "Any discussion, summary, or paraphrasing of the Conditions of Certification in this CRMMP is intended as general guidance and as an aid to the user in understanding the Conditions and their implementation. The conditions, as written in the Commission Decision, shall supersede any summarization, description, or interpretation of the conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A."

2. A proposed general research design that includes a discussion of archaeological research questions and testable hypotheses specifically applicable to the project area, and a discussion of artifact collection, retention/disposal, and curation policies as related to the research questions formulated in the research design. The research design will specify that the preferred treatment strategy for any buried archaeological deposits is avoidance. A mitigation plan shall be prepared for any CRHR-eligible (as determined by the CPM) resource, impacts to which cannot be avoided. A prescriptive treatment plan may be included in the CRMMP for limited data types.

3. Specification of the implementation sequence and the estimated time frames needed to accomplish all construction-related tasks during the ground disturbance and post-ground–disturbance analysis phases of the project.

4. Identification of the person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team.

5. A description of the manner in which Native American observers or monitors will be included, the procedures to be used to select them, and their role and responsibilities.

6. A description of all impact-avoidance measures (such as flagging or fencing) to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during ground disturbance, construction, and/or operation, and identification of areas where these measures are to be implemented. The description shall address how these measures would be implemented prior to the start of ground disturbance and how long they would be needed to protect the resources from construction-related effects.

7. A statement that all encountered cultural resources over 50 years old shall be recorded on Department of Parks and Recreation (DPR) 523 forms and mapped and photographed. In addition, all archaeological materials retained as a result of the archaeological investigations (survey, testing, data recovery) shall be curated in accordance with the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, into a retrievable storage collection in a public repository or museum.

8. A statement that the project owner will pay all curation fees for artifacts recovered and for related documentation produced during cultural resources investigations conducted for the project. The project owner shall identify three possible curation facilities that could accept cultural resources materials resulting from project activities.

9. A statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resource materials that are encountered during ground disturbance and cannot be treated prescriptively.

10. A statement demonstrating when and how the project owner will comply with Health and Human Safety Code 7050.5(b) and Public Resources Code 5097.98(b) and (e).

11. A description of the contents, format, and review and approval process of the final Cultural Resource Report (CRR), which shall be prepared according to ARMR guidelines.

Verification:

1. Upon approval of the CRS proposed by the project owner, the CPM will provide to the project owner an electronic copy of the draft model CRMMP for the CRS.

2. At least 30 days prior to the start of ground disturbance, the project owner shall submit the CRMMP to the CPM for review and approval.

3. At least 30 days prior to the start of ground disturbance, in a letter to the CPM, the project owner shall agree to pay curation fees for any materials generated or collected as a result of the archaeological investigations (survey, testing, data recovery).

4. Within 90 days after completion of ground disturbance (including landscaping), if cultural materials requiring curation were generated or collected, the project owner shall provide to the CPM a copy of an agreement with, or other written commitment from, a curation facility that meets the standards stated in the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, to accept the cultural materials from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

CUL-4 The project owner shall submit the final Cultural Resources Report (CRR) to the CPM for approval. The final CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The final CRR shall report on all field activities including dates, times and locations, results, samplings, and analyses. All survey reports, Department of Parks and Recreation (DPR) forms, data recovery reports, and any additional research reports not previously submitted to the California Historical Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as appendices to the final CRR.

If the project owner requests a suspension of ground disturbance and/or construction activities, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the CRS and submitted to the CPM for review and approval on the same day as the suspension/extension request. The draft CRR shall be retained at the project site in a secure facility until ground disturbance and/or construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

Verification:

1. Within 30 days after requesting a suspension of construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.

2. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the final CRR to the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.

3. Within 10 days after CPM approval of the CRR, the project owner shall provide documentation to the CPM confirming that copies of the final CRR have been provided to the SHPO, the CHRIS, the curating institution, if archaeological materials were collected, and to the Tribal Chairpersons of any Native American groups requesting copies of construction-related reports.

CUL-5 Prior to and for the duration of ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment at the project site, along the linear facilities routes, and at laydown areas, roads, and other ancillary areas. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when ground disturbance is completed or suspended, but must be resumed when ground disturbance, such as landscaping, resumes.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Samples or visuals of artifacts that might be found in the project vicinity;
3. A discussion of what such artifacts may look like when partially buried, or wholly buried and then freshly exposed;
4. A discussion of what prehistoric and historical archaeological deposits look like at the surface and when exposed during construction, and the range of variation in the appearance of such deposits;
5. Instruction that the CRS, alternate CRS, and CRMs have the authority to halt ground disturbance in the area of a discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;
6. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources discovery and shall contact their supervisor and the CRS or CRM, and that redirection of work would be determined by the construction supervisor and the CRS;
7. An informational brochure that identifies reporting procedures in the event of a discovery;
8. An acknowledgement form signed by each worker indicating that they have received the training; and
9. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

No ground disturbance shall occur prior to implementation of the WEAP program, unless such activities are specifically approved by the CPM.

Verification:

1. At least 30 days prior to the beginning of ground disturbance, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval.

2. At least 15 days prior to the beginning of ground disturbance, the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.

3. Monthly, until ground disturbance is completed, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of workers who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-6 The project owner shall ensure that the CRS, alternate CRS, or CRMs monitor full time all construction-related ground disturbance along the linear facilities routes, at laydown areas, roads, and other ancillary areas, and on those parts of the project site that the geoarchaeological report identified as representing a terrace landform (having a high archaeological sensitivity) to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner, including the Palmdale Ditch.

The project owner shall ensure that no damage to the Palmdale Ditch occurs during project construction. If the Palmdale Ditch is damaged in any way, including but not limited to disturbance of the masonry of the bridge and culverts, disturbance of the earthen profile or course, or disturbance of the tunnel mouth, the project owner shall submit to the CPM a plan for the recordation of the impacted parts of the ditch or features by an architectural historian who meets the U.S. Secretary of the Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61 (36 C.F.R., part 61). The recordation shall meet the standards of the Historic American Engineering Record.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of the earth-removing activities in the areas specified in the first paragraph of this condition, for as long as the activities are ongoing. Where excavation equipment is actively removing dirt and hauling the excavated material farther than fifty feet from the location of active excavation, full-time archaeological monitoring shall require at least two monitors per excavation area. In this circumstance, one monitor shall observe the location of active excavation and a second monitor shall inspect the dumped material. For excavation areas where the excavated material is dumped no farther than fifty feet from the location of active excavation, one monitor shall both observe the location of active excavation and inspect the dumped material.

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts are discovered. Contact lists of interested Native Americans and guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow ground disturbance to proceed without a Native American monitor.

The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered.

On forms provided by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resources activities and any instances of non-compliance with the Conditions and/or applicable LORS. Copies of the daily monitoring logs shall be provided by the CRS to the CPM, if requested by the CPM. From these logs, the CRS shall compile a monthly monitoring summary report to be included in the MCR. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended.

The CRS or alternate CRS shall report daily to the CPM on the status of the project's cultural resources-related activities, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

In the event that the CRS believes that the current level of monitoring is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

The CRS, at his or her discretion, or at the request of the CPM, may informally discuss cultural resources monitoring and mitigation activities with Energy Commission technical staff.

Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties assigned by the CRS, or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these Conditions.

Upon becoming aware of any incidents of non-compliance with the Conditions and/or applicable LORS, the CRS and/or the project owner shall notify the CPM by telephone or e-mail within 24 hours. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the Conditions. When the issue is resolved, the CRS shall write a report describing the issue, the resolution of the issue, and the effectiveness of the resolution measures. This report shall be provided in the next MCR for the review of the CPM.

Verification:

1. At least 30 days prior to the start of ground disturbance, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log.

2. Monthly, while monitoring is on-going, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS and shall attach any new DPR 523A forms completed for finds treated prescriptively, as specified in the CRMMP.

3. Immediately upon a CRM recognizing that PHPP construction will impact the Palmdale Ditch or any associated features in an unanticipated and adverse manner, the project owner shall submit to the CPM for review and approval a plan for the recordation of the impacted parts of the ditch or features. The plan shall be prepared by an architectural historian who meets the U.S. Secretary of the Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61 (36 C.F.R., part 61). The recordation shall be conducted by such a qualified architectural historian and shall meet the standards of the Historic American Engineering Record.

4. At least 24 hours prior to implementing a proposed change in monitoring level, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for changing the monitoring level.

5. Daily, as long as no cultural resources are found, the CRS shall provide a statement that "no cultural resources over 50 years of age were discovered" to the CPM as an e-mail or in some other form of communication acceptable to the CPM.

6. At least 24 hours prior to reducing or ending daily reporting, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for reducing or ending daily reporting.

7. No later than 30 days following the discovery of any Native American cultural materials, the project owner shall submit to the CPM copies of the information transmittal letters sent to the Chairpersons of the Native American tribes or groups who requested the information. Additionally, the project owner shall submit to the CPM copies of letters of transmittal for all subsequent responses to Native American requests for notification, consultation, and reports and records.

8. Within 15 days of receiving them, the project owner shall submit to the CPM copies of any comments or information provided by Native Americans in response to the project owner's transmittals of information.

CUL-7 The project owner shall grant authority to halt ground disturbance to the CRS, alternate CRS, and the CRMs in the event of a discovery. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event that a cultural resource over 50 years of age is found (or if younger, determined exceptionally significant by the CPM), or impacts to such a resource can be anticipated, ground disturbance shall be halted or redirected in the immediate vicinity of the discovery sufficient to ensure that the resource is protected from further impacts. If the discovery includes human remains, the project owner shall comply with the requirements of Health and Human Safety Code 7050.5(b) and (c). Monitoring and daily reporting as provided in these conditions shall continue during the project's ground-disturbing activities elsewhere. The halting or redirection of ground disturbance shall remain in effect until the CRS has visited the discovery, and all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the discovery (or changes in character or attributes), the action taken (i.e., work stoppage or redirection), a recommendation of CRHR eligibility, and recommendations for data recovery from any cultural resources discoveries, whether or not a determination of CRHR eligibility has been made.

2. If the discovery would be of interest to Native Americans, the CRS has notified all Native American groups that expressed a desire to be notified in the event of such a discovery.

3. The CRS has completed field notes, measurements, and photography for a DPR 523 "Primary" form. Unless the find can be treated prescriptively, as specified in the CRMMP, the "Description" entry of the DPR 523 "Primary" form shall include a recommendation on the CRHR eligibility of the discovery. The project owner shall submit completed forms to the CPM.

4. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the discovery and approved the CRS's proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

Verification:

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS, and CRMs have the authority to halt ground disturbance in the vicinity of a cultural resources discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning.

2. Within 48 hours of the discovery of a resource of interest to Native Americans, the project owner shall ensure that the CRS notifies all Native American groups that expressed a desire to be notified in the event of such a discovery.

3. Unless the discovery can be treated prescriptively, as specified in the CRMMP, completed DPR 523 forms for resources newly discovered during ground disturbance shall be submitted to the CPM for review and approval no later than 24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever the CRS decides is more appropriate for the subject cultural resource.

CUL-8 If fill soils must be acquired from a non-commercial borrow site or disposed of to a non-commercial disposal site, unless less-than-five-year-old surveys of these sites for archaeological resources are documented to and approved by the CPM, the CRS shall survey the borrow and/or disposal site/s for cultural resources and record on DPR 523 forms any that are identified. When the survey is completed, the CRS shall convey the results and recommendations for further action to the project owner and the CPM, who will determine what, if any, further action is required. If the CPM determines that significant archaeological resources that cannot be avoided are present at the borrow site, other Conditions shall apply. The CRS shall report on the methods and results of these surveys in the final CRR.

Verification:

1. As soon as the project owner knows that a non-commercial borrow site and/or disposal site will be used, he/she shall notify the CRS and CPM and provide documentation of previous archaeological survey, if any, dating within the past five years, for CPM approval.

2. In the absence of documentation of recent archaeological survey, at least 30 days prior to any soil borrow or disposal activities on the non-commercial borrow and/or disposal sites, the CRS shall survey the site/s for archaeological resources. The CRS shall notify the project owner and the CPM of the results of the cultural resources survey, with recommendations, if any, for further action.

CULTURAL RESOURCES ACRONYM GLOSSARY

PALMDALE COMBINED-CYCLE HYBRID POWER PROJECT

AD	After the Birth of Christ
AFC	Application for Certification
ARMR	Archaeological Resource Management Report
BC	Before the Birth of Christ
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
Conditions	Energy Commission's Conditions of Certification
COP	City of Palmdale, the applicant
CRHR	California Register of Historical Resources
CRM	Cultural Resources Monitor
CRMMP	Cultural Resources Monitoring and Mitigation Plan
CRR	Cultural Resource Report
CRS	Cultural Resources Specialist
DPR 523	Department of Parks and Recreation cultural resource inventory form
FSA	Final Staff Assessment
LORS	laws, ordinances, regulations, and standards
MCR	Monthly Compliance Report
MLD	Most Likely Descendent
NAHC	Native American Heritage Commission
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
PHPP	City of Palmdale Hybrid Combined-Cycle Power Project

Project Area of Analysis	The project site (see below) plus what additional areas staff defines for each project that are necessary for the analysis of the cultural resources that the project may impact.
Project Site	The bounded area(s) identified by the applicant as the area(s) within which they propose to build the project.
PSA	Preliminary Staff Assessment
SHPO	State Historic Preservation Officer
Staff	Energy Commission cultural resources technical staff
WEAP	Worker Environmental Awareness Program

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HAZARDOUS MATERIALS MANAGEMENT

Testimony of Alvin Greenberg, Ph.D. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed project, along with staff's proposed mitigation measures, indicate that hazardous materials use at the proposed Palmdale Hybrid Power Project (PHPP) would not present a significant impact on the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations and standards (LORS). In response to Health and Safety Code, section 25531 et seq., the applicant would be required to develop a Risk Management Plan (RMP). To ensure the adequacy of this plan, staff's proposed conditions of certification require that it be submitted for concurrent review by the Los Angeles County Fire Department, Health Hazardous Materials Division and the California Energy Commission (Energy Commission) staff. Other proposed conditions of certification address the transportation, storage, and use of aqueous ammonia and engineering controls on the pipes containing the heat transfer fluid in the solar generating system.

Applying the estimated flight accident incident rate calculated by staff above for AF Plant 42 with the Caltrans California Airport Land Use Planning Handbook (described above), staff believes that the probability of a flight accident at AF Plant 42 is very low and that the location of the accident would be within Safety Zones 1 or 2 at the end of the runway), not at the location of the Palmdale Hybrid Power Plant (the side zone). Therefore, staff concludes that the risk of a plane crashing into the solar array is less than significant.

INTRODUCTION

The purpose of this **HAZARDOUS MATERIALS MANAGEMENT** analysis is to determine if the proposed PHPP could potentially cause significant impacts on the public from the use, handling, storage, or transportation of hazardous materials at the proposed project site. If significant adverse impacts on the public are identified, Energy Commission staff must evaluate facility design alternatives and additional mitigation measures to reduce those impacts to an insignificant level.

This analysis does not address the potential exposure of workers to hazardous materials used at the proposed project site. Employers must inform employees of hazards associated with their work and provide those employees with special protective equipment and training to reduce the potential of health impacts from the handling of hazardous materials. The **WORKER SAFETY AND FIRE PROTECTION** section of this document describes the protection of workers from those risks.

Aqueous ammonia (less greater than 20 % ammonia in aqueous solution) is the only hazardous material proposed for use or storage at the PHPP in quantities exceeding the reportable amounts defined in California Health and Safety Code, section 25532 (j) (COP 2008a, section 5.6.3.3) and thus requires a Risk Management Plan to be developed and implemented. Aqueous ammonia will be used for controlling oxides of nitrogen (NOx) emissions through selective catalytic reduction. The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with use of the more hazardous anhydrous form of ammonia. Use of the aqueous form eliminates the high internal energy associated with the anhydrous form, which is stored as a liquefied gas at elevated pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air and cause high down-wind concentrations. Spills associated with the aqueous form are much easier to contain than those associated with anhydrous ammonia, and emissions from these spills are limited by the slow mass transfer from the surface of the spilled material.

Other hazardous materials such as mineral and lubricating oils, corrosion inhibitors, water treatment chemicals, catalyst panels, acids and bases to control pH, and a heat transfer fluid (HTF) will be present at the proposed project site. No acutely toxic hazardous materials will be used on-site during construction. None of these materials pose a significant potential for off-site impacts as a result of the quantities on-site, their relative toxicity, their physical states, and/or their environmental mobility.

Although no natural gas is stored, the project will involve the handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. Natural gas will be delivered via a new gas pipeline that would travel about 8.7 miles south from the project site to an interconnection with the Southern California Gas Company line (COP 2008a, section 5.6.3.3) and the safety and maintenance will be the responsibility of the Southern California Gas Company.

PHPP will also require the transportation of aqueous ammonia to the facility, as well as other liquid and solid hazardous materials. This document addresses all potential impacts associated with the use, storage, and transport of 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 (LORS)

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)	Establishes a nationwide emergency planning and response program, and imposes reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA Section on Risk Management Plans (42 USC §112(r)	Requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 CFR 172.800	Requires that the suppliers of hazardous materials prepare and implement security plans in accordance with U.S. Department of Transportation (DOT) regulations.
49 CFR Part 1572, Subparts A and B	Requires that suppliers of hazardous materials ensure that their hazardous material drivers comply with personnel background security checks.
The Clean Water Act (CWA) (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures (SPCC) plan to be prepared for facilities that store oil that could leak into navigable waters.
Title 49, Code of Federal Regulations, Part 190	Outlines gas pipeline safety program procedures.
Title 49, Code of Federal Regulations, Part 191	Addresses the transportation of natural and other gases by pipeline. Requires preparation of annual reports, incident reports, and safety-related condition reports. Also requires operators of pipeline systems to notify the U.S. Department of Transportation DOT) of any reportable incident by telephone and submit a follow-up written report within 30 days.
Title 49, Code of Federal Regulations, Part 192	Addresses transportation of natural and other gases by pipeline: Requires minimum federal safety standards, specifies minimum safety requirements for pipelines, and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use that characterize the

	surrounding land. This part also contains regulations governing pipeline construction, which must be followed for Class 2 and Class 3 pipelines, and requirements for preparing a pipeline integrity management program.
6 CFR Part 27	The CFATS (Chemical Facility Anti-Terrorism Standard) regulation of the U.S. Department of Homeland Security (DHS) that requires facilities that use or store certain hazardous materials to submit information to the DHS so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
California Health and Safety Code, section 25531 to 25543.4	The California Accidental Release Program (Cal-ARP) requires the preparation of a Risk Management Plan (RMP) and Off-site Consequence Analysis (OCA) and submittal to the local Certified Unified Program Authority (CUPA) for approval.
Title 8, California Code of Regulations, Section 5189	Requires facility owners to develop and implement effective safety management plans to ensure that large quantities of hazardous materials are handled safely. While these requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.
Title 8, California Code of Regulations, Section 5189 Process Safety Management	Sets forth requirements for design, construction, and operation of the vessels and equipment used to store and transfer ammonia. These sections generally codify the requirements of several industry codes including the American Society for Material Engineering (ASME) Pressure Vessel Code, the American National Standards Institute (ANSI) K61.1, and the National Boiler and Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia but are also used to design storage facilities for aqueous ammonia. It also requires facility owners to develop and implement effective process safety management plans when toxic, reactive, flammable, or explosive chemicals are maintained on site in quantities that exceed regulatory thresholds.
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.
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	
California Fire Code, Title 8 City of Palmdale Code Section 8.04.400	Adopts the California Fire Code, 2007 Edition, into City of Palmdale regulations.

The Los Angeles County Fire Department, Health Hazardous Materials Division acts as the Certified Unified Program Authority (CUPA), and is responsible for reviewing RMPs and Hazardous Materials Business Plans. With regard to seismic safety issues, the proposed PHPP site is located in Seismic Risk Zone 4. The construction and design of buildings and vessels storing hazardous materials will meet the seismic requirements of the California Building Code (COP 2008a, section 5.6.3.3).

SETTING

Several characteristics of an area in which a project is located affect its potential for an accidental release of a hazardous material. 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 health risks. When wind speeds are low and the atmosphere is stable, dispersion is severely reduced and can lead to increased localized public exposure.

Recorded wind speeds and ambient air temperatures are described in the Air Quality section (5.2.2.1) and Appendix G.1 of the Application for Certification (AFC) (COP 2008a). Staff agrees with the applicant that use of F stability (stagnated air, very little mixing), wind speed of 1.5 meters per second, and the highest recorded temperature in the project area over a recent three-year period (108°F) are excessive and thus very conservative input variables for conducting the worst case modeling for the offsite consequence analysis (COP 2008a, section 5.6.3.3). Staff believes this represents an overstated conservative scenario and thus truly reflects worst-case atmospheric conditions.

TERRAIN CHARACTERISTICS

The location of elevated terrain is often an important factor in assessing potential

exposure. An emission plume from an accidental release may impact high elevations before it impacts lower elevations. The topography of the PHPP site and immediate vicinity is generally flat at about 2,500 feet above sea level. Elevated terrain exists to the west and south of the project where the Tehachapi Mountains reach an elevation of about 5,000 feet within 10 miles (COP 2008a, Section 5.2.2).

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 large bearing on health risk. Sensitive receptors and residences in the project vicinity (within a 3-mile radius) are listed in **Appendix G.7** and shown in **Figure 5.10-2** (COP 2008a). The nearest sensitive receptor is an adult care center located approximately 0.4 miles west of the site boundary, and the nearest residence is approximately 0.25 miles north of the site boundary (COP 2008a, Section 5.6.2.1 and Figure 5.10-2).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff reviewed and assessed the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals and natural gas were evaluated. Staff's analysis examines 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 utilizes the most current acceptable public health exposure levels (both acute and chronic) to protect the public from the effects of an accidental chemical release.

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

Staff reviewed the applicant's proposed engineering and administrative controls for hazardous material use. Engineering controls are physical or mechanical systems such as storage tanks or automatic shut-off valves that can prevent a spill of hazardous material from occurring, or that can limit the spill to a small amount or confine it to a

small area. Administrative controls are rules and procedures that workers must follow to help either prevent accidents or keep them small if they do occur. Both engineering and administrative controls can act as either methods of prevention or methods of response and minimization. In both cases, the goal is to prevent a spill from moving off-site and harming the public.

Staff reviewed and evaluated the proposed use of hazardous materials, as described by the applicant (COP 2008a, section 5.6). Staff's assessment followed the five steps listed below:

- Step 1: Staff reviewed the chemicals and amounts proposed for on-site use, as listed in Table 5.6-3 of the AFC and Table DR-27 of the Data Responses (AECOM 2009a) and determined the need and appropriateness of their use. Only those that are needed and appropriate are allowed to be used. If staff feels that a safer alternative chemical can be used, staff will recommend or require its use, depending upon the impacts posed.
- 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 the 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 size 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 even with 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 project be allowed to use hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small Quantity Hazardous Materials

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

During the construction phase of the project, the only hazardous materials proposed for use include paint, cleaners, solvents, gasoline, diesel fuel, motor oil, and lubricants. Any impact of spills or other releases of these materials would be limited to the site because of the small quantities involved, the infrequent use and hence 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 all have very low volatility and would represent limited off-site hazards, even in larger quantities.

During operations, hazardous chemicals such as cleaning agents, lube oil, sulfuric acid, sodium hydroxide, sodium hypochlorite, and other various chemicals (see **Hazardous Materials Appendix B** for a list of all chemicals proposed to be used and stored at PHPP) would be used and stored on-site and represent limited off-site hazard due to their small quantities, low volatility, and/or low toxicity. However, small amounts of cleaning agents and laboratory reagents and gases are not listed in **Hazardous Materials Appendix B** and the project owner will not be required to report the presence of those materials unless they exceed certain volumes, amounts, concentrations, are regulated as extremely hazardous chemicals pursuant to 40 CFR Part 355 Appendix A, or are required by the Compliance Project Manager (CPM) based upon it's toxic, flammable, combustible, caustic, or explosive nature.

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 to review the remaining hazardous materials: natural gas, the heat transfer fluid Therminol , and aqueous ammonia.

Large Quantity Hazardous Materials

Natural Gas

Natural gas poses a fire and/or possible explosion risk because of its flammability. Natural gas is composed mostly of methane, but it also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, tasteless, and lighter than air. Natural gas can cause asphyxiation when methane's concentration exceeds 90 %. Methane is flammable when mixed in air at concentrations of 5-14 %, which is also its detonation range. Natural gas therefore poses a risk of fire and/or explosion if a release were to occur under certain specific conditions. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1998), natural gas is less likely to result in an unconfined vapor cloud explosion than many other fuel gases such as propane or liquefied petroleum gas although an unconfined vapor cloud of natural gas can explode under certain conditions (as demonstrated by the natural gas explosion in Belgium in July 2004).

While natural gas will be used in significant quantities, it will not be stored on-site. It will be delivered via a new 8.7-mile gas pipeline to be constructed by the Southern California Gas Company (SCG) running south from the project site. The gas pipeline

route would follow existing rights-of-ways through the City of Palmdale (COP 2008a, Section 2.1).The risk of a fire and/or explosion on-site can be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. The National Fire Protection Association (NFPA 85A) requires the use of double block and bleed valves for gas shut-off and automated combustion controls. These measures will significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures would require air purging of the gas turbines prior to start-up, thus precluding formation of an explosive mixture. The Safety Management Plan proposed by the applicant would address both the handling and use of natural gas and significantly reduce the potential for equipment failure due to either improper maintenance or human error.

The natural gas pipeline must be designed to meet California Public Utilities Commission General Order 112 standards, and 49 CFR 192 standards for pipelines located in populated areas. CPUC General Order 112-E, Section 125.1 requires that at least 30 days prior to the construction of a new pipeline, the owner must file a report with the commission that will include a route map for the pipeline. The natural gas pipeline must be constructed and operated in accordance with the Federal Department of Transportation (DOT) regulations, Title 49, Code of Federal Regulations (CFR), Parts 190, 191, and 192 (see Table 1 LORS). Therefore, the safety requirements for gas-fired power plant pipeline construction vary according to the population density and land use which characterize the surrounding land. Construction and maintenance requirements become more stringent with increasing population density. In addition, staff reviewed the proposed power plant gas supply lines for worst case consequences and determined that additional conditions on the construction and maintenance (such as deeper burial depths and concrete capping) were not warranted. The State of California Public Utilities Commission, the U.S. DOT Pipeline and Hazardous Materials Safety Administration, and the U.S. Chemical Safety Board are currently reviewing the safety and maintenance programs for existing natural gas pipelines and may make additional recommendations or requirements in the near future. However, until they do, staff concludes that existing LORS are sufficient to ensure that a less than significant risk of pipeline failure would exist with a newly installed gas pipeline.

Therminol VP-1

Therminol VP1 is the HTF that will be used in the solar panels to collect solar heat and transfer it in order to generate steam to run the steam turbine. Approximately 260,000 gallons of HTF will be contained in the pipes and heat exchanger. Therminol is a mixture of 73.5 % diphenyl ether and 26.5 % biphenyl, and is a solid at temperatures below approximately 54°F. Therminol can therefore be expected to remain liquid if a spill occurs. While the risk of off-site migration is minimal, Therminol is highly flammable and fires have occurred at other solar generating stations that use it. Staff has assessed the properties of Therminol, and reviewed the record of its use at Solar Electric Generating Stations 8 and 9 at Harper Lake, California. Past leaks, spills, and fires

involving this HTF were examined and discussed. It appears that the placement of additional isolation valves in the HTF pipe loops throughout the solar array would add significantly to the safety and operational integrity of the entire system by allowing a loop to be closed if a leak develops in a ball joint, flex-hose, or pipe, instead of closing off the entire HTF system and shutting down the plant. In order to ensure that HTF leaks do not pose a significant risk, staff proposes Condition of Certification **HAZ-7,** which would require the project owner to install a sufficient number of isolation valves that can be either manually, remotely or automatically activated so as to limit the maximum amount of spilled HTF to the entire contents of a single solar array "loop", 1250 gallons. This amount is a maximum amount that could be lost if a catastrophic break in a HTF pipe in the solar field were to break. It is based on the size of the solar array pipe loops and an effort to avoid placing too many valves in the pipes as valves create friction and turbulence and thus disrupt slightly the flow of the heat transfer fluid. Disrupting the flow will cause a decrease in power generation. The maximum amount that could be lost, therefore, is based upon engineering and efficiency factors that staff finds reasonable. Too many valves would cause disruption in flow and too few valves would result in a far larger maximum potential spill volume. This is not to say that any leak will result in the maximum amount that could be released. Most leaks in existing solar power plants will be very small and result in very small amounts lost. Other shut-off valves will be placed in areas of the power block to isolate a leak. Additionally, the Cal-OSHA Process Safety Management (PSM) standard will apply and thus staff proposes that this requirement be included in proposed Condition of Certification **HAZ-2**.

Furthermore, Therminol breaks down when heated to the temperatures of a solar system and thus VOC emissions occur which include the toxic HTF decomposition products. The impacts of the release of these decompositions products, which include benzene, are addressed in the **Public Health** section of this FSA.

Aqueous Ammonia

Aqueous ammonia would be used to control the emission of oxides of nitrogen (NO_x) from the combustion of natural gas at the PHPP. The accidental release of aqueous ammonia, without proper mitigation, can cause significant down-wind concentrations of ammonia gas. The PHPP would store 19 % aqueous ammonia solution in a stationary aboveground storage tank, with an approximate 30,000-gallon capacity (COP 2008a, section 5.6.3.3).

Based on staff's analysis, aqueous ammonia is the only hazardous material that may pose a significant off-site risk. The use of aqueous ammonia can result in the formation and release of toxic gases in the event of a spill, even without interaction with other chemicals. This is the result of its moderate vapor pressure and the large amounts of aqueous ammonia to be used and stored on-site. However, as with the example of using aqueous sodium hypochlorite as a substitute for the very hazardous chlorine gas,

the use of aqueous ammonia instead of the much more hazardous anhydrous ammonia (in other words, ammonia that is not diluted with water) poses far less risk.

Staff believes that the transfer of liquid hazardous materials such as aqueous ammonia from a tanker truck to an on-site storage tank would pose the predominant risk involving hazardous materials use. Proposed condition **HAZ-3** requires the development of a Safety Management Plan for the delivery of all liquid hazardous materials, including aqueous ammonia. 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 will further reduce the risk of any accidental release not specifically addressed by the proposed spill prevention mitigation measures and the required RMP, and further prevent the mixing of incompatible materials that could result in the generation of toxic vapors.

To assess the potential impacts of an accidental release of aqueous ammonia from the storage tank, staff uses four “bench mark” exposure levels of ammonia gas These include: 1) the lowest concentration that poses a lethal risk, 2,000 parts per million (ppm); 2) the Immediately Dangerous to Life and Health (IDLH) level of 300 ppm; 3) the Emergency Response Planning Guideline l(ERPG) level 2 of 150 ppm, which is also the RMP level 1 criterion used by US EPA and California; and 4) the level considered by Energy Commission staff to be without serious adverse effects to the public for a one-time exposure of 75 ppm (considered by staff to be a *level above which significant impact may occur and thus requires further analysis*). If exposure to a potential release exceeds 75 ppm at any public receptor, staff will assess the probability of occurrence of the release and/or the nature of the potentially exposed population in determining if the likelihood and extent of potential exposure are sufficient to support a finding of potentially significant impact. A detailed discussion of the exposure criteria considered by staff, and their applicability to different populations and exposure-specific conditions, is provided in **Hazardous Materials Appendix A**.

Section 5.6.3.3 of the AFC (COP 2008a) describes the modeling parameters used for the worst-case and alternative accidental releases of aqueous ammonia in the applicant’s Off-site Consequence Analysis (OCA). The OCA was conducted by the applicant and based on the proposed design configuration for the PHPP ammonia storage tank. The OCA considered tank size, the surface area of the containment structure, the location of the storage area relative to potential off-site receptors, local climatology, and the type of release. Pursuant to the California Accidental Release Program (CalARP) regulations (federal Risk Management Plan regulations do not apply to sources that store/use aqueous ammonia solutions below 20 %), the OCA was performed for the worst-case release scenario, which involved the failure and complete discharge of the storage tank, as well as an alternative release scenario which assumed a contained 10-minute release from a loading hose separation during ammonia delivery.

Ammonia emissions from two potential release scenarios were calculated, following methods provided in the RMP *Offsite Consequence Analysis Guidance*, US EPA, April 1999. The default meteorological data necessary for emission and dispersion calculations were supplemented with daily temperature data, as required by Title 19, California Code of Regulations, section 2750.2. The maximum temperature recorded in the area between 2002 and 2004 (108°F) was used for emission and dispersion calculations.

Results from the OCA were tabulated showing the distance from the point of release (the source) to four benchmark concentrations for both release scenarios. These results are summarized in Table 5.6-4 of the AFC and reproduced here as **Hazardous Materials Management Table 2.**

Hazardous Materials Management Table 2
Distance to EPA/CalARP and CEC Toxic Endpoints

Release Scenario	Distance in Feet to 2,000 ppm	Distance in Feet to 500 ppm	Distance in Feet to 200 ppm	Distance in Feet To 75 ppm
Worst Case	~53	~106	~158	~264
Alternative	~11	~53	~53	~106

(Source: COP 2008a, Table 5.6-4)

The applicant's modeling predicts that concentrations exceeding staff's level of concern (75 ppm) would only extend 80 meters (about 264 feet) from the ammonia storage tank. Due to these results, which show that significant concentrations of ammonia would not extend beyond the site boundaries for either scenario, staff did not conduct its own modeling. Staff believes that the engineering controls proposed by the applicant and staff will be adequate and will ensure that no significant risk would be posed to off-site receptors should a spill of aqueous ammonia occur.

Mitigation

Staff believes that this project's use of hazardous materials poses no significant risk but only if mitigation measures are used. 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 prevent accidents and releases (spills) from moving off-site and impacting the community by incorporating engineering safety design criteria into the project's design. Engineering safety features proposed by the applicant include:

- Construction of secondary containment areas surrounding each of the hazardous materials storage areas, designed to contain accidental releases during storage or delivery plus the rainfall associated with a 25-year, 24-hour storm event;
- Physical separation of stored chemicals in isolated containment areas to prevent the accidental mixing of incompatible materials, which may in turn cause the formation and release of toxic gases or fumes;
- Use of flow and/or pressure sensors in the HTF system loops to detect even slight leaks;
- Construction of a steel-reinforced concrete containment structure surrounding the aqueous ammonia tank, capable of holding 110 % of the tank volume and which drains into an underground sump through a 4 ft^2 opening;
- Construction of a curbed and paved containment area surrounding the ammonia truck unloading area that drains into the ammonia tank secondary containment structure and from there into the underground sump; and
- Process protective systems, including continuous tank level monitors, temperature and pressure monitors, ammonia vapor monitors, alarms, check valves, and emergency block valves.

Administrative Controls

Administrative controls help prevent accidents and releases (spills) from moving off-site and impacting the community by establishing worker training programs and process safety management programs.

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/FIRE PROTECTION** section in this FSA for specific regulatory requirements):

- Worker training on 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 that use hazardous materials including the preparation of a process safety management plan (PSM Plan) for the use and handling of the heat transfer fluid Therminol;
- Fire safety and prevention; and
- Emergency response actions including facility evacuation, hazardous material spill cleanup, and fire prevention including the preparation of a SPCC Plan.

At the PHPP, the project owner will be required to designate an individual who will have the responsibility and authority to ensure a safe and healthful workplace. This project health and safety official will oversee the health and safety program and will have the authority to halt any action or modify any work practice in order to protect the workers, facility, and the surrounding community in the event that the health and safety program is violated.

The applicant will also prepare a Risk Management Plan (RMP) for aqueous ammonia as required by CalARP regulations and Condition of Certification **HAZ-2** that would include a program for prevention of accidental releases and responding to an accidental release of aqueous ammonia. A Hazardous Materials Business Plan (HMBP) will also be prepared by the applicant. This HMBP would comply with state requirements that a list of all the hazardous materials that will be used and stored at the power plant be provided, that the locations of hazardous materials storage also be provided so as to aid fire-fighters in immediately locating spills, that proper precautions to take to avoid spills and keep spills from migrating off-site are readily listed, and that other approaches for the handling of hazardous materials are listed as well (COP 2008a, section 5.6.1.2). (See also proposed condition **HAZ-1** which will ensure that no hazardous material would be used at the facility except as listed in Appendix B of this staff assessment, unless there is prior approval by the Energy Commission Compliance Project Manager.) The information required in a HMBP serves to mitigate the presence of stored hazardous materials by ensuring that they are stored in a safe manner.

On-site Spill Response

In order to address spill response, the facility will prepare and implement an emergency response plan which includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, prevention equipment and capabilities, etc. 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 Countermeasure (SPCC) Plan. The quantity of oil contained on the site would be in excess of the minimum quantity that requires such a plan. However, there are no known waters of the State or of the United States and thus staff's position is that an SPCC Plan is not required by 40 CFR 112 but is required pursuant to California HSC Sections 25270 through 25270.13. Therefore, the PHPP would be required to prepare a SPCC because it will store 10,000 gallons or more of petroleum (diesel fuel, lube oil, and mineral oil) 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).

The Los Angeles County Fire Department (LACFD) Station No. 129, located about one mile west of the proposed PHPP site, would be the responder for hazardous materials incidents. The hazmat unit at this station includes nine personnel per shift and is fully equipped to handle any type of hazardous materials spill. The response time to a hazmat emergency call from PHPP would be approximately 4 minutes (LACFD 2008). Staff concludes that the hazardous material response time is excellent, and that the LACFD HazMat Response Team is adequately trained and equipped to respond to an emergency at PHPP in a timely manner.

Additionally, past experience at other solar generating stations in existence has shown that HTF will be spilled on a rather routine basis and that proper handling and disposal of the soil containing the HTF is required. This matter is discussed in the **WASTE MANAGEMENT** section of this FSA.

Transportation of Hazardous Materials

Hazardous materials including aqueous ammonia will be transported to the facility via tanker truck. While many types of hazardous materials may be transported to the site, staff believes that the transport of aqueous ammonia poses the predominant risk associated with hazardous materials transport.

Hazardous materials would be delivered to the project site via SR-14, East Avenue M, and the facility's access road (COP 2008a, section 5.6.3.3).

Ammonia or other liquid hazardous materials can be released during a transportation accident, and the extent of their impact in the event of a release would depend on the location of the accident and the rate of vapor dispersion from the surface of the spilled pool. The likelihood of an accidental release during transport is dependent upon three factors:

- The skill of the tanker truck driver;
- The type of vehicle used for transport; and
- Accident rates.

To address this concern, staff evaluated the risk of an accidental transportation release in the project area. Staff's analysis focused on the project area after the delivery vehicle leaves the main highway (SR-14). Staff believes it is appropriate to rely upon the extensive regulatory program that applies to shipment of hazardous materials on California Highways to ensure safe handling in general transportation (see the Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, the U.S. Department of Transportation Regulations 49 CFR Subpart H, §172-700, and the California DMV Regulations on Hazardous Cargo). These regulations also address issues of driver competence. See AFC section 5.13 for additional information on regulations governing the transportation of hazardous materials.

To address tank truck safety, aqueous ammonia will be delivered to the proposed facility in Department of Transportation (DOT) certified vehicles with a design capacity of 8,000 gallons. These vehicles will be designed to DOT Code MC-307. These are high-integrity vehicles designed for hauling caustic materials such as ammonia. Staff has, therefore, proposed Condition of Certification **HAZ-5** to ensure that, regardless of which vendor supplies the aqueous ammonia, delivery will be made in a tanker that meets or exceeds the specifications described in these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific

literature on hazardous materials transportation (including tanker trucks) accident rates in both the United States and California. Staff relied on six references and three federal government databases to assess the risks of a hazardous materials transportation accident. Staff used the data from the Davies and Lees (1992) article, which references the 1990 Harwood et al., study, to determine that the frequency of release of all transportation of hazardous materials (not just from tanker trucks) in the U.S. is between 0.06 and 0.19 releases per million miles traveled on well-designed roads and highways. The maximum annual use of aqueous ammonia for operation of the proposed PHPP will require about 14 deliveries each month (COP 2008a, Section 5.6.3.3), for a total of 168 annual tanker truck deliveries of aqueous ammonia, each delivering about 8,000 gallons. Each delivery will travel approximately 3.5 miles from SR-14 via E Avenue M to the project site.

This would result in an estimated 590 miles of delivery tanker truck travel in the project area per year (with a full load). Staff believes that the risk over this distance is insignificant over a period of one year or over the expected life of the power plant (0.003 accidents predicted over a 30-year period). Data from the U.S. DOT show that the actual risk of a fatality (not an accident) over the past five years from all modes of hazardous material transportation (rail, air, boat, and truck) is approximately 0.1 in one million with many of the fatalities due to the physical impact of the accident itself rather than from exposure to spilled hazardous materials.

Staff therefore believes that the risk of exposure to significant concentrations of aqueous ammonia during transportation to the facility is insignificant because of the remote possibility of accidental release of a sufficient quantity to present a danger to the public. The transportation of similar volumes of hazardous materials on the nation's highways is neither unique nor an infrequent occurrence. Staff's analysis of the transportation of aqueous ammonia to the proposed facility (along with data from the DOT) demonstrates that the risk of accident and exposure are less than significant.

Based on the environmental mobility, toxicity, quantities present, and frequency of delivery, it is staff's opinion that aqueous ammonia poses the predominate risk associated with hazardous materials transportation and use at the proposed facility. Staff concludes that the risk associated with the transportation of other hazardous materials to the proposed facility does not significantly increase the risk of impact beyond that associated with ammonia transportation.

Seismic Issues

The possibility exists that an earthquake could cause the failure of a hazardous materials storage tank. A quake could also cause the failure of the secondary containment system (berms and dikes), as well as electrically controlled valves and pumps. The failure of all these preventive control measures might then result in a vapor cloud of hazardous materials that could move off-site and impact residents and workers in the surrounding community. The effects of the Loma Prieta earthquake of 1989, the

Northridge earthquake of 1994, and the earthquake in Kobe, Japan, in January 1995, heighten concerns about earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused to several large and small storage tanks at the water treatment system of a cogeneration facility. The tanks with the greatest damage, including seam leakage, were older tanks, while newer tanks sustained lesser damage with displacements and attached line failures. Therefore, staff conducted an analysis of the codes and standards, which should be followed to adequately design and build storage tanks and containment areas that could withstand a large earthquake. Staff also 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 were impacted by this quake. Referring to the sections on **GEOLOGIC HAZARDS AND RESOURCES** and **HAZARDOUS MATERIALS MANAGEMENT** in the AFC, staff notes that the proposed facility will be designed and constructed to the applicable standards of the 2007 California Building Code for Seismic Zone 4 (COP 2008a, 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 Chili (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 Chili, 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

PHPP proposes to use hazardous materials identified by the US EPA as materials where special site security measures should be developed and implemented to prevent unauthorized access. US EPA published a *Chemical Accident Prevention Alert* regarding site security (EPA 2000a), the U.S. Department of Justice published a special report on Chemical Facility Vulnerability Assessment Methodology (US DOJ 2002), the North American Electric Reliability Corporation (NERC) published *Security Guidelines for the Electricity Sector* in 2002 (NERC 2002) as well as issued a Critical Infrastructure Protection standard for cyber security (NERC 2009), and the U.S. Department of Energy published a draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE 2002). The energy generation sector is one of 14 areas of critical Infrastructure listed by the U.S. Department of Homeland Security. On April 9, 2007, the U.S Department of Homeland Security published, in the Federal Register (6

CFR Part 27), an Interim Final Rule requiring facilities that use or store certain hazardous materials to conduct vulnerability assessments and implement certain specified security measures. This rule was implemented with the publication of Appendix A, the list of chemicals, on November 2, 2007. While the rule applies to aqueous ammonia solutions of 20 % or greater and this proposed facility plans to utilize less than 20 % aqueous ammonia, staff still believes that all power plants under the jurisdiction of the Energy Commission should implement a minimum level of security consistent with the guidelines listed here.

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-8** and **HAZ-9** 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. The results of the off-site consequence analysis prepared as part of the RMP will be used, in part, to determine the severity of the consequences of a catastrophic 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 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 PHPP would fall into the "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 and breach detectors, possibly guards, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contact in the event of a security breach.

Site access for vendors will be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleets and employ only drivers who are properly licensed and trained. The project owner will 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 per 49 CFR 172.800 and ensure that certain large volume hazardous materials drivers are in compliance with personnel background security checks per 49 CFR Part 1572, Subparts A and B. 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.

Airport Risk Assessment

The PHPP fence line is proposed to be located approximately 1500 feet north of the side of runway 7/25 of Air Force Plant 42, a military airport that is also used by commercial aviation airplanes for landing and takeoff practice. This airport has a tower and thus follows advanced electronic flight rules (ILS) for approach, landings, and departures. The nearest solar collector trough array will be located approximately 2000 feet north of the west end of runway 7/25 (the east/west runway).

AF Plant 42 is under direct control of the United States Air Force and any aircraft use of the field must receive official permission from the Air Force. The runways are used mostly by the military with approximately 80 % of the daily flights consisting of military aircraft (e.g., C5As, C130s, and fighter jets) practicing touch and go landings and take offs, approximately 16 % consisting of approved local and transient general aviation flights, approximately 2 % air taxi service, and approximately 2 % commercial aircraft take off and landing practice (FAA 2010). Experimental and secret military aircraft assembled at AF Plant 42 are usually transported via land to nearby Edwards Air Force base for air operations and testing. Despite the fact that 16 % of the flights are general aviation, the length of the runway, the use of a tower, and the restriction on flights to only those approved by the Air Force render this airport a “military” airport, a distinction relevant to assessing risk and safety zones.

Staff has determined through personal communications that the yearly maximum number of flights flown into and out of Air Force Plant 42 Airport is 35,000 per year. Using the figure of 35,000/yr, and assuming that departures and landings are evenly distributed, that amounts to approximately 17,500 departures/yr. It was estimated by staff from viewing satellite images of the density of aircraft tire tread marks on the runway that the vast majority of landings and departures (greater than 75 %) occur on runway 25 headed west (due to the prevailing winds in the area coming mostly from the west).

If a plane should crash during approach or take off, it is conceivable that the crash could occur in the solar field of the PHPP. Such a crash would be catastrophic in nature to the plane’s occupants and to the solar field as the damage to the pipes containing the highly combustible/flammable heat transfer fluid would undoubtedly result in a fire at the crash site. Because a crash could result in the failure of some safety shut-off systems,

there is a high potential for escalation of a crash induced fire in the solar field. The occupants of an airplane involved in a crash into a solar field would undoubtedly experience severe injuries and have a high probability of death. Staff describes this type of accident as a **low probability/high consequence** event, yet the consequences would be low in terms of population impacts and impacts to the power grid.

Staff does not consider an aircraft flying over the solar array at high or low altitude either in transit or when circling to be a significant contributor to the risk of a plane crashing. The ability of military and commercial aircraft that have multiple engines to avoid the power plant and the ability of general aviation single-engine aircraft to glide a considerable distance after malfunction reduces the probability of a plane crashing specifically into the PHPP under these circumstances to below a level of significance. However, because the probability of a crash increases during take off and landing upon direct approach, the proximity of the solar fields north of the east-west runway of Air Force Plant 42 increases the risk of a crash into the solar fields. Staff evaluated similar accident scenarios during the High Desert, Blythe Energy Project I, and Blythe Solar Power Plant siting cases and determined that the probability of occurrence in those cases were less than 1 in 10,000,000 (Tyler 1999) and 2.4 accidents over a 30 year period upon take-off (Greenberg 2010).

The probability of an aircraft crashing into the solar field is proportional to the frequency of flights (specifically take offs from and approaches to runways that would have the plane flying over or very near the solar field) and the relative location of the target facility in relationship to the runway (Hodges et al 1993).

The National Transportation Safety Board (NTSB) and the California Department of Transportation (Caltrans) Division of Aeronautics found that airport size and type of aviation use are significant determinants in assigning an accident statistic to the category of being airport-related and of occurring in the “airport vicinity”. Both the NTSB and Caltrans criteria treat an aircraft accident occurring within a 5-mile radius (as measured from the airport center in accordance with the NTSB data format), as meeting this criterion. This radius would include the entire PHPP site.
In order to more accurately determine the probability of such an accident occurring, staff conducted a risk assessment. Staff conducted its analysis based using two methodologies:

1. Airport safety zones, as described in The California Airport Land Use Planning Handbook, State of California Department of Transportation, Division of Aeronautics, January 2002; and

2. Actual aviation accident statistics for the most recent years available (1999 - 2009) obtained from the NTSB. Since accident rates for military flights are not available from the NTSB and only practice flights involving commercial aircraft occur at this airport, the use of commercial flight accident rates is used and

considered an over-estimation of accident potential.

Probability of a Crash into the Solar Array using the California Airport Land Use Planning Handbook

In reviewing, establishing, and maintaining airport safety zones, the surrounding land use (present and future) is the most important factor. The consequences of an off-airport aircraft accident are highly dependent upon the nature of the land use at the accident site. The California Department of Transportation (Caltrans) evaluates three criteria when assessing an airport's need for a safety zone:

1. Intensity of land use (people per acre),
2. Residential versus nonresidential land uses, and
3. Sensitive uses which contain two subcategories:
    - Low Effective Mobility Occupancies (schools, day care centers, hospitals, and nursing homes), and
    - Hazardous Materials locations (aboveground storage tanks).

Caltrans has developed runway protection zones (RPZs), which are rectangular or trapezoidal-shaped areas located at ground level beyond and to the sides of each end of a runway. The size of an RPZ is airport-specific and depends upon type of landing approach available at the airport (visual, non-precision, or precision) and the type of aircraft (e.g., single or multi-engine, commercial, private, or military) operating at the airport. If a part of a RPZ is not under direct airport control, the FAA recommends that churches, schools, hospitals, office buildings, shopping centers, and other places of public assembly, as well as fuel storage facilities, be prohibited. Beyond the runway protection zones, the FAA has no specific safety-related land use guidance other than airspace protection. Caltrans, however, recommends Safety Compatibility Zones depending upon the length of the runways. The safety zones are described as follows:

Zone 1: Runway protection zone;
Zone 2: Inner approach/departure zone;
Zone 3: Inner turning zone;
Zone 4: Outer approach/departure zone;
Zone 5: Sideline zone; and
Zone 6: Traffic pattern zone.

The zones are specific to runway length. In the case of Air Force Plant 42, the runway lengths are in the category Military Runway for Large Aircraft. The AF Plant 42 airport runway lengths are:

- East/West runways 7/25: 12,002 ft.
- NE by SW runways 4/22: 12,001 ft.

Caltrans Figure 9L depicts the Accident Potential Zones (APZs) for large air carriers and for military aircraft established by the U.S. Department of defense in the guideline *entitled "Air Installation Compatible Use Zones (AICUZ)"* program. The sideline zone 5 for large air carriers is 2000 feet while no sideline zone exists for military flights (but the figure does describe a 2000-ft. side zone) as they are assumed to take off and land on straight-in approaches.

Using this data, Caltrans suggests the following safety zones for a large air carrier/military airport:

Zone 1: Runway Protection Zone
Very high risk requires airport ownership of property, prohibit all new structures.

Zone 2: Inner Approach/Departure Zone
Substantial risk requires a prohibition on residential and most commercial uses but allows large, agricultural parcels. Prohibit children's schools, day care centers, hospitals, nursing home, and fuel storage tanks.

Zone 4: Outer Approach/Departure Zone

This zone is particularly applicable to busy general aviation runways with straight-in instrument approach procedures and other runways where straight-in or straight-out flight paths are common. This zone prohibits schools, day care centers, hospitals, and nursing homes. This zone can be reduced in size or eliminated for runways with very-low activity levels

On this basis, Caltrans recommends the following guidelines:

Zone 1: Runway Protection Zone - Maintain all undeveloped land clear of objects in accordance with FAA standards.

Zone 2: Inner Approach/Departure Zone -Seek to preserve 25 % to 30 % of the overall zone as usable open land.
Zone 4: Outer Approach/Departure Zone - Maintain approximately 15 % to 20 % open land within the overall zone.

When this information is applied to AF Plant 42, it appears that the proposed PHPP is outside of all the safety zones suggested by Caltrans for a military airport.

Staff concludes, therefore, that the risk of a plane crash into the PHPP due to approach or take off from AF Plant 42 would be less than significant. Staff notes that the application of these criteria by the Los Angeles County Land Use Commission for the Palmdale Regional Airport when it existed on the AF Plant 42 site and used the runways resulted in the establishment of Runway Protection Zones (RPZs) located only directly at the end of each runway with no side zones established (Los Angeles County 2004).

This is consistent with the Caltrans criteria. However, the Planning Boundary/Airport Influence Area would include the entire PHPP site but being within this area would not prevent the placement of a thermal solar or natural gas power plant or require any other safety factor to be assessed.

Probability of a Crash into the Solar Array using aviation accident statistics for the period 1990 through 2009

As stated above, staff has determined through personal communications that the yearly maximum number of flights flown into and out of Air Force Plant 42 Airport is 35,000 per year. Using the figure of 35,000/yr, and assuming that departures and landings are evenly distributed, that amounts to approximately 17,500 departures/yr. It was noted from viewing satellite images of the runway that the vast majority of the take-offs and landings occurred on runway 25 headed west (due to the prevailing winds in the area coming mostly from the west).

According to the NTSB Aviation Accident Statistics, Table 5, U.S. Air Carriers years 1990 through 2009, the rate for all accidents ranged from 0.25 to 0.5 per 100,000 departures. Staff used this value for commercial air operations as a surrogate for military flights as both are straight in and out and involve large well-maintained aircraft with trained pilots. Thus, one can see that the maximum predicted accident rate for 17,500 departures per year would be far less than one per year, approximately 0.088 accidents per year. If the solar field were active for 30 years, this statistical method would predict 2.6 accidents over a 30 year period upon take-off. However, this method does not predict where the accident would occur in relation to the airport and the solar array.

The probability for approaches would be much lower and since the majority of flights landing would do so at the far eastern end of runway 25 and thus not near the solar field at the western end of the runway, a simple doubling of the departure probability would greatly overestimate the total risk of departures and landings. Evidence indicates that no more than 25 % of landings occur on runway 7 (near the solar field) and thus adding 25 % of 2.6 accidents/yr shows an estimated accident rate at AF Plant 42 airport of 3.25 flight accidents over the 30-year life of the PHPP, again without predicting where the accidents would occur. Since the flight-line is straight in, it is expected that the accidents would be in direct line with the runway and not to the sides.

Staff's Conclusion

Applying the estimated flight accident incident rate calculated by staff above for AF Plant 42 with the Caltrans California Airport Land Use Planning Handbook (described above), staff believes that the probability of a flight accident at AF Plant 42 is very low and that the location of the accident would be within Safety Zones 1 or 2 at the end of the runway), not at the location of the Palmdale Hybrid Power Plant (the side zone). Therefore, staff concludes that the risk of a plane crashing into the solar array is less

than significant. Staff notes that this analysis assumes conditions (weather, location of structures around the airport, and estimated flight usage) that exist during the period accident data have been complied continue on a similar trend in the near future. If factors on the ground change (e.g., glare and thermal plumes coming from the proposed solar power plant) in the AF Plant 42 vicinity significantly, staff's conclusion could change.

CUMULATIVE IMPACTS AND MITIGATION

Staff considered the potential for impacts due to a simultaneous release of aqueous ammonia from the proposed PHPP and existing or planned facilities in the immediate vicinity of the project. Section 5.1.1 of the AFC describes future projects in the Cities of Palmdale and Lancaster. None of the listed projects would store or use hazardous materials and therefore they do not pose a risk of hazardous materials-related cumulative impacts.

The applicant will develop and implement a hazardous materials handling program for the PHPP independent of any other projects considered for potential cumulative impacts. Staff believes that the facility, as proposed by the applicant 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 the PHPP 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.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the PHPP would be in compliance with all applicable LORS for both long-term and short-term project impacts in the area of hazardous materials management.

AGENCY AND PUBLIC COMMENTS

Comments on **Hazardous Materials Management** issues were received from Air Force Plant 42. Concern was raised about the site security cameras viewing and recording activities at Plant 42

Response: Staff agrees with the need to maintain security at AF Plant 42 and has revised proposed Condition of Certification **HAZ-9** to require that all site CCTVs be angled and physically restricted so as to not view or record any activity at Air Force Plant 42.

CONCLUSIONS

Staff's evaluation of the proposed project (with proposed mitigation measures) concludes that hazardous material use, storage, and transportation will not pose a significant impact on the public. Staff's analysis also shows that there will be no significant cumulative impact. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable LORS. In response to Health and Safety Code, section 25531 et seq., the applicant will be required to develop an RMP. To ensure adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by US EPA, the Health Hazardous Materials Division of the Los Angeles County Fire Department, and Energy Commission staff. In addition, staff's proposed conditions of certification require the review and approval by staff of the RMP prior to delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issues of the transportation, storage, and use of aqueous ammonia, and other site security matters.

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

Staff proposes nine conditions of certification, some of which are mentioned in the text (above), and listed below. **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in the AFC, unless there is prior approval by the Energy Commission Compliance Project Manager. **HAZ-2** requires that an RMP, and SPCC Plan, and a PSM Plan be prepared and submitted prior to the delivery of aqueous ammonia and Therminol.

Staff believes that an accidental release of aqueous ammonia during transfer from the delivery tanker to the storage tank is the most probable accident scenario, and therefore proposes Condition of Certification **HAZ-3**, which requires the development of a Safety Management Plan for the delivery of all liquid hazardous materials, including aqueous ammonia. 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 will further reduce the risk of any accidental release not specifically addressed by the proposed spill prevention mitigation measures and the required RMP, and further prevent the mixing of incompatible materials that could result in the generation of toxic vapors. **HAZ-4** requires that the aqueous ammonia storage tank be designed to certain rigid specifications. The transportation of hazardous materials is addressed in **HAZ-5** and **6**. The placement of isolation valves in the HTF loops near the solar panels is addressed in **HAZ-7**. Site security during both the construction and operation phases is addressed in **HAZ-8** and **HAZ-9**.

Applying the estimated flight accident incident rate calculated by staff above for AF Plant 42 with the Caltrans California Airport Land Use Planning Handbook (described above), staff believes that the probability of a flight accident at AF Plant 42 is very low and that the location of the accident would be within Safety Zones 1 or 2 at the end of the runway), not at the location of the Palmdale Hybrid Power Plant (the side zone). Therefore, staff concludes that the risk of a plane crashing into the solar array is less than significant.

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 During commissioning and operations, the project owner shall not use any hazardous materials not listed in **Appendix B**, below, or in greater quantities than those identified by chemical name in **Appendix B,** unless approved in advance by the Compliance Project Manager (CPM). All inert gases are exempt from this requirement. Paints, thinners, laboratory reagents, and herbicides in amounts less than 20 gallons or 20 pounds are exempt from this requirement unless containing a chemical at any amount which is regulated as an extremely hazardous chemical pursuant to 40 CFR Part 355 Appendix A, or is required by the Compliance Project Manager (CPM) to be listed based upon it's toxic, flammable, combustible, caustic, or explosive nature.

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 provide a Business Plan, a Spill Prevention, Control, and Countermeasure Plan (SPCC), a Process Safety Management Plan (PSMP) and a Risk Management Plan (RMP) to the Health Hazardous Materials Division of the Los Angeles County Fire Department and the CPM for review. After receiving comments from the Health Hazardous Materials Division of the Los Angeles County Fire Department and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final plans shall then be provided to the Health Hazardous Materials Division of the Los Angeles County Fire Department for information and to the CPM for approval.

Verification: At least thirty (30) days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Business Plan to the CPM for approval.

At least thirty (30) days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the CUPA for information and to the CPM for approval.

At least thirty (30) days prior to delivery of Therminol to the site, the project owner shall provide the final PSM Plan and SPCC Plan to the CUPA for information and to the CPM

for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for delivery of aqueous ammonia and other liquid and gaseous hazardous materials by tanker truck. 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 including provisions to maintain lockout control by a power plant employee not involved in the delivery or transfer operation. This plan shall be applicable during construction, commissioning, and operation of the power plant.

Verification: At least thirty (30) days prior to the delivery of any liquid or gaseous hazardous material via tanker truck 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 aqueous ammonia storage facility shall be designed to either the ASME Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, the storage tank shall be protected by a secondary containment basin capable of holding 125% of the storage volume or the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm. The final design drawings and specifications for the ammonia storage tank and secondary containment basins shall be submitted to the CPM.

Verification: At least thirty (30) days prior to delivery of aqueous ammonia to the facility, the project owner shall submit final design drawings and specifications for the ammonia storage tank and secondary containment basin to the CPM for review and approval.

HAZ-5 The project owner shall direct all vendors delivering aqueous ammonia to the site to use only tanker truck transport vehicles which meet or exceed the specifications of DOT Code MC-307.

Verification: At least thirty (30) days prior to receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

HAZ-6 The project owner shall direct all vendors delivering any hazardous material to the site for use during commissioning and commercial operations to use only the route approved by the CPM. Trucks and tankers will travel on SR-14 and exit onto East Avenue M and from which they will enter the plant site via the access road. If the route must be changed for any reason, the project owner shall obtain the review and approval of the CPM not later than ten (10) days before the next shipment of hazardous materials is due to arrive at the facility and shall notify the Los Angeles County Fire Department at the same time a

request for route change is submitted to the CPM.

Verification: At least thirty (30) days prior to receipt of any hazardous materials on site, the project owner shall submit copies of the required transportation route limitation direction to the CPM for review and approval. Any change to the route must be reviewed and approved by the CPM and must be made in writing not less than ten (10) days prior to the next shipment of hazardous materials to the facility.

HAZ-7 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 loop in the event of a leak of fluid such that the volume of a total loss of HTF from that isolated loop will not exceed 1,250 gallons. These valves shall be capable of being actuated manually and remotely. 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 construction.

Verification: At least sixty (60) days prior to the commencement of solar array construction, the project owner shall provide the design drawings as described above to the CPM for review and approval.

HAZ-8 At least thirty (30) days 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 thirty (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-9 The project owner shall prepare a site-specific Security Plan for the operational

phase and shall submit it to the CPM for review and approval. The project owner shall implement site security measures addressing physical site security and hazardous materials storage. The level of security to be implemented shall not be less than that described as 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 and meet the requirements specified in Condition of Certification **BIO-11**.

2. Main entrance security gate, either hand operable 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 ascertain the accuracy of employee identity and employment history, and shall be conducted in accordance with state and federal law regarding security and privacy;

   b. A statement(s) (refer to sample, attachment "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 contractor personnel that visit the project site.

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

8. A statement(s) (refer to sample, attachment "C") signed by the owners or authorized representative of Therminol, hydrogen, 93% sulfuric acid, and aqueous ammonia transport vendors certifying that they have prepared and implemented security plans in conformity 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 able to pan, tilt, and zoom (PTZ), recordable, and viewable in the power plant control room and

security station (if separate from the control room) providing a view of the main entrance gate, the entrance to the control room, and the ammonia storage tank but angled and physically restricted so as to not view or record any activity at Air Force Plant 42; and

10. Additional measures to ensure adequate perimeter security consisting of either:
    a. Security guard(s) present 24 hours per day, seven days per week, **or**
    b. Power plant personnel on-site 24 hours per day, seven days per week and:
        1) The northern and eastern sections of the perimeter fence around the solar array shall be viewable by the CCTV system; **or**
        2) have perimeter breach detectors **<u>or</u>** on-site motion detectors for all fence lines.

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to the security plans. The CPM may authorize modifications to these measures, or may require additional measures, such as protective barriers for critical power pant components (e.g., transformers, gas lines, compressors, etc.) depending on circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Council, after consultation with appropriate law enforcement agencies and the applicant.

<u>Verification:</u> At least 30 days prior to the initial receipt of 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 updated certification statements are appended to the Operations Security Plan. In the Annual Compliance Report, the project owner shall include a statement that the Operations Security Plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

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

Basis for Staff's Use of 75 PPM Ammonia Exposure Criteria

BASIS FOR STAFF'S USE OF 75 PPM AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 PPM to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this level is not consistent with the 200-ppm level used by EPA and Cal/EPA in evaluating such releases pursuant to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's analysis of the proposed project. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines (ERPGs) states that "these values have been derived as planning and emergency response guidelines, **not** exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. CEQA requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through feasible changes or alternatives to the proposed project.

Staff has chosen to use the National Research Council's 30-minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events, and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm STPEL. **Hazardous Materials**

Appendix B provides a summary of adverse effects, which might be expected to occur at various airborne concentrations of ammonia

Hazardous Materials Appendix A Table-1
Acute Ammonia Exposure Guidelines

Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guid
NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 min.	Exposure above this level requires "highly reliable" respiratory protect poses the risk of death, serious irr injury or impairment of the ability t
EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 min.	Protects nearly all segments of ge population from irreversible effects
NIOSH	Adult healthy male workers	35 ppm	15 min. four times per 8 hr day	No toxicity, including avoidance of
NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 min.	Significant irritation but no impact personnel in performance of emer work; no irreversible health effects adults. Emergency conditions one exposure
NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 min. 30 min. 10 min.	Significant irritation but protects ne segments of general population fr irreversible acute or late effects. O accidental exposure
NIOSH	Adult healthy male workers	25 ppm	8 hr.	No toxicity or irritation on continuo exposure for repeated 8 hr. Work
AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 min.	Exposures above this level entail* unacceptable risk of irreversible ef healthy adult members of the gene population (no safety margin)

1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)

RC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both ed exposure and increased exposure duration.

NRC 1979) describes a study involving young animals, which suggests greater sensitivity to acute exposure in young animals. The (WHO 1986) warns tha elderly, asthmatics, those with bronchitis and those that exercise should also be considered at increased risk based on their demonstrated greater suscepti n-specific irritants.

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Abbreviations for Hazardous Materials Appendix A, Table 1

ACGIH	American Conference of Governmental and Industrial Hygienists
AIHA	American Industrial Hygienists Association
EEGL	Emergency Exposure Guidance Level
EPA	Environmental Protection Agency
ERPG	Emergency Response Planning Guidelines
IDLH	Immediately Dangerous to Life and Health Level
NIOSH	National Institute of Occupational Safety and Health
NRC	National Research Council
STEL	Short Term Exposure Limit
STPEL	Short Term Public Emergency Limit
TLV	Threshold Limit Value
WHO	World Health Organization

Hazardous Materials
Appendix B

Hazardous Materials Proposed for Use
At the
Palmdale Hybrid Power Project

Hazardous Materials Appendix B
Hazardous Materials Proposed for Use at the PHPP[a]

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	Federal Reportable Quantity
Acetylene	74-86-2	Welding gas	Health: moderate toxicity Physical: toxic	800 cubic feet	NA
Aqueous Ammonia <20% solution	7664-41-7	NO_X Emissions Control	Health: high toxicity Physical: corrosive, irritant	30,000 gallons	100 pounds
Boiler Water Treatment Chemicals; may include: Carbohydrazide Diethylhydroxylamine Sodium bisulfite Sodium metabisulfite Sodium sulfite Morpholine, Cyclohexamine, Diethylaminoethanol Aminomethylpropanol Methoxypropylamine	Various 497-18-7 3710-84-7 7631-90-5 7681-57-4 7757-83-7 110-91-8 108-91-8 100-37-8 124-68-5 5332-73-0	Oxygen scavenger and neutralizing amine for boiler water treatment.	Health: low to moderate toxicity Physical: varies by ingredient, may be flammable, combustible, and/or corrosive	660 gallons	NA except for Sodium bisulfite: 5,000 pounds
Calcium Oxide (Lime)	1305-78-8	pH Adjustment	Health: low toxicity	4,000 pounds	NA
Carbon Dioxide	124-38-9	Fire suppression	Health: low toxicity Physical: non-flammable gas	24 tons	NA
Diesel Fuel	68476-34-6	Black-start generator fuel, fire-water pump engine	Health: low toxicity Physical: combustible liquid	1,200 gallons (generator), 300 gallons (fire-water pump engine)	NA
Hydrogen	1333-74-0	Generator coolant	Health: low toxicity Physical: flammable gas	320 pounds stored in a tube trailer plus 320 pounds in the cooling loop.	NA
Hydraulic Fluid	None		Health: low to moderate toxicity Physical: Class IIIB combustible liquid	500 gallons in equipment, 110 gallons in storage	NA
Lubrication Oil	64742-65-0	Lubricate rotating equipment	Health: low toxicity	4,000 gallons	NA
Mineral Insulation Oil	8042-47-5		Health: low toxicity	65,000	NA

				gallons	
Monopotassium Phosphate	7778-77-0	Fertilizer	Health: low toxicity Physical: irritant	250 pounds	NA
NALCO Tri-Act 1800 Cyclohexlyamine (5 – 10%) Monoehtonolamine (10 – 30%) Methoxyproplyamnie (10 – 30%)	 108-91-8 141-43-5 5332-73-0	Water Treatment Chemical	Health: high toxicity Physical: corrosive, Class II combustible liquid	Plastic Totes, 2 x 400 gallons	NA
NALCO Elimin-Ox Carbohydazide (5 – 10%)	497-18-7	Water Treatment Chemical	Health: moderate toxicity Physical: sensitizer	Plastic Totes, 2 x 400 gallons	NA
NALCO 3D Trasar 3DT185 Phosphoric Acid (60 – 100%)	7664-38-2	Water Treatment Chemical	Health: high toxicity Physical: corrosive	Plastic Totes, 2 x 400 gallons	5,000 pounds
NALCO 3D Trasar 3DT177 Phosphoric Acid (30%)	7664-38-2	Water Treatment Chemical	Health: moderate toxicity Physical: irritant	Plastic Totes, 2 x 400 gallons	5,000 pounds
NALCO 3D Trasar 3DT190 Substituted aliphatic aldehyde	None	Water Treatment Chemical	Health: low toxicity Physical: irritant	Plastic Totes, 2 x 400 gallons	NA
NALCO Acti-Brom ® 7342 Sodium Bromide	7647-15-6	Water Treatment Chemical	Health: low toxicity Physical: irritant	Plastic Totes, 2 x 400 gallons	NA
NALCO pHreedom® 5200M Sodium salt of phosphonomethylated diamine	None	Water Treatment Chemical	Health: low to moderate toxicity Physical: irritant	Plastic Totes, 2 x 400 gallons	NA
NALCO PCL-1346	None	Water Treatment Chemical	Health: low toxicity Physical: irritant	Plastic Totes, 2 x 400 gallons	NA
NALCO Permacare ® PC-7408 Sodium Bisulfite	7631-90-5	Water Treatment Chemical	Health: low toxicity Physical: irritant	Plastic Totes, 2 x 400 gallons	5,000 pounds
NALCO BT-3000 Sodium Hydroxide Sodium Tripolyphosphate	 1310-73-2 7758-29-4	Water Treatment Chemical	Health: high toxicity Physical: corrosive	Plastic Totes, 2 x 400 gallons	 1,000 pounds NA
NALCO 8338 Sodium Nitrite Sodium Tolytriazole Sodium Hydroxide	 7632-00-0 64665572 1310-73-2	Water Treatment Chemical	Health: moderate toxicity Physical: toxic	Plastic Totes, 2 x 400 gallons	 100 pounds NA 1,000 pounds
Natural Gas (methane)	74-82-8	Fuel for the CTGs	Health: low toxicity Physical: flammable gas	140 pounds in equipment and piping	NA
Oxygen	7782-44-7	Welding gas	Health: low toxicity Physical: oxidizer	800 cubic feet	NA

Sodium Hydroxide (50%)	1310-73-2	pH control	Health: high toxicity Physical: corrosive	7,500 gallons	1,000 pounds
Sodium Hypochlorite (12.5%)	7681-52-9	biocide	Health: high toxicity Physical: poison-b, corrosive	2,500 gallons	100 pounds
Sulfuric Acid (93%)	7664-93-9	pH control	Health: high toxicity Physical: corrosive, water reactive	10,000 gallons	1,000 pounds
Therminol VP-1: Diphenyl Ether (73.5%) Biphenyl (26.5%)	 101-84-8 92-52-4	Heat transfer fluid	Health: moderate toxicity Physical: irritant, combustible liquid (Class III-B)	260,000 gallons	 NA 100 pounds

a. Source: COP 2008a Table 5.6-3 and AECOM 2009a Table DR-27

LAND USE

Testimony of Negar Vahidi and Susanne Huerta

SUMMARY OF CONCLUSIONS

Staff concludes that the proposed project would not result in a significant conversion of any farmland to non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts; and would not disrupt or divide the physical arrangement of an established community. However, construction of the proposed transmission line would disrupt existing agricultural activities. Therefore, staff has recommended Condition of Certification **LAND-1**, which would require the applicant to coordinate with agricultural landowners prior to construction in order to ensure minimal disruption to agricultural activities.

Due to land use actions taken by the city of Palmdale in 2009, the 377-acre city-owned site is intended for development of the proposed Palmdale Hybrid Power Project (PHPP). Therefore, staff concludes that the proposed project site would be compatible with existing on-site or nearby uses because it is consistent with the city's general plan and zoning, as well as the character of permitted uses and planned development for the area.

The proposed project includes a 35.6-mile 230-kV transmission line which would be constructed within new and existing rights-of-way (ROW), and an underground natural gas pipeline. Approval of the portion of the proposed transmission line within the city of Palmdale (approximately 18.2 miles) and the natural gas pipeline would be contingent upon Condition of Certification **LAND-2**, which includes a Site Plan Review, as requested by the city (City of Palmdale 2010). Approximately 17.4 miles of the proposed transmission line ROW would be within unincorporated areas of Los Angeles County. Because transmission lines are not specifically listed as a use in the county's general plan and zoning ordinance, staff sought the county's interpretation of their land use documents. In response, the county stated that their zoning ordinance does not regulate such projects and does not require a conditional use permit (LAC 2010a). Therefore, staff has determined that the proposed transmission line would not be inconsistent with the county's applicable LORS.

In addition, the County of Los Angeles' Department of Parks and Recreation stated in their comments on the PSA that the proposed transmission line easement in Segment 1 would be in the same location as the proposed Avenue S Connector Trail (#147), and is requesting a minimum of a 12-foot wide trail easement from the western edge of parcel #AIN39011005 to the eastern edge of parcel #AIN3039006021 (LAC 2010a). As such, staff is recommending Condition of Certification **LAND-3**, which would require a trail easement, as requested by the county. Implementation of **LAND-3** would avoid conflicts with the county's proposed connector trail.

INTRODUCTION

The land use analysis of the PHPP Application for Certification (AFC) focuses on the project's consistency with land use plans, ordinances, regulations, and policies; and the project's compatibility with existing and planned land uses. In general, a power plant and its related facilities could be incompatible with surrounding land uses if they cause unmitigated impacts in the areas of noise, dust, public health, traffic, and visual resources. These individual resource areas are discussed in detail in separate sections of this document. A power plant may also create a significant land use impact if it converts Important Farmlands to non-agricultural uses.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Land use LORS directly applicable to the proposed project include the Air Force's Air Installation Compatible Use Zone Study, the General Plan and Zoning Ordinance of the city of Palmdale, and the General Plan and Zoning Code of Los Angeles County. **LAND USE Table 1** provides a general description of land use LORS applicable to the proposed project. The project's consistency with these LORS is discussed in **LAND USE Table 2**.

LAND USE Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	
Air Installation Compatible Use Zone (AICUZ) Study – Air Force Plant 42 (AICUZ, 2002)	This study is an update to the 1990 Production Flight Test Installation for the U.S. Air Force Plant 42. The update presents and documents changes to the AICUZ amendment for the period 1991-2001 and is based on the 2001 aircraft operations condition, which includes anticipated future operations and aircraft maintenance activity. Specifically, the study provides noise contours and compatible use guidelines for land areas surrounding the installation, and promotes compatible land development in areas subject to aircraft noise and accident potential. As the cities of Palmdale and Lancaster and Los Angeles County prepare and modify land use development plans, recommendations from this study should be included in the planning process to prevent incompatible land uses that may compromise the ability of Plant 42 to fulfill its mission.
State	None
Local	
City of Palmdale General Plan (City of Palmdale 1993)	The City of Palmdale is located in the High Desert region of Los Angeles County, and is one of two incorporated cities and several unincorporated communities within the Antelope Valley. Issues on growth patterns and community goals are addressed in all elements of the General Plan. In particular, the Land Use Element establishes long-term objectives, goals and policies for addressing the significant issues facing the community through a variety of land use planning strategies.
City of Palmdale Zoning Ordinance (City of Palmdale 1994)	The Palmdale Zoning Ordinance provides for the creation of zones in the incorporated area of the City of Palmdale and prescribes area requirements, classes of uses and standards of development for buildings, structures, improvements and premises.
County of Los Angeles General Plan (LAC 1980)	This plan is a tool for initiating and responding to change and provides a framework for coordinating short and long range actions designed to meet the needs of the public. It also sets forth guidelines for how the county should allocate resources over the next few decades.
Antelope Valley Areawide General Plan, 1986 (LAC 1986)	In conjunction with the other Chapters and Elements of the County of Los Angeles General Plan, this plan is a coordinated statement of public policy by the county of Los Angeles for use in making important public decisions relating to the future of the Antelope Valley. The role of this plan is to assist in this evaluation process and to identify desirable goals and objectives for the area.
County of Los Angeles – County Code, Title 22 Planning and	The Los Angeles County Code is a compilation of the county's general ordinances. Title 22 of the County Code is the zoning ordinance which establishes zones for specific land uses and includes area requirements, provisions for density of land occupancy, and the proper

Zoning (LAC 2009a)	grouping of the various land uses within the unincorporated area of the county.
County of Los Angeles, Antelope Valley Trails Master Plan (adopted in 2007)	The intent of the Antelope Valley Trails Master Plan is to provide a framework for allowing the Department of Parks and Recreation to require easements for trails. The Department worked with community trail groups to identify regular trail alignments, and based on this effort, they mapped the best trails that would provide connectivity between city and county trails (LAC 2010b).

SETTING

PROJECT SITE

The proposed PHPP would be located on a 377-acre site that is currently vacant and undeveloped, and is part of a 613.4-acre property owned by the city of Palmdale. In February 2009, the city approved a general plan amendment, zone change, and tentative parcel map for the entire 613.4-acre city-owned property, including the 377-acre PHPP site. As a result, according to Resolution PC-2009-008, the entire city-owned site is intended for the proposed PHPP and for other future industrial uses (PHPP 2009a). Part of the resolution and ordinance state that the proposed discretionary actions are in the public's best interests as they would result in the development of the PHPP and the generation of electricity through the use of both natural gas and solar power. Existing land uses immediately adjacent to the proposed PHPP site include:

- **North:** Undeveloped land and heavy industrial uses;
- **East:** Air Force Plant 42 (Plant 42);
- **South:** Plant 42; and
- **West:** Undeveloped land owned by the city of Palmdale and water storage tanks that would be used for the proposed potable water pipeline.

The area immediately surrounding the project site is primarily dominated by industrial development with several scattered residences north of the proposed project site. The closest residence is in the city of Lancaster located approximately 1,500 feet northwest of the closest boundary of the project site. Other sensitive receptors include the Lancaster Adult Day Center which is approximately 1,800 feet northwest of the closest boundary of the project site (PHPP 2008b).

Plant 42 surrounds the south and east boundaries of the proposed project site and is operated by Lockheed, Rockwell International, Northrop, and Nero; a portion is leased to the LA/Palmdale Regional Airport. Plant 42 site is over 6,600 acres and supports facilities for production, engineering, final assembly, and flight testing of high performance aircraft, as well as commercial operations (PHPP 2008b).

The proposed project site is located on the south side of East Avenue M approximately 1.95 miles east of State Route (SR) 14/138. The site is bounded by Challenger Way to

the east, East Avenue M to the north, and Sierra Highway to the west. Access to the site during construction and operation would be available from a new street and signalized intersection at 10th Street that would be developed by the city of Palmdale (PHPP 2008a).

The power plant site, construction laydown area, natural gas pipeline, potable water line, and access road corridor are located within the city of Palmdale. The proposed transmission line would traverse both the city of Palmdale and areas of unincorporated Los Angeles County. For a detailed description of the proposed project components and associated facilities (including the 35.6-mile 230 kV transmission line), see the **Project Description** section of this document.

PROJECT-RELATED FEATURES AND FACILITIES

The 230-kV transmission line would be constructed in two segments within new and existing ROW. Proposed Segment 1 would be 23.7 miles, and would start from the PHPP site and end at SCE's Pearblossom Substation. The majority of this route, approximately 18.2 miles, would be within the city of Palmdale, while the remaining 5.5 miles would be within unincorporated Los Angeles County lands. The portion of Segment 1 within the city of Palmdale would be located within the Light Industrial and Planned Industrial land use designations, and zoned Light Industrial (M-1), General Industrial (M-2), and Planned Industrial (M-4). Segment 1 would require a new transmission line ROW in the form of a utility corridor easement for the entire route (PHPP 2009b). In addition, according to the county's Department of Parks and Recreation, a portion of Segment 1 would be in the same location as the proposed Avenue S Connector Trail (#147), from the western edge of parcel #AIN39011005 to the eastern edge of parcel #AIN3039006021 (LAC 2010a).

Because a new ROW would be required, Segment 1 would require permanent components including stub roads (i.e., roads to access the ROW and transmission poles for maintenance) and pole foundations; and construction would require temporary components including pull sites and two construction laydown sites. According to dimensions noted in the AFC and from data responses provided by the applicant, staff has calculated the land disturbances associated with the transmission line. The results of the calculations, along with the data sources, are listed below.

- **143.6-acre utility corridor easement** – Calculations are based on the entire length of Segment 1 (23.7 miles) and the 50 foot width noted in response to Data Request 41 (PHPP 2009b);
- **Approximately 166 pole foundations** – Average pole spacing would be approximately 750 feet (PHPP 2009b). As such, calculations are based on the 23.7 miles (125,136 feet) divided by 750 feet.
- **2.6 acres of stub roads** –The AFC noted the average dimensions of the stub roads would be approximately 50 feet long by 14 feet wide (PHPP 2008a), while the response to Data Request 39 estimated the dimensions would be between 15 to 30 feet long and 16 feet wide (PHPP 2009b). With such a difference, staff's calculations are based on the worst case scenario, or an area of 700 square feet, noted in the AFC. In addition, as stated in the data response, it is assumed that stub roads will be needed for all new poles in Segment 1(PHPP 2009b). Therefore, the total acreage of

each stub road (700 square feet) times the estimated number of pole foundations (approximately 166) is 2.6 acres.

- **10.5-acres for 23 pull sites (for Segments 1 and 2)** – Calculations included in response to Data Request 45 (PHPP 2009b).
- **4 acres for two construction laydown sites** – Acreages included in response to Data Request 46 (PHPP 2009b).

Proposed Segment 2 would be 11.9 miles of double-circuit 230-kV transmission line entirely within unincorporated Los Angeles County. This segment would parallel SCE transmission lines in an existing ROW (PHPP 2008). Pull sites and a 0.5-acre construction laydown site would be a temporary land disturbance south of Segment 2.

Based on the calculations noted above, approximately 84 pole foundations would be required for Segment 2, which would be constructed in the existing SCE transmission line corridor between SCE's Pearblossom Substation and Vincent Substation.

SCE's November 19, 2009 letter to the city of Palmdale stated that barring legal or regulatory challenges, the information provided to them (by the city) is sufficient to determine that Segment 2 of the proposed transmission line is technically feasible for the purposes of an Energy Commission permit. Other off-site features and facilities associated with the proposed project include:

- A temporary 50-acre construction laydown area located west of the proposed project site within the adjacent city-owned property;
- A natural gas pipeline from an existing Southern California Gas Company facility on East Ave S located approximately 5 miles south of the proposed project site;
- A 7.4-mile reclaimed water supply pipeline extending west along East Ave P from the Palmdale Water Reclamation Plant (PWRP) then north along the same route as the proposed natural gas pipeline to the east boundary of the proposed project site;
- A 1.37-mile potable water supply line along East Avenue M to the proposed power plant site; and
- A 1.54-mile sanitary wastewater pipeline along East Avenue M to the proposed power plant site.

The AFC states that the natural gas pipeline would be 8.7 miles long and 20 inches in diameter (PHPP 2008). However, the Data Response dated May 1, 2009, describes the pipeline as entering the project site from the eastern boundary of the site, which corresponds with the AFC description (PHPP 2009c). Email correspondence sent to staff by the applicant's consultant includes a map that depicts the pipeline following the proposed access road, thereby entering the project site at the western boundary (PHPP 2009d). This discrepancy has not been resolved but does not hinder this impact analysis.

Existing land uses within one mile of the proposed project site and 0.25 mile of the proposed linear rights-of-way (i.e., natural gas pipeline, transmission line, potable water

line, and access road) include rural to medium density residential, commercial, industrial, public facilities, airports and related facilities, and open space.

Agricultural Land

There is no agricultural land within or near the proposed power plant site and most of the linear facilities. According to the Farm Land Mapping and Monitoring Program (FMMP) "Important Farmlands" maps, the proposed power plant site is located on land defined as "Other Land.[1]"

The proposed transmission line would traverse areas with Important Farmland designations and within agricultural zoning districts. In particular, approximately two miles of Segment 1 would be adjacent to Prime Farmland[2] along East Avenue L and 30th Street East (a mostly vacant area with some agricultural production); and Segment 2 would either traverse or border small portions of Prime Farmland or Unique Farmland[3] (PHPP 2008b). In addition, Segment 1, from East Avenue Q to the Pearblossom Substation (approximately six miles), and the majority of Segment 2 would be within areas zoned for agriculture by the Los Angeles County Zoning Code. These areas are also characterized as mostly undeveloped land (PHPP 2008b).

Los Angeles County does not participate in the Williamson Act, therefore, the proposed project and related facilities are not subject to Agricultural Land Conservation (Williamson Act) contracts (CDC 2007).

GENERAL PLAN LAND USE AND ZONING DESIGNATIONS

As stated above, the city-owned site, including the proposed power plant site have a General Plan land use designation of Industrial (IND) and are zoned M-2 (General Industrial). The IND General Plan designation provides for the development, manufacturing, warehousing, distribution, and assembly of products and goods, and similar uses (City of Palmdale 1993). Permitted uses within the M-2 zoning designation include a full range of manufacturing, fabrication, assembly, warehousing, and distribution uses associated with heavy industrial land uses (City of Palmdale 1994).

The power block and access road would be within the proposed project site, and the construction laydown site and gas metering station would be located west of the proposed project site in the adjacent city-owned property. Therefore, the land use and zoning designation for these components would be the same as the proposed project site.

Project-Related Features and Facilities

The northern portion of Segment 1 of the proposed 230-kV transmission line would traverse Light Industrial and Planned Industrial land use designations from the city of

1 Other Land is "land not included in any other mapping category… [including v]acant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as other land" (CDC 2006).

2 Prime Farmland includes lands with "the best combination of physical and chemical features able to sustain long-term agricultural production."

3 Unique Farmland is land that "…consists of lesser quality soils used for the production of the state's leading agricultural crops."

Palmdale's General Plan. The city's zoning designations for this area are Light Industrial (M-1), General Industrial (M-2), and Planned Industrial (M-4).

The southern portion of Segment 1 and all of Segment 2 would traverse areas designated as R-Non Urban and Public and Semi-public by Los Angeles County's General Plan (LAC 1980); zoning designations include the Light Agricultural Zone (A-1), Heavy Agricultural Zone (A-2), Open Space (O-S), and Resort and Recreation Zone (R-R) (LAC 2009b).

The proposed utility pipelines, including the natural gas pipeline, reclaimed water supply pipeline, sanitary wastewater pipeline, and the potable water pipeline, would traverse several city of Palmdale General Plan land use and zoning designations. The specific designations for these proposed project-related linear facilities are described in detail and illustrated on maps in the AFC Land Use section (Section 5.7). In addition, a portion of the natural gas pipeline would be within the boundaries of unincorporated Los Angeles County, and would be within the Public and Semi-Public General Plan designations and the Light Manufacturing zoning designation (LAC 1980, 2009).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff has analyzed the information provided in the AFC and has acquired information from other sources to determine consistency of the proposed PHPP with applicable land use LORS, and the proposed project's potential to have significant adverse land use-related impacts. In addition, conditions developed by staff to reduce any potential impacts to a less than significant level are provided, as well as the feasibility and enforceability of the recommended conditions of approval.

METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document are based on the CEQA Guidelines (CCR 2006) and performance standards or thresholds identified by the Energy Commission staff, based on applicable LORS and utilized by other governmental regulatory agencies. An impact may be considered significant if the proposed project results in:

- Conversion of Farmland
  - Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
  - Conflict with existing zoning for agricultural use or a Williamson Act contract.
  - Other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses.
- Physical disruption or division of an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project adopted for the purpose of avoiding or mitigating an environmental effect. This includes, but is not limited to, a General Plan or zoning ordinance.

- Individual environmental effects, which, when considered with other impacts from the same project or in conjunction with impacts from other closely related past, present, and reasonably foreseeable future projects, are considerable, compound, or increase other environmental impacts.

In general, a power plant and its related facilities may also be incompatible with existing or planned land uses, resulting in potentially significant impacts, if they create unmitigated noise, dust, or a public health or safety hazard or nuisance; result in adverse traffic or visual impacts; or preclude, interfere with, or unduly restrict existing or future uses. Please see other sections of this document, as noted, for a detailed discussion of any additional potential project impacts, and recommended mitigation and conditions of certification.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Conversion of Farmland

According to the FMMP, the proposed power plant site is located on land defined as "Other Land;" the natural gas, water supply, and sanitary wastewater pipelines would traverse land defined as "Other Land" and "Urban and Built-Up Land;" and the proposed transmission line would traverse land defined as "Prime Farmland," "Unique Farmland," "Grazing Land," "Urban and Built-Up Land," and "Other Land." Therefore, construction of the transmission line would be the only component of the proposed project that could result in the conversion of Prime Farmland and/or Unique Farmland.

According to the AFC, approximately 986 acres within the project area are Prime Farmland, and eight acres surrounding the proposed transmission line are Unique Farmland (PHPP 2008b). However, as noted in the "Setting" above, the AFC defines the "project area" as land within 0.25 mile on either side of the linear routes. Based on figures from the AFC and data responses from the applicant, the potentially affected area includes two miles of a 50-foot wide easement along portions of Prime Farmland on the east side of 30th Street East and the south side of East Avenue L within the city of Palmdale. In total, the transmission line easement would traverse approximately 12 acres of Prime Farmland along this route. However, this area is zoned as Light Industrial, General Industrial, and Planned Industrial, and therefore, is intended for industrial development by the city's zoning ordinance. The pole foundations would result in a permanent conversion of approximately 0.04 acre of Prime Farmland along the 2-mile route noted above. Also, it is assumed that stub roads would be needed for all of the new poles in Segment 1, which would result in the conversion of approximately 2.6 acres of Prime Farmland, undeveloped agricultural land, or land that is adjacent to agricultural activities. The amount of Prime Farmland conversion due to the pole foundations and stub roads is minimal and after construction, agricultural production is feasible within the transmission line ROW, including under the transmission line. Therefore, the pole foundations and stub roads would not result in a significant permanent conversion of Important Farmland.

However, existing agricultural operations would be disturbed by transmission line construction activities such as ROW clearing and grading for the 143.6-acre utility corridor easement, placement of transmission line pole foundations for 166 poles, line stringing at the 23 pull sites (totaling 10.5 acres), and siting of new stub roads to access

each new tower foundation. Given the extent of construction activities and the amount of potential ground disturbance, lands under active agricultural operations within or adjacent to the proposed transmission line ROW, stub roads, and pull sites would be disturbed and agricultural activities would have to cease. This construction-related impact would be significant. As such, staff is recommending Condition of Certification **LAND-1**, which requires the applicant to coordinate with landowners to ensure minimal disruption during the construction period. Given the temporary nature of transmission line construction, the implementation of **LAND-1** would help ensure that impacts to active agricultural operations would be less than significant.

The remaining portions of Prime and Unique Farmland that would be affected by Segments 1 and 2 are small portions of parcels that are scattered along the proposed route, and are in areas that consist mostly of undeveloped land. Therefore, construction of the proposed transmission line would result in the conversion of a negligible amount of agricultural land, and the impact would be less-than-significant.

Segments 1 and 2 would traverse lands zoned as Light Agriculture (A-1) and Heavy Agriculture (A-2) by the Los Angeles County Zoning Code. As noted in the “Setting,” the width of the proposed utility corridor easement in Segment 1 would be 50 feet wide, and the portion of Segment 1 within the agricultural zoning designations is approximately 5.5 miles. Therefore, approximately 33 acres of land designated for agriculture would be within the proposed utility corridor easement, the pole foundations would permanently convert approximately 0.10 acre, and only a portion of the pole foundations would require stub roads (assuming worst case scenario, stub roads for all 84 pole foundations would convert approximately 1.3 acres of land in Segment 2). As noted above, the pole foundations and stub roads would result in a less-than-significant conversion of agricultural land. Segment 2 would also traverse land zoned for agriculture. However, construction would occur in an existing SCE transmission line corridor, which currently consists of mainly undeveloped land; and therefore, would not result in a conversion of existing agricultural land.

Based on staff’s assessment of the agricultural land surrounding the proposed transmission line, the proposed project would not result in a significant conversion of agricultural lands. In addition, the project site is not located in an area that is under a Williamson Act contract, and therefore, would not result in the conversion of Williamson Act lands to a non-agricultural use.

Physical Disruption or Division of an Existing Community

The proposed project is located in an area primarily dominated by industrial development such as airports and related facilities. Several scattered residences are also located within the industrial area surrounding the PHPP site, and the nearest residence is located approximately 1,500 feet northwest of the proposed power plant site. Therefore, relocation of these residences is unlikely and the proposed project would not result in the division or disruption of an established community.

Proposed Site

The proposed PHPP site and construction laydown area would be located entirely on city-owned property that has been zoned for industrial development. Access to the

PHPP site and the construction laydown area would be via existing public roadways, and the applicant would construct a 3,200-foot-long access road extending off East Avenue M (existing paved public roadway) to the proposed power plant site. The proposed project involves the development of energy infrastructure in an area designated for general industrial uses and therefore would not physically disrupt or divide an existing community.

Proposed 230 kV Transmission Line

Electricity generated by the proposed project would be delivered to the existing SCE Vincent Substation via a 35.6-mile transmission line connecting the project station switchyard to the Vincent Substation. Proposed Segment 1 would be located within a new utility corridor easement in an area designated as Light Industrial and Planned Industrial and zoned Light Industrial (M-1), General Industrial (M-2), and Planned Industrial (M-4) by the city of Palmdale, and agriculture by the Los Angeles County Zoning Code.

Segment 2 would be located in an existing SCE transmission line corridor. Segment 2 would traverse lands designated R-Non Urban and Public and Semi-public (Los Angeles County General Plan); zoning designations would include the Light Agricultural Zone (A-1), Heavy Agricultural Zone (A-2), Open Space (O-S), and Resort and Recreation Zone (R-R).

Along the entire route, the area is characterized as vacant and undeveloped land with some agricultural production (PHPP 2008). Therefore, implementation of Segments 1 and 2 of the transmission line would not physically divide or disrupt an established community.

Gas, Water, and Wastewater Lines

Natural gas would be supplied to the project site via the extension of a natural gas pipeline line in existing street ROWs. Given that the proposed pipeline would be located underground within an existing road ROW, it would not divide an established community.

The proposed potable water supply line would be 1.37 miles long and runs along East Avenue M from the water tanks to the proposed power plant site. Outside of the project boundaries, the potable water line would be placed underground within the existing road ROW. Therefore, there would be no displacement or disturbance of any existing land uses, and an established community would not be divided.

The 7.4-mile reclaimed water supply pipeline would extend west along East Ave P from the Palmdale Water Reclamation Plant (PWRP) then north along the same route as the proposed natural gas pipeline to the east boundary of the proposed project site. The proposed recycled water pipeline would be placed underground in an existing road ROW. Implementation of this pipeline would not result in any permanent land use changes and would not conflict with existing land uses. Therefore, there would be no disruption or division of an established community.

The proposed sanitary wastewater pipeline would connect to the Los Angeles County Sanitation District's sewer system. The pipeline would be a 1.54-mile underground pipeline from the proposed power plant site to an existing sanitary wastewater main on East Avenue M. Implementation of the proposed recycled water pipeline would not result in any permanent land use changes and would not conflict with existing land uses. Therefore, there would be no disruption or division of an established community.

Conflict with Any Applicable Land Use Plan, Policy, or Regulation

As required by California Code of Regulations, Title 20, Section 1744, Energy Commission staff evaluates the information provided by the applicant in the AFC (and any supplemental information), including project design and operational components to determine if elements of the proposed project would conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, or that would normally have jurisdiction over the project except for the Energy Commission's exclusive authority. As part of the licensing process, the Energy Commission must determine whether a proposed facility complies with all applicable state, regional, and local LORS (Public Resources Code section 25523[d][1]). The Energy Commission must either find that a project conforms to all applicable LORS or make specific findings that a project's approval is justified even where the project is not in conformity with all applicable LORS (Public Resources Code section 25525). When determining LORS compliance, staff is permitted to rely on a local agency's assessment of whether a proposed project is consistent with that agency's zoning and general plan. On past projects, staff has requested that the local agency provide a discussion of the findings and conditions that the agency would make when determining whether a proposed project would comply with the agency's LORS, were they the permitting authority. Any conditions recommended by an agency are considered by Energy Commission staff for inclusion in the proposed conditions of certification for the project.

In February 2009, the city approved a general plan amendment, zone change, and tentative parcel map for the entire 613.4-acre city-owned property, including the 377-acre PHPP site. As a result, according to Resolution PC-2009-008, the entire city-owned site is intended for the proposed PHPP and other future industrial uses (PHPP 2009a). Part of the resolution and ordinance state that the proposed discretionary actions are in the public's best interests as they would result in the development of the PHPP and the generation of electricity through the use of both natural gas and solar power, as well as create possible future industrial employment opportunities on the remaining portion of the city-owned site.

LAND USE Table 2 (below) provides the consistency of the proposed PHPP with the applicable land use LORS adopted by the city of Palmdale and Los Angeles County, as identified in **LAND USE Table 1**.

Based on staff's review of the city of Palmdale and Los Angeles County's applicable LORS documents, the proposed PHPP would be consistent with those LORS. However, approval of the portion of the proposed transmission line and the natural gas pipeline within the jurisdiction of the city of Palmdale would be contingent upon implementation of Condition of Certification **LAND-2**, which includes a Site Plan Review, as requested by the city (City of Palmdale 2010). In addition, the County of Los Angeles' Department

of Parks and Recreation stated in their comments on the PSA that the proposed transmission line easement in Segment 1 would be in the same location as the proposed Avenue S Connector Trail (#147), and is requesting a minimum of a 12-foot-wide trail easement from the western edge of parcel #AIN39011005 to the eastern edge of parcel #AIN3039006021 (LAC 2010a). As such, staff is recommending Condition of Certification **LAND-3**, which would require a trail easement, as requested by the county. Implementation of Condition of Certification **LAND-3** would avoid conflicts with the county's proposed connector trail and the county's Antelope Valley Trails Master Plan.

LAND USE Table 2
Project Compliance with Adopted Applicable Land Use LORS

<table>
<tr><th>Applicable LORS</th><th>Description of Applicable LORS</th><th>Consistent?</th><th>Basis for Consistency</th></tr>
<tr><td>Federal</td><td></td><td></td><td></td></tr>
<tr><td><u>Air Installation Compatible Use Zone (AICUZ) Study – Air Force Plant 42</u></td><td>4.6.2 Land-Use Compatibility Guidelines
Below are excerpts from Table 4.3 – Land Use Compatibility Guidelines
<table><tr><th rowspan="2">Land Use</th><th colspan="2">Accident Potential Zone</th></tr><tr><th>APZ I</th><th>APZ II</th></tr><tr><td>Utilities</td><td>Y[4]</td><td>Y</td></tr></table>Y (Yes) - Land use and related structures are compatible without restriction
Y[4] (Yes with restrictions)
Note 4. No passenger terminals and no major above ground transmission lines in APZ I</td><td>Yes</td><td>Based on Figure 4.8 (Clear Zones and Accident Potential Zones) of the AICUZ Study, proposed underground utility lines, including the natural gas pipeline and reclaimed water supply pipeline, would traverse APZ I and APZ II along Sierra Highway and 10th Street E. As noted in Table 4.3 (Land Use Compatibility Guidelines), APZ I allows utilities with restrictions. These restrictions include passenger terminals and major above ground transmission lines. As such, the proposed underground utility components would not conflict with these restrictions. The APZ II allows utilities without restrictions.
The proposed transmission line would traverse an area within the APZ II along E Avenue L, which would be allowed without restrictions.
Therefore, the proposed underground utilities and transmission line would be consistent with the land use compatibility guidelines set forth by the AICUZ Study.</td></tr>
<tr><td></td><td>5.5.1 – Runway 07 Approach Clear Zones and Accident Potential Zones
This section describes the existing land uses within the Clear Zone and the APZ I and APZ II zones of Runway 07.</td><td>Yes</td><td>The proposed natural gas pipeline and reclaimed water supply pipeline would traverse Runway 07 APZ II along Sierra Highway. As noted in Table 4.3 (Land Use Compatibility Guidelines), APZ II allows utilities without restrictions. Therefore, the proposed pipelines would be compatible with this zone.</td></tr>
<tr><td></td><td>5.5.2 – Runway 25 Approach Clear Zones and Accident Potential Zones
This section describes the existing land uses within the Clear Zone and the APZ I and APZ II zones of Runway 25.</td><td>Yes</td><td>The proposed project and the linear components would not traverse the Runway 25 Clear Zone or APZs.</td></tr>
<tr><td></td><td>5.5.3 – Runway 04 Approach Clear Zones and Accident Potential Zones
This section describes the existing land uses within the Clear Zone and the APZ I and APZ II zones of Runway 04.</td><td>Yes</td><td>The proposed natural gas pipeline and reclaimed water supply pipeline would traverse Runway 04 APZ I and APZ II along 10th Street E. As noted in Table 4.3 (Land Use Compatibility Guidelines), APZ I allows utilities with restrictions, but the proposed utility components would not conflict with the restrictions; and APZ II allows utilities without restrictions. Therefore, the proposed pipelines would be compatible with this zone.</td></tr>
</table>

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	5.5.4 – Runway 22 Approach Clear Zones and Accident Potential Zones This section describes the existing land uses within the Clear Zone and the APZ I and APZ II zones of Runway 22.	Yes	The proposed transmission line would traverse an area within the Runway 22 APZ II along E Avenue L, which would be allowed without restrictions as noted in the Land Use Compatibility Guidelines. Therefore, the proposed underground utilities and transmission line would be compatible with this zone.
State	None		
Local			
City of Palmdale General Plan – Land Use Element	**Policy L5.1.1:** On the Land Use Map, establish designations to meet the City's long-term industrial and manufacturing needs, as follows: **3. Industrial:** The Industrial (IND) designation is intended to permit a variety of industrial uses, including the manufacturing and assembly of products and goods, warehousing, distribution, and similar uses. Some limited commercial uses which are incidental to and supportive of the primary industrial uses may also be permitted. This designation permits the most intensive types of manufacturing and industrial uses, subject to the height, coverage and development regulations of the underlying zone district. The Industrial designation is appropriate in areas having or planned to have adequate sewer, water, transportation, drainage, utilities and public services available to meet anticipated needs of this type of development. Where possible, industrial designations should be separated from residential areas by natural or manmade barriers, such as major arterials, utility easements, drainage courses or railroad rights-of-way. Adequate land use and design standards to mitigate impacts	Yes	It should be noted that the proposed project applicant is the city of Palmdale. On February 19, 2009, the Palmdale City Council approved resolutions for a general plan amendment (GPA), a zone change, and a tentative parcel map for the 613.4-acre city-owned site. On April 1, 2009, the City Council passed Ordinance No. 1373 approving the zone change and thereby amending the official zoning map. As a result, the general plan and zoning designations for the entire city-owned site, including the proposed 377-acre power plant site, are now Industrial (IND) and M-2 (General Industrial), respectively. The city of Palmdale implemented the GPA and zone change specifically to allow for the development of the proposed PHPP. As such, staff assumes that the city finds the IND and M-2 designations to be appropriate for siting of a power plant such as the proposed project. Therefore, the proposed power plant site would be consistent with the IND land use designation.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	from intense uses in this designation will be addressed through the zone districts and design review process. Maximum floor area ratio within this designation is 0.5.		
	Goal L2: Adopt land use and development policies which encourage growth and diversification of the City's economic base. **Objective L2.1:** Promote creation and retention of businesses within the City, to increase employment opportunities within the Antelope Valley. **Policy L2.1.7:** Support new technologies which may result in increased business opportunities within the City.	Yes	The following are comments provided by the city regarding the proposed project's consistency with the city's General Plan: "The proposed PHPP and related transmission lines will promote creation of business in the City by increasing short-term construction employment opportunities and increased construction material demands. The project will also result in long-term employment opportunities for operations and maintenance functions. The project also incorporates new power generating technologies and a solar power generating component that will likely result in increased business opportunities within the City. The General Plan also promotes the use and development of renewable alternative energy such as the proposed solar power component of the use." (City of Palmdale 2010) Based on the city's comments, the proposed PHPP would be consistent with these LORS.
City of Palmdale General Plan – Public Services Element	**Policy PS1.6.2** Coordinate installation of utility line placement with street construction where possible, to minimize cost. **Policy PSI.6.3:** Through the development review process, protect existing utility easements and require dedication of additional easements where needed.	Yes with implementation of the Condition of Certification **LAND-2**	According to the city of Palmdale (i.e., the applicant), a Site Plan Review would be required for approval of the proposed transmission line (PHPP 2010). As such, staff recommends Condition of Certification **LAND-2**, which requires a Site Plan Review, thereby ensuring that placement and installation of the transmission line, as well as the natural gas pipeline, would be in compliance with these LORS.
City of Palmdale General Plan – Community Design Element	**Objective CD 10.1:** In reviewing site design of projects within industrially-designated areas, consideration should be given to the location and setting of the project with respect to site visibility, adjacent uses and designations, abutting roadways, and other similar factors, to ensure that development	Yes	As noted in the consistency determination for the city's Land Use Element above, the city considers the proposed PHPP as an opportunity to create short- and long-term construction employment, which would contribute to the expansion of the city's employment and economic base. In addition, the city's PSA comments also stated that with the existing industrial development in the surrounding area, the facility site and transmission lines have been sited in locations that are compatible with the adjacent land uses (City of Palmdale, 2010). Based on the city's

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	requirements are appropriate for the vicinity and the intended use.		comments, the proposed PHPP would be consistent with these LORS.
	GOAL CD 10: Facilitate creation and expansion of industrial uses within the City to accommodate manufacturing, distribution, and complementary office and support uses in order to expand the City's employment and economic base and improve the jobs/housing balance, while ensuring that such areas are compatible with adjacent uses and minimizing adverse impacts on more restrictive use districts.		
City of Palmdale Zoning Ordinance	**ARTICLE 41 SINGLE FAMILY RESIDENTIAL (ZONE R-1)** **Section 41.05 Uses Permitted Subject to Site Plan Review Approval** The following uses shall require approval pursuant to the provisions of Chapter 2, Article 21 (Site Plan Review).E. Utility facilities, building and equipment, including but not limited to water, natural gas, and sewage facilities, but excluding sewage pump stations or treatment plants and major communication facility.	Yes with implementation of the Condition of Certification **LAND-2**	The proposed natural gas pipeline would traverse the R-1 zone for approximately 0.4 mile along East Avenue S and 10th Street East. A 20-inch pipeline would be installed underground in an existing street ROW. The surrounding area mostly consists of commercial development with some residential development. Zone R-1 permits the siting of utilities such as natural gas facilities based on approval of a Site Plan Review. The **Hazardous Materials Management** analysis discusses the design standards for the pipeline as required by the California Public Utilities Commission (CPUC) and the U.S. Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration. The CPUC, the DOT, and the U.S. Chemical Safety Board are currently reviewing the safety and maintenance programs for existing natural gas pipelines and may make additional recommendations or requirements in the near future. However, until they do, hazardous materials staff concludes that existing LORS are sufficient to ensure that a less than significant risk of pipeline failure would exist with a newly installed natural gas pipeline. Nonetheless, land use staff recommends Condition of Certification **LAND-2** to ensure that the city's Site Plan Review is included in the siting of the natural gas pipeline, as it would include a comprehensive review process to ensure pipeline integrity, and siting and installation of the pipeline in appropriate locations. In addition, the implementation of Condition of Certification **LAND-2** would ensure that the siting of the proposed natural gas pipeline is consistent with this portion of the city's zoning ordinance. Also as a general practice, for all power plants under its jurisdiction, the Energy Commission requires that the designs, locations and

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
			specifications (plans) of natural gas pipelines be reviewed and approved by a qualified California building official (CBO) and the CBO's fire protection consultant, and that the pipelines be physically inspected by a special safety inspector approved by the CBO, to ensure compliance with the latest code requirements and safety practices. This work entails a comprehensive review process that includes, for example, performing full radiography tests (special inspection) on each weld and witnessing the pneumatic/hydrostatic pressure tests (generally at 2.5 times the working pressure, typically using a non-hazardous gas such as air or using water) to ensure pipeline integrity. The inspection process also includes an effective process for ensuring that all gas pipelines are corrosion-resistant and are tested for continuity of protective coatings. In addition to installing the normally recommended number of manual and automatic gas flow shutoff valves, the Energy Commission-licensed power plants must provide, at strategic locations, excess manual/automatic, and remotely-controlled shutoff valves. Please see the **Hazardous Materials Management** section of this Staff Assessment for a detailed discussion of federal and State LORS applicable to the siting of high-pressure natural gas pipelines.
	ARTICLE 42 MEDIUM RESIDENTIAL (ZONE R-2) **Section 42.05 Uses Permitted Subject to Site Plan Review Approval** The following uses shall require approval pursuant to the provisions of Chapter 2, Article 21 (Site Plan Review). F. Utility facilities, building and equipment, including but not limited to water, natural gas, and sewage facilities, but excluding sewage pump stations or treatment plants and major communication facility.	Yes with implementation of the Condition of Certification **LAND-2**	The proposed natural gas pipeline would traverse the R-2 zone for approximately 0.6 mile. A 20-inch pipeline would be installed underground in an existing street ROW. The surrounding area mostly consists of commercial development with some residential development. Zone R-2 permits siting of utilities such as natural gas facilities based on approval of a Site Plan Review. Staff recommends Condition of Certification **LAND-2** to ensure that the city's Site Plan Review is included in the siting of the natural gas pipeline. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone. Also, please refer to the discussion above regarding the analysis of the natural gas pipeline in the **Hazardous Materials Management** section of this Staff Assessment.
	ARTICLE 53 GENERAL COMMERCIAL (ZONE C-3) **Section 53.05 Uses Permitted Subject to Site Plan Review Approval** **D. Public, quasi-public and institutional uses of a scale**	Yes with implementation of the Condition of Certification **LAND-2**	The proposed natural gas pipeline would traverse the C-3 zone for approximately 0.1 mile. A 20-inch pipeline would be installed underground in an existing street ROW. The surrounding area mostly consists of commercial development with some residential development. Zone C-3 permits utility facilities based on approval of a Site Plan Review. Staff recommends Condition of Certification **LAND-2** to ensure

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	compatible and consistent with the intent of the C-3 zone, including: 11. Utility facilities, buildings and equipment, excluding sewage pumping stations and treatment plants and major communication facility.		that the city's Site Plan Review is included in the siting of the natural gas pipeline. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone. Also, please refer to the discussion above regarding the analysis of the natural gas pipeline in the **Hazardous Materials Management** section of this Staff Assessment.
	ARTICLE 55 SERVICE COMMERCIAL ZONE (C-5) **Section 55.05 Uses Permitted Subject to Site Plan Review Approval** **D. Public, quasi-public and institutional uses:** 9. Utility facilities, excluding major communication facility. (Zoning Ordinance Amendment 97-3, adopted by City Council September 10, 1997.)	Yes with implementation of the Condition of Certification **LAND-2**	Based on AFC Figure 5.7-3a, it appears that the proposed natural gas pipeline would traverse or border zone C-5. However, AFC Table 5.7-3b does not include an approximate length for the gas pipeline within the C-5 district. As such, assuming that the gas pipeline would traverse zone C-5, it would require a Site Plan Review. Staff recommends Condition of Certification **LAND-2** to ensure that the city's Site Plan Review is included in the siting of the natural gas pipeline. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone. Also, please refer to the discussion above regarding the analysis of the natural gas pipeline in the **Hazardous Materials Management** section of this Staff Assessment.
	ARTICLE 61 LIGHT INDUSTRIAL (ZONE M-1) **Section 61.05 Uses Permitted Subject to Site Plan Review Approval** **11. Public, quasi-public and institutional uses:** k. Utility facilities, excluding major communication facilities. (Zoning Ordinance Amendment 97-3, adopted by City Council September 10, 1997.)	Yes for water and wastewater pipelines Yes with implementation of COC **LAND-2** for the proposed transmission line and natural gas pipeline	The proposed sanitary wastewater pipeline would traverse the M-1 zone for approximately 0.1 mile. The wastewater pipeline would be consistent with this zone, because it would be sited underground and any associated impacts would be temporary; and, as stated in the **Facility Design** section of this document, the pipeline would be constructed to accepted industry standards. Therefore, upon completion of construction, the wastewater pipeline would not result in any LORS inconsistencies. The proposed natural gas pipeline would traverse the M-1 zone for approximately 0.5 mile, and a portion of the transmission line would cross this zone classification. According to the city of Palmdale, a Site Plan Review would be required for approval of the proposed transmission line (PHPP 2010). As such, staff recommends Condition of Certification **LAND-2**, which would require a Site Plan Review, thereby ensuring a comprehensive review process by the city, and that placement and installation of the transmission line and natural gas pipeline would be consistent with the M-1 zone. Also, please refer to the discussion above regarding the analysis of the natural gas pipeline in the **Hazardous Materials Management** section of this Staff Assessment.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	ARTICLE 62 GENERAL INDUSTRIAL (ZONE M-2) **Section 62.01** **Intent and Purpose** The General Industrial (M-2) Zone is established to create, preserve and enhance areas for a full range of manufacturing, fabrication, assembly, warehousing, and distribution uses associated with heavy industrial land uses. Outdoor operations and storage are permitted, provided that such areas are generally screened from public rights-of-way. Commercial and businesses uses which are supportive to industrial activities, or which serve daily needs of employees in the vicinity, are also allowed. The zone is intended to create an environment in which industrial and allied uses may be conducted with a minimum of land use conflicts, through exclusion of residential and general retail uses. **62.05 Uses Permitted Subject to Site Plan Review Approval** **12. Public, quasi-public and institutional uses:** k. Utility facility, excluding major communication facilities.	Yes for the proposed PHPP site and water pipeline Yes with implementation of COC **LAND-2** for the proposed transmission line and natural gas pipeline	The proposed project site has an M-2 zoning designation. As described above under the IND General Plan Land Use designation for the site, the city of Palmdale implemented the GPA and zone change specifically to allow for the development of the proposed PHPP. As such, staff assumes the city would find the IND and M-2 designations appropriate for siting of a power plant such as the proposed project. Therefore, staff concludes the proposed power plant site would be consistent with the M-2 zoning designation. The proposed reclaimed water supply pipeline would traverse the M-2 zone for approximately 0.7 mile, the proposed sanitary wastewater pipeline would traverse the M-2 zone for approximately 0.7 mile, the proposed natural gas pipeline would traverse the M-2 zone for approximately 0.6 mile, and the proposed transmission line would traverse the M-2 zone for approximately 0.3 mile. The surrounding area mostly consists of commercial and industrial development with some residential development. Zone M-2 permits utility facilities, such as gas and water pipelines based on approval of a Site Plan Review. The Energy Commission's review of the proposed project includes a site plan review. Staff concludes that the water and wastewater pipelines would be consistent with this zone because they would be sited underground and any associated impacts would be temporary; and, as stated in the **Facility Design** section of this document, the pipeline would be constructed to accepted industry standards. Therefore, upon completion of construction, the water and wastewater pipeline would not result in any LORS inconsistencies. Staff finds that these linear facilities would be consistent with the M-2 zone. According to the city of Palmdale, i.e., the applicant, a Site Plan Review would be required for approval of the proposed transmission line (PHPP 2010). As such, staff recommends Condition of Certification **LAND-2**, which would require a Site Plan Review, thereby ensuring that placement and installation of the transmission line would be in consistent with the M-2 zone. Condition of Certification **LAND-2** would also apply to the natural gas pipeline to ensure that the city's Site Plan Review is included in the siting of the natural gas pipeline. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone. Also, please refer to the discussion above regarding the analysis of the natural gas pipeline in the **Hazardous Materials Management** section of this Staff Assessment.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	ARTICLE 63 AIRPORT INDUSTRIAL (ZONE M-3) **Section 63.05 Uses Permitted Subject to Site Plan Review Approval** **F. Public, quasi-public and institutional uses, including:** 5. Utility facilities, including substations, excluding major communication facilities.	Yes for the proposed water pipeline Yes with implementation of COC **LAND-2** for the proposed natural gas pipeline	The proposed reclaimed water supply pipeline would traverse the M-3 zone for approximately 0.6 mile. The water pipeline would be consistent with this zone because it would be sited underground and any associated impacts would be temporary; and, as stated in the **Facility Design** section of this document, the pipeline would be constructed to accepted industry standards. Therefore, upon completion of construction, the water pipeline would not result in any LORS inconsistencies. Staff finds that these linear facilities would be consistent with the M-2 zone. The proposed natural gas pipeline would traverse the M-3 zone for approximately 0.6 mile. Staff recommends Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting of the natural gas pipeline. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone. Also, please refer to the discussion above regarding the analysis of the natural gas pipeline in the **Hazardous Materials Management** section of this Staff Assessment.
	ARTICLE 64 PLANNED INDUSTRIAL (ZONE M-4) **Section 64.06 Uses Permitted Subject to Site Plan Review Approval** In conjunction with an approved Master Plan pursuant to Section 64.03, the following uses are permitted in the M-4 zone subject to Site Plan Review approval…	Yes with implementation of COC **LAND-2**	The proposed natural gas line would traverse the M-4 zone for approximately 0.2 mile, and the proposed transmission line would traverse the M-4 zone for approximately 6.3 miles. According to this ordinance, uses subject to Site Plan Review also require a Master Plan, which may take one of the following forms: a Specific Plan or a Planned Development, pursuant to Chapter 2, Article 28, a comprehensive Conditional Use Permit, pursuant to Chapter 2, Article 22, or an area plan or other comprehensive development program determined by the Planning Director to meet the intent of the M-4 zone (City of Palmdale, 1994). Transmission lines are not specifically identified as a use

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	K. Public, quasi-public and institutional uses, including: 7. Utility facilities, buildings and equipment, excluding sewage pumping stations and treatment plants, and major communication facilities. (Zoning Ordinance Amendment 97-3, adopted by City Council September 10, 1997.)		permitted subject to site plan approval and a portion of the transmission line would cross the M-4 zone classification However, according to the city of Palmdale, i.e., the applicant, a Site Plan Review would be required for approval of the proposed transmission line (PHPP 2010). As such, staff recommends Condition of Certification **LAND-2**, which would require a Site Plan Review, thereby ensuring that placement and installation of the transmission line and natural gas pipeline would be consistent with the M-4 zone, and would ensure Site Plan Review by the city. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone. Also, please refer to the discussion above regarding the analysis of the natural gas pipeline in the **Hazardous Materials Management** section of this Staff Assessment.
	ARTICLE 71 PUBLIC FACILITIES (ZONE PF) **Section 71.05 Uses Permitted Subject to Site Plan Review Approval** B. Public, quasi-public and institutional uses, including: 12. Utility corridors.	Yes for the proposed water and wastewater pipelines Yes with implementation of COC **LAND-2** for the proposed natural gas pipeline	The proposed natural gas pipeline would traverse the PF zone for approximately 0.4 mile, the proposed reclaimed water supply pipeline would traverse the PF zone for 0.2 mile, and the proposed water pipeline would traverse the PF zone for <0.1 mile. The water and wastewater pipelines would be consistent with this zone because they would be sited underground and any associated impacts would be temporary; and, as stated in the **Facility Design** section of this document, the pipeline would be constructed to accepted industry standards. Therefore, upon completion of construction, the water pipelines would not result in any LORS inconsistencies. The proposed natural gas pipeline would traverse the PF zone for approximately 0.4 mile. Staff recommends Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting and installation of the natural gas pipeline. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone. Also, please refer to the discussion above regarding the analysis of the natural gas pipeline in the **Hazardous Materials Management** section of this Staff Assessment.
	ARTICLE 73 MIXED USE OVERLAY (MX) ZONE **Section 73.05 Uses Permitted Subject to Site Plan Review Approval** A. All uses permitted subject to Site Plan Review approval within the underlying zone(s) to which this overlay is attached shall also be permitted within the MX Overlay Zone subject to Site Plan Review approval.	Yes with implementation of COC **LAND-2** for the proposed natural gas pipeline	The proposed natural gas line would traverse the CD-MX zone for approximately 0.1 mile. This is an overlay zone for Downtown Commercial (C-D) zone, and consistency is based on the underlying zone. As such, refer to the consistency analysis for the C-D zone, below.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	ARTICLE 75 DOWNTOWN COMMERCIAL (ZONE C-D) **Section 75.01 Intent and Purpose** The Downtown Commercial (C-D) Zone is established to implement the policies and design guidelines described in the Downtown Revitalization Plan. The downtown Commercial Zone is intended to create a pedestrian friendly environment which encourages people to stay and shop, dine and socialize in downtown Palmdale. The pedestrian zone between the street curb line and the entry facades of adjacent buildings should create a series of layers and a variety of visually interesting features that encourage visitors to explore and circulate in and around the retail venues.	Yes with implementation of COC **LAND-2** for the proposed natural gas pipeline	The proposed natural gas line would traverse the C-D zone for approximately 0.1 mile. Although this zone does not specifically state that the use of utility facilities is permitted, the commercial zones noted above (C-3, C-5) do allow utility facilities with Site Plan Review approval. Staff recommends Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting and installation of the natural gas pipeline. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone. Also, please refer to the discussion above regarding the analysis of the natural gas pipeline in the **Hazardous Materials Management** section of this Staff Assessment.
Los Angeles County General Plan 1980	Land Use Policy Map The countywide Land Use Policy Map depicts nine generalized land use classifications, each of which is intended to describe the dominant use characteristics within the area covered. 7. Public and Semi-Public Facilities Major existing and proposed public and semi-public uses depicted on the Map include airports and other major transportation facilities, solid and liquid waste disposal sites, utilities, public buildings, public and private educational institutions, religious institutions, hospitals, detention facilities and fairgrounds. This classification provides for the continued operation, expansion and construction of new facilities, as	Yes	Segment 1 would connect to the Pearblossom Substation via a proposed 230-kV transmission line that would be constructed in a new utility easement. Segment 2 would connect the Pearblossom Substation to the Vincent Substation via a new 230-kV transmission line that would be constructed within an existing SCE transmission line corridor. Because transmission lines are not specifically listed in the Los Angeles County General Plan as a permitted use, staff sought the county's interpretation of its general plan. The county's comments on the PSA are as follows: "Please be advised that there is no requirement within the County's Zoning Ordinance that would require those portions of the proposed transmission line located within the Unincorporated areas of the project to receive an approved Conditional Use Permit. The County's Zoning Ordinance does not regulate such projects (LAC 2010a). Therefore, the proposed project would not be inconsistent with this zone.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	necessary, to serve current and future County residents.		
	8. Non-Urban Public and semi-public uses typically located in non-urban environs include solid and liquid waste disposal sites, utility and communications installations, schools and other public facilities necessary to serve the needs of non-urban populations. Most major existing facilities of this type, however, are shown within the Public and semi-public and Open Space land use classifications.	Yes	The majority of Segments 1 and 2 of the proposed transmission line within Los Angeles County would traverse the Non-Urban land use designation. Because transmission lines are not specifically listed as a permitted use, staff sought the county's interpretation of its general plan. According to the county's comments on the PSA, the county's Zoning Ordinance does not regulate such projects and does not require a conditional use permit (LAC 2010a). Therefore, the proposed project would not be inconsistent with this zone.
Antelope Valley Area Plan 1986	b. Non-residential Uses in Non-urban Areas Non-residential uses requiring, or appropriate for, remote locations may be allowed in Non-urban areas in keeping with the following general guidelines: Subject to compliance with the General conditions for Development, (Section D of this Chapter) non-residential uses can include: (c) Public and semi-public uses typically located in non-urban environs, such as solid and liquid waste disposal sites, utility and community installations, and schools and other public facilities necessary to serve Non-urban populations.	Yes	The majority of Segments 1 and 2 of the proposed transmission line within Los Angeles County would traverse the Non-Urban land use designation. Because transmission lines are not specifically listed as a permitted use, staff sought the county's interpretation of the Antelope Valley Area Plan. According to the county's comments on the PSA, the county's Zoning Ordinance does not regulate such projects and does not require a conditional use permit (LAC 2010a). Therefore, the proposed project would not be inconsistent with this plan.
	D. General Conditions for Development 3. Non-residential uses in non-urban areas a. Location	Yes	In the discussion below regarding the proposed project's consistency with the Los Angeles County Zoning Ordinance, siting of the proposed transmission line within the county's A-2 zone would require a Conditional Use Permit, but for the exclusive authority of the Energy Commission to license the project. Because transmission lines are not specifically listed as a use, staff sought the county's interpretation of the Antelope Valley

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	(1.) The proposed use should be located and designed so as not to conflict with established community land use and circulation patterns.		Area Plan. According to the county's comments on the PSA, the county's Zoning Ordinance does not regulate such projects and does not require a conditional use permit (LAC 2010a). Therefore, the proposed project would not be inconsistent with this plan.
Los Angeles County Zoning Code, Title 22 Planning and Zoning	**Part 2 A-1 LIGHT AGRICULTURAL ZONE** **22.24.070 Permitted uses.** **22.24.100 Uses subject to permits.** Property in Zone A-1 may be used for: A. The following uses, provided a conditional use permit has first been obtained as provided in Part 1 of Chapter 22.56, and while such permit is in full force and effect in conformity with the conditions of such permit for: — Electric distribution substations and electric transmission substations, including microwave facilities used in conjunction with either. **Part 3 A-2 HEAVY AGRICULTURAL ZONE** **22.24.120 Permitted uses.** **22.24.150 Uses subject to permits.** Property in Zone A-2 may be used for: A. The following uses, provided a conditional use permit has first been obtained as provided in Part 1 of Chapter 22.56, and while such permit is in full force and effect in conformity with the conditions of such permit for: -- Electric distribution substations, electric transmission substations and generating plants, including microwave	Yes	Portions of Segments 1 and 2 of the proposed transmission line would traverse unincorporated Los Angeles County lands within the Light Agricultural Zone (A-1) and Heavy Agricultural Zone (A-2) designation. The provisions of both the A-1 and A-2 zone designations allow for the development of electric substations and generating plants with issuance of a Conditional Use Permit (CUP) by Los Angeles County, but do not specifically allow for siting of high voltage transmission lines. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code. According to the county's comments on the PSA, the county's Zoning Ordinance does not regulate such projects and does not require a conditional use permit (LAC 2010a). Therefore, the proposed project would not be inconsistent with this zone.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	facilities used in conjunction with any one thereof.		
	Part 5 R-R RESORT AND RECREATION ZONE **22.40.190 Permitted uses.** **22.40.220 Uses subject to permits.** Premises in Zone R-R may be used for: A. The following uses, provided a conditional use permit has first been obtained as provided in Part 1 of Chapter 22.56, and while such permit is in full force and effect in conformity with the conditions of such permit for: -- Electric distribution substations and electric transmission substations and generating plants, including microwave facilities used in conjunction with any one thereof.	Yes	Segments 1 and 2 of the proposed transmission line would traverse this zone designation within unincorporated Los Angeles County. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code. According to the county's comments on the PSA, the county's Zoning Ordinance does not regulate such projects and does not require a conditional use permit (LAC 2010a). Therefore, the proposed project would not be inconsistent with this zone.
	Part 2 M-1 LIGHT MANUFACTURING ZONE **22.32.040 Permitted uses.** Premises in Zone M-1 may be used for: A. Any use listed as a permitted use in either Sections 22.24.070 (Zone A-1) or 22.28.230 (Zone C-M), subject to the limitations and conditions set forth therein.	Yes	Portions of the proposed transmission line traverse the M-1 zone. Uses permitted within the M-1 zone are the same as those for the A-1 zone. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code. According to the county's comments on the PSA, the County's Zoning Ordinance does not regulate such projects and does not require a conditional use permit (LAC 2010a). Therefore, the proposed project would not be inconsistent with this zone.
	22.44.126 Acton Community Standards District. A. Intent and Purpose. The Acton Community Standards District is	Yes	Approximately 1.5 miles of the end of Segment 2 of the proposed transmission line would be located within the Acton Community Standards District (CSD) (PHPP 2008b). As such, according to Los Angeles County's online GIS mapping, this portion of Segment 2 would traverse an area zoned for light agriculture (A-1) within the CSD. This

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	established to protect and enhance the rural, equestrian and agricultural character of the community and its sensitive features including significant ecological areas, floodplains, hillsides, National Forest, archaeological resources, multipurpose trail system, and Western heritage architectural theme. The standards are intended to ensure reasonable access to public riding and hiking trails, and to minimize the need for installation of infrastructure such as sewers, streetlights, concrete sidewalks and concrete flood control systems that would alter the community's character, while providing for adequate drainage and other community safety features.		portion of the proposed transmission line would be constructed within the existing SCE transmission line corridor. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code within the CSD. According to the county's comments on the PSA, the County's Zoning Ordinance does not regulate such projects and does not require a conditional use permit (LAC 2010a).Therefore, proposed project would not be inconsistent with this CSD.
	22.44.141 Southeast Antelope Valley Community Standards District. A. Intent and Purpose. The Southeast Antelope Valley Community Standards District ("CSD") is established to protect and enhance the community's rural, equestrian, and agricultural character as well as its natural features, including significant ecological areas, flood plains, and desert terrain. The standards contained in this CSD are also intended to ensure reasonable access to public riding and hiking trails, and to minimize the impacts of urbanization.	Yes	Approximately 12 miles of the transmission line would cross the Southeast Antelope Valley Community Standards District (CSD) which is located east and southeast of the city of Palmdale (PHPP 2008). According to Los Angeles County's online GIS mapping, this portion of Segment 2 would traverse an area zoned for heavy agriculture (A-2) within this CSD. This portion of the proposed transmission line would be constructed within the existing SCE transmission line corridor. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code within this CSD. However, according to the county's comments on the PSA, the County's Zoning Ordinance does not regulate such projects and does not require a conditional use permit (LAC 2010a). Therefore, the proposed project would not be inconsistent with this CSD.
Los Angeles County, Antelope Valley Trails Master Plan	The intent of the Antelope Valley Trails Master Plan (adopted in 2007) is to provide a framework for allowing the Department of Parks and Recreation to require easements for trails. The Department worked with community trail	Yes with implementation of COC **LAND-3**	According to the county, the trail is currently a multi-use trail but has not been formally adopted, and upon approval of a project along the proposed trail, an easement must be dedicated for a multi-use trail. The project owner is responsible for funding and recording of the trail, as well as coordinating with the county. The county would not require a re-route of the proposed transmission line. Based on staff's discussions with the

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	groups to identify regular trail alignments, and based on this effort, they mapped the best trails that would provide connectivity between city and county trails. (LAC 2010b) The Avenue S Connector Trail (trail alignment #147) was adopted by the county's Board of Supervisors. As such, the Department of Parks and Recreation is requesting a minimum of a 12-foot wide trail easement from the western edge of parcel #AIN39011 005 to the eastern edge of parcel #AIN3039006021.		county, the county is recommending that the trail be re-routed or that the trail and transmission line could be co-located with the utility easement taking precedence and being the predominant land use. At this time, the county recommends the co-location of the trail with a maintenance road as the best option for the county and the proposed transmission line associated with the PHPP (LAC 2010b). Based on conversations with the county, staff recommends Condition of Certification **LAND-3** to ensure the proposed project's consistency with the Antelope Valley Trails Master Plan.

Land Use Compatibility

Land use compatibility refers to the physical compatibility of planned and existing land uses. Administrative or conditional use permitting requirements (see detailed discussion in **LAND USE Table 2** above) and project reviews under CEQA are in place to evaluate the compatibility of projects that are not a permitted use or that have elements that may adversely impact public safety, the environment, or that could interfere with or unduly restrict existing and/or future permitted uses.

As discussed in the section entitled **Physical Disruption or Division of an Existing Community** and in **LAND USE Table 2**, the proposed power plant site would be located in an area primarily dominated by industrial development and zoned by the city for those uses. Therefore, development of the proposed project would be compatible with existing surrounding land uses. However, Condition of Certification **LAND-2** requires that the proposed transmission line and natural gas pipeline undergo a Site Plan Review by the city of Palmdale to ensure that placement and installation of these linear facilities would be consistent with the city's zoning ordinance as discussed in detail above in **LAND USE Table 2**.

In addition, in regards to the natural gas pipeline, the safety requirements for gas-fired power plant pipeline construction vary according to the population density and surrounding land uses. Construction and maintenance requirements become more stringent with increasing population density. Therefore, the **Hazardous Materials Management** analysis discusses the design standards for the pipeline as required by the California Public Utilities Commission (CPUC) and the U.S. Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration. The natural gas pipeline must be designed to meet CPUC General Order 112 standards, and 49 CFR 192 standards for pipelines located in populated areas. CPUC General Order 112-E, Section 125.1 requires that at least 30 days prior to the construction of a new pipeline, the owner must file a report with the commission that will include a route map for the pipeline. The natural gas pipeline must also be constructed and operated in accordance with the Federal DOT regulations, Title 49, Code of Federal Regulations (CFR), Parts 190, 191, and 192. The CPUC, the USDOT, and the U.S. Chemical Safety Board are currently reviewing the safety and maintenance programs for existing natural gas pipelines and may make additional recommendations or requirements in the near future. However, until they do, staff concludes that existing LORS are sufficient to ensure that a less than significant risk of pipeline failure would exist with a newly installed gas pipeline (see the **Hazardous Materials Management** section). Nonetheless, staff recommends Condition of Certification **LAND-2** to ensure that the city's Site Plan Review is included in the siting of the natural gas pipeline as it would require a comprehensive review process by the city to ensure pipeline integrity, and siting of the pipeline in appropriate locations. The implementation of Condition of Certification **LAND-2** would ensure that the siting of the proposed natural gas pipeline is compatible with surrounding land uses.

Also as a general practice, for all power plants under its jurisdiction, the Energy Commission requires that the designs, locations and specifications (plans) of natural gas pipelines be reviewed and approved by a qualified California building official (CBO) and the CBO's fire protection consultant, and that the pipelines be physically inspected

by a special safety inspector approved by the CBO, to ensure compliance with the latest code requirements and safety practices. This work entails a comprehensive review process that includes, for example, performing full radiography tests (special inspection) on each weld and witnessing the pneumatic/hydrostatic pressure tests (generally at 2.5 times the working pressure, typically using a non-hazardous gas such as air or using water) to ensure pipeline integrity. The inspection process also includes an effective process for ensuring that all gas pipelines are corrosion-resistant and are tested for continuity of protective coatings. In addition to installing the normally recommended number of manual and automatic gas flow shutoff valves, the Energy Commission-licensed power plants must provide, at strategic locations, excess manual/automatic, and remotely-controlled shutoff valves (CEC 2010).

Please see the **Hazardous Materials Management** section of this Final Staff Assessment for a detailed discussion of federal and State LORS applicable to the siting of high-pressure natural gas pipelines.

In addition, the County of Los Angeles' Department of Parks and Recreation stated in their comments on the PSA that the proposed transmission line easement in Segment 1 would be in the same location as the proposed Avenue S Connector Trail (#147), and is requesting a minimum of a 12-foot wide trail easement from the western edge of parcel #AIN39011005 to the eastern edge of parcel #AIN3039006021 (LAC 2010a). As such and based on discussions with the county, staff is recommending Condition of Certification **LAND-3**, which would require a trail easement, as requested by the county (LAC 2010a; LAC 2010b). Implementation of **LAND-3** would avoid conflicts with the county's proposed land use plan for the connector trail.

Sensitive Receptors

A proposed siting location may be considered inappropriate if a new source of pollution or hazard is located within close proximity to a sensitive receptor. From a land use perspective, sensitive receptor sites are those locations where people who would be more adversely affected by pollutants, toxins, noise, dust, or other project-related consequence or activity are likely to live or gather. Children, those who are ill or immune-compromised, and the elderly are generally considered more at risk from environmental pollutants. Therefore, schools, along with day-care facilities, hospitals, nursing homes, and residential areas, are considered to be sensitive receptor sites for the purposes of determining a potentially significant environmental impact. Depending on the applicable code, close proximity is defined as "within 1000 feet" of a school (California Health & Safety Code §§42301.6–9) or within 0.25 mile of a sensitive receptor, under CEQA (CCR 2006; CCR 2008). Proximity is not necessarily the deciding factor for a potentially significant impact, but is the threshold generally used to require further evaluation.

The area surrounding the power plant is primarily dominated by industrial uses. The closest residence is located approximately 1,500 feet (0.28 mile) to the northwest of the closest PHPP site boundary. Several residential properties are scattered amongst the industrial uses surrounding the project site. In addition, the Lancaster Adult Day Center is located approximately 1,800 feet (0.34 mile) northwest of the closest boundary of the PHPP site. No other sensitive receptors (childcare facilities, schools, hospitals, libraries,

or churches) were identified within a 1-mile radius of the proposed project site. Existing land uses within one mile of the proposed project site and 0.25 mile of the proposed linear ROWs (natural gas pipeline, transmission line, potable water line, and access road) include: Single-Family to Medium Residential, Commercial, Industrial, Public Facilities And Institutions, and Airport facilities. Land within a 0.25-mile radius of the proposed recycled water pipeline is primarily used for residential uses and open space (golf courses and related facilities). The nearest sensitive receptors to the proposed natural gas pipeline are residences located directly along the proposed natural gas pipeline on East Avenue S and 10th Street East, and also north of the natural gas and reclaimed water supply pipelines along East Avenue M. In addition, small portions of Segment 1 of the transmission line would be east of residences along East Avenue Q and 120th Street East.

Given the existing permitted uses surrounding the proposed project, and the fact that with implementation of Conditions of Certification **LAND-2** and **LAND-3** the proposed power plant site and associated features and facilities would be consistent with local LORS, the proposed project would not be considered an incompatible land use with the surrounding and nearby uses, including sensitive receptors. Also, as discussed above and in detail in the **Hazardous Materials Management** section of this Final Staff Assessment, the natural gas pipeline must be designed, constructed, and operated to meet CPUC and USDOT safety standards and regulations. Safety requirements for gas-fired power plant pipeline construction vary according to the population density and land use which characterize the surrounding land. Construction and maintenance requirements become more stringent with increasing population density. At this time, staff conclude that existing LORS are sufficient to ensure that that a less than significant risk of pipeline failure would exist with a newly installed natural gas pipeline. (see the **Hazardous Materials Management** section.)

From a land use perspective, staff has found no significant impacts regarding land use compatibility; therefore the siting of the PHPP site at the proposed location would be compatible with nearby surrounding sensitive receptors. The **Hazardous Materials Management, Noise, Public Health, Traffic and Transportation,** and **Visual Resources** sections provide detailed analyses of the noise, public health hazards or nuisance and adverse traffic or visual impacts on surrounding sensitive receptors such as residential uses. For a discussion of air quality impacts on sensitive receptors, see the **Air Quality** section of the Final Staff Assessment.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CCR, §15065[A][3]).

Plans and projections, such as those found in General Plans and other planning documents provide insight into longer-term expectations regarding development. These are informative to the cumulative analysis even though specific projects are not necessarily identified. Due to the ongoing and intense level of development in the region

(i.e., the Antelope Valley), General Plans and their projections provide a particularly useful method of analyzing the cumulative impacts of a project because these types of planning documents provide the general outlook for development in a particular jurisdiction.

Section 5.1 of AFC (Environmental Information), described projects within a 3-mile radius of the proposed PHPP site. Four development projects are listed below that are under construction or that have been approved by the planning agency responsible for their jurisdiction. By nature of their approval, permitted projects have complied with the land use plans, policies and regulations applicable to that project. The projects listed that have not been approved have the potential to conflict with applicable plans, policies, and regulations. However, in order for these projects to be approved, they would need to conform to these plans, policies, and regulations, and undergo CEQA environmental review prior to permit issuance.

- The Fairway Business Park is located approximately 1.3 miles southwest of the PHPP plant site in the City of Palmdale and was created by the Palmdale Community Redevelopment Agency in 1998. The goal of the Park was to purchase land that could be developed into a commercial and industrial park to assist in attracting large-scale industrial users. A Master EIR and a Master Conditional Use Permit were approved in 2005. The Fairway Business Park is approximately 60 percent built out, and approximately 200,000 square feet of industrial and commercial buildings are available for lease or purchase and nine parcels totaling 39 acres are currently vacant and available for development. (PHPP 2008).
- The Palmdale Transit Village Specific Plan area is located approximately 2.5 miles southwest of the PHPP plant site. Development of the Palmdale Transit Village Specific Plan would result in a transit-oriented village near the City's newly constructed Metrolink commuter rail and Antelope Valley Transit Authority bus transfer station (Multi-modal Transportation Center). The area potentially could be developed with up to 1,027 new housing units; 40,000 square feet of stand-alone neighborhood retail uses; 93,000 square feet of neighborhood retail mixed use; 353,000 square feet of stand-alone low rise office; and 93,000 square feet of low rise mixed-use office uses. Development also would involve circulation improvements including a pedestrian bridge traversing the Union Pacific Railroad tracks, landscaping, and extending the existing box culvert and rail platform approximately 100 feet north of the existing platform. (PHPP 2008).
- The Amargosa Creek Specific Plan is located approximately two miles northwest of the PHPP plant site in the City of Lancaster. The project is the development of retail and office uses, a hotel, and a medical facility within two major districts: the Commercial District (1.1-1.5 million square feet to be built out over 10 years) and the Medical District (approximately 655,000 square feet). An EIR was approved for the project in 2007. (PHPP 2008).
- The 30th St W and Ave K projects are located approximately three miles northwest of the PHPP plant site in Lancaster. The two projects at this intersection include a 4.4-acre commercial development on the southwest corner and an 8.5-acre commercial and townhome development on the southeast corner. The southeast project site has been approved and is moving forward. (PHPP 2008).

- The Tehachapi Renewable Transmission Project (TRTP), proposed by SCE, would involve new and upgraded transmission infrastructure along approximately 173 miles of new and existing rights-of-way (ROW) from the Tehachapi Wind Resource Area (TWRA) in southern Kern County, south through Los Angeles County and east to the existing Mira Loma Substation in Ontario, San Bernardino County. The proposed transmission lines would connect to the Vincent Substation within an existing ROW and construction would include a rebuild of a 220 kV transmission line to 500 kV standards. The project is currently in the final stages of the EIR certification and CEQA decision process, and the NEPA Final EIS process.
- The proposed Avenue S Connector Trail (#147), from the western edge of parcel #AIN39011005 to the eastern edge of parcel #AIN3039006021 along Segment 1 of the proposed transmission line located within unincorporated Los Angeles County (LAC 2010a).

The area in the vicinity of the proposed power plant site is essentially dominated by commercial and industrial development. The proposed PHPP would represent a similar land use type to adjacent uses. As a result of the General Plan Amendment, Zoning Amendment and the approval of the Tentative Parcel Map, the proposed project site would comply with applicable land use regulations, and also would not require other changes or concessions that would alter the development standards, availability of permits, or use of the project site or surrounding properties.

The proposed power plant would not make a significant contribution to regional impacts related to new development and growth; and potential cumulative impacts associated with the proposed transmission line would be mitigated with implementation of Condition of Certification **LAND-2**. Therefore, staff concludes that the proposed project in combination with past, present, and reasonably foreseeable projects in the area would not be cumulatively considerable. Therefore, the project's cumulative land use impacts line would be less than significant.

RESPONSE TO COMMENTS

Staff received comments related to land use from the Los Angeles County Department of Regional Planning, the Department of Parks and Recreation, the County Sanitation Districts of Los Angeles County, and the applicant (i.e., the City of Palmdale).

Los Angeles County, Department of Regional Planning
February 25, 2010

Comment: The County of Los Angeles' Department of Regional Planning provided comments regarding the proposed transmission line. Portions of Segments 1 and 2 of the proposed transmission line would traverse unincorporated county lands which do not specifically allow for siting of high voltage transmission lines. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code. At the time of publication of the PSA, staff was unsuccessful in obtaining the county's interpretation; therefore, staff's conclusion regarding the consistency of the transmission line with the county's applicable LORS documents was undetermined. However, included in the county's comments was a response to staff's requests, which states that

the zoning ordinance does not require a conditional use permit and the ordinance does not regulate such projects. In addition, the county states their preference for the Alternative Route 3 option, which is a shorter route that would impact fewer resources.

> **Response:** Staff appreciates comments provided by the County and has revised the discussion of the county's applicable land use LORS analysis in **LAND USE Table 2**.

Los Angeles County, Department of Parks and Recreation
February 25, 2010

Comment: The County of Los Angeles' Department of Parks and Recreation states the proposed utility easement would be in the same locations as the proposed Avenue S Connector Trail (#147), and is requesting a minimum of a 12-foot wide trail easement from the western edge of parcel #AIN39011005 to the eastern edge of parcel #AIN3039006021.

> **Response:** Staff appreciates comments provided by the Department of Parks and Recreation, and has included the Avenue S Connector Trail in the setting and impact analysis. Condition of Certification **LAND-3** has been included to require the project owner to provide a trail easement, as requested by the county.

City of Palmdale
March 3, 2010 and May 12, 2010

Comment: The City of Palmdale (i.e., the proposed project applicant) provided additional LORS that should be added to the consistency determination of applicable city LORS. In addition, the city has stated that the proposed project, along with the transmission line, would be sited in locations that are compatible with adjacent land uses, and therefore, are in conformance with the goals set forth by the General Plan and the regulation standards set forth by the Zoning Ordinance. (City of Palmdale 2010)

Subsequently, in a letter dated May 12, 2010, PHPP commented on behalf of the city stating that within the M-1, M-2, and M-4 zones, utility facilities are permitted subject to a site plan review (PHPP 2010).

> **Response:** Staff appreciates comments provided by the city. Staff has added the LORS noted in the city's March 3rd comment above, and has revised the consistency determinations for applicable city LORS. Please refer to **LAND USE Table 2**. In addition, staff has included Condition of Certification **LAND-2**, which requires that the transmission line be constructed and operated in compliance with the city' zoning ordinance.

CONCLUSIONS AND RECOMMENDATIONS

- The proposed project would not result in a significant conversion of Farmland (as classified by the FMMP) to non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts.

- Construction of the proposed transmission line would disrupt existing agricultural activities; therefore, staff has recommended Condition of Certification **LAND-1**, which would require the applicant to coordinate with agricultural landowners prior to construction in order to ensure minimal disruption to agricultural activities.
- The proposed project would not disrupt or divide the physical arrangement of an established community.
- Generally, the proposed power plant site would be compatible with existing on-site or nearby uses, as it is consistent with the general character of these permitted uses and the planned development pattern for the area.
- Based on PSA comments provided by the city of Palmdale, staff has recommended Condition of Certification **LAND-2**, which requires a Site Plan Review for the proposed transmission line and natural gas pipeline.
- Based on PSA comments provided by Los Angeles County, staff has recommended Condition of Certification **LAND-3** for consistency with an existing Antelope Valley Trails Master Plan for the development of the Avenue S Connector Trail.
- The proposed project's cumulative land use impacts would be less than significant.

Proposed Conditions of Certification

LAND-1 The project owner shall coordinate with property owners of farmland that is actively in production within the proposed transmission line right-of-way. The purpose of this coordination is to: (1) schedule construction activities at a location and time when damage to agricultural operations would be minimized, to the extent practicable; and (2) ensure that any areas damaged or disturbed by construction are restored to a condition that closely approximates conditions that existed prior to construction-related disturbance, to the extent practicable.

This includes avoiding construction during peak planting, growing, and harvest seasons, if feasible, based on transmission line outage limitations. If damage or destruction occurs, the applicant shall perform restoration activities on the disturbed area in order to return the area to a condition that closely approximates conditions that existed prior to construction-related disturbance. This could include activities such as soil preparation, regrading, and reseeding.

Verification: The project owner shall document coordination efforts with affected agricultural landowners, and shall submit this documentation to the CPM at least 30 calendar days prior to the start of construction activities on the affected agricultural parcels. In addition, the project owner shall document any plans for restoration activities prior to construction and document any actual restoration activities it conducts post completion of the restoration. The project owner shall submit the documentation of restoration plans to the CPM at least 30 calendar days prior to the start of construction activities on the affected agricultural parcels. The project owner shall submit the documentation of the actual restoration activities that occurred to the CPM no later than 30 calendar days after the completion of construction activities on the affected agricultural parcels.

LAND-2 The project owner shall ensure that the proposed transmission line and natural gas pipeline will be constructed and operated in compliance with the city of Palmdale's Zoning Ordinance, Chapter 2, Article 21 (Site Plan Review). The project owner shall submit a Site Plan Review to the city of Palmdale in sufficient time for review and comment, and to the Compliance Project Manager (CPM) for review and approval prior to the start of transmission line construction. The Site Plan Review shall be in compliance with the review process set forth by Chapter 2, Article 21 (Site Plan Review) of the city's Zoning Ordinance in order to ensure that the physical plans for the project are compatible with neighboring developments, are appropriate for the site, and achieve the highest level of design that is feasible for the project.

Verification: At least 90 calendar days prior to the start of construction of the transmission line and natural gas pipeline, including any demolition, grading, trenching, or site remediation, the project owner shall submit the site plan to the city of Palmdale for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to the city of Palmdale.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any revisions to the site plan received from the city of Palmdale, along with any changes to the proposed site plan, to the CPM for review and approval.

LAND-3 The project owner shall dedicate an easement within, or adjacent to, the PHPP transmission line corridor for the Avenue S Connector Trail as required by Los Angeles County's Antelope Valley Trails Master Plan and as requested by Los Angeles County's Department of Parks and Recreation. The easement to be dedicated by the project owner shall be a minimum of a 12-foot wide trail easement from the western edge of parcel #AIN39011005 to the eastern edge of parcel #AIN3039006021.

Verification: The project owner shall coordinate the dedication of a portion of the PHPP transmission line corridor to the county of Los Angeles for development of the Avenue S Connector Trail easement as approved by the Compliance Project Manager (CPM) within 180 days of the start of construction. The project owner shall provide documentation to the CPM that the dedication of the trail easement has been executed based on mutually agreed upon provisions between the project owner and the Los Angeles County's Department of Parks and Recreation, while ensuring safety and security of trail users. The documentation also shall guarantee that the easement would be located in the area specified by the county (a 12 foot wide trail easement from the western edge of parcel #AIN39011005 to the eastern edge of parcel #AIN3039006021). The project owner shall provide to the CPM updates in the Annual Compliance Report on the status of easement dedication.

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NOISE AND VIBRATION

Testimony of Shahab Khoshmashrab and Erin Bright

SUMMARY OF CONCLUSIONS

California Energy Commission staff concludes that the Palmdale Hybrid Power Project can be built and operated in compliance with all applicable noise and vibration laws, ordinances, regulations, and standards and, if built in accordance with the conditions of certification proposed below, would produce no significant adverse noise impacts on sensitive receptors within the affected area, either direct or cumulative.

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 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 groundborne 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 Palmdale Hybrid Power Project (PHPP) 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), and to avoid creation of significant adverse noise or vibration impacts. For an explanation of technical terms and acronyms employed in this section, please refer to **Noise Appendix A** immediately following.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Noise Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure
State (Cal/OSHA): Cal. Code Regs., tit. 8, §§ 5095-5099	Protects workers from the effects of occupational noise exposure

Applicable Law	Description
Local City of Palmdale General Plan, Noise Element City of Palmdale Municipal Code, Chapter 8.28 City of Lancaster General Plan, Noise Element City of Lancaster Municipal Code	Establishes noise guidelines and policies. Restricts construction noise to specified hours. Establishes acceptable noise levels and limits hours of construction. Limits time of day during which loud construction noise may be created.

FEDERAL

Under the Occupational Safety and Health Act of 1970 (29 USC § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure (29 CFR § 1910.95). These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **Noise Appendix A Table A4** immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.
There are no federal laws governing off-site (community) noise.

The only guidance available for evaluation of power plant vibration is guidelines published by the Federal Transit Administration (FTA) for assessing the impacts of groundborne vibration associated with construction of rail projects. These guidelines have been applied by other jurisdictions to assess groundborne vibration of 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 groundborne vibration. The FTA measure of the threshold of perception is 65 VdB,[1] 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

[1] VdB is the common measure of vibration energy.

guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure.

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 the federal OSHA standards (see the **Worker Safety and Fire Protection** section of this document and **Noise Appendix A Table A4**).

LOCAL

City of Palmdale General Plan Noise Element

The General Plan Noise Element, Section 2: Goals, Objectives and Policies, lists the following policies for any development (COP1993):

> Policy N1.1.3: Require measures to reduce noise levels to no more than 65 dBA CNEL exterior.
>
> Policy N1.2.2: Restrict construction hours during the evening, early morning and Sundays.
>
> Policy N1.2.3: Utilize any of all of the following measures in order to maintain acceptable noise environments throughout the City:
>
> 1. Control noise at its source, including noise barriers and other muffling devices built into the noise source.

Section 3, TABLE N-3 sets maximum acceptable exterior noise levels at different land uses. The maximum acceptable exterior noise level at residential uses is 65 dBA L_{eq}.

Section 3.C refers to the City Municipal Code, Chapter 8.28 and its provisions that restrict construction between the hours of 8:00 p.m. and 6:30 a.m.

City of Palmdale Municipal Code

Chapter 8.28, Building Construction Hours of Operation and Noise Control, includes Section 8.28.030, *Construction noise prohibited in residential zones*, which states (COP2009a):

> Except as otherwise provided in this chapter, no person shall perform any construction or repair work on any Sunday, or any other day after 8:00 p.m. or before 6:30 a.m., in any residential zone or within 500 feet of any residence, hotel, motel or recreational vehicle park… (Ord. 1335 §1, 2007; Ord. 584 §1, 1986).

City of Lancaster General Plan Noise Element

Section III of the General Plan comprises the Noise Element (COL2009a)

> Objective 4.3 requires the implementation of the noise standards identified in Table III-1. Table III-1, Noise Compatible Land Use Objectives, establishes maximum exterior noise levels in residential land uses at 65 dBA CNEL.
>
> Policy 4.3.1(h) requires that new noise sources comply with the maximum noise level standards of Table III-1 at the property line of adjacent uses.
>
> Policy 4.3.2(d) limits construction activities to daylight hours between sunrise and 8:00 p.m.
>
> Policy 4.3.3(b) requires the use, wherever feasible, of noise barriers (walls, berms, or a combination thereof) to reduce significant noise impacts.

City of Lancaster Municipal Code

Title 8 – Health and Safety includes Chapter 8.24 – Noise Regulations. Included in this chapter is subchapter 8.24.040 *Loud, unnecessary and unusual noises prohibited – Construction and building*, which states (COL2009b):

> Except as otherwise provided in this chapter, a person at any time on Sunday or any day between the hours of eight p.m. and seven a.m. shall not perform any construction or repair work of any kind upon any building or structure or perform any earth excavating, filling or moving where any of the foregoing entails the use of any air compressor, jack hammer, power-driven drill, riveting machine, excavator, diesel-powered truck, tractor or other earth-moving equipment, hard hammers on steel or iron or any other machine tool, device or equipment which makes loud noises within five hundred (500) feet of an occupied dwelling, apartment, hotel, mobile home or other place of residence (Ord. 693 §1 (part), 1995: prior code §4-1.4)(Ord. No. 916, §2, 2-10-09).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., tit. 14, App. G) sets forth some characteristics that may 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 groundborne vibration or groundborne noise levels;

3. substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

4. substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying item 3 above to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by 5 dBA or more at the nearest sensitive receptor, including those receptors that are considered minority population.

Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA is considered significant. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant, depending on the particular circumstances of the case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting combined noise level;[2]

2. the duration and frequency of the noise;

3. the number of people affected;

4. the land use designation of the affected receptor sites; and

5. public concern or controversy as demonstrated at workshops or hearings or by correspondence.

[2] For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments and with industrial noise regulations adopted by European jurisdictions. If the project would create an increase in ambient noise no greater than 10 dBA at nearby sensitive receptors, and the resulting noise level would be 40 dBA or less, the project noise level would likely be insignificant.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary;
- use of heavy equipment and noisy activities is limited to daytime hours; and
- all industry-standard noise abatement measures are implemented for noise-producing equipment.

Staff uses the above method and threshold to protect the most sensitive populations, including the minority population.

SETTING

The PHPP would be a nominal 570 MW combined cycle power plant, consisting of two General Electric (GE) Frame 7F gas turbine generators and one steam turbine generator configured as GE's Rapid Start Process. Additionally, a solar collector field consisting of parabolic trough collectors would provide up to ten % of peak power during periods of peak demand. The PHPP would be constructed on 377 acres in a currently vacant, undeveloped industrial area in the northernmost portion of the City of Palmdale in Los Angeles County. The site is bounded on the north by E Avenue M; across this thoroughfare lies a portion of the City of Lancaster. To the north of the site, land is zoned Heavy Industrial (City of Lancaster) or Industrial (City of Palmdale); to the west, land is zoned Light Industry, Office, Business Park and Commercial. Air Force Plant 42 lies to the south and east of the site (COP 2008a, AFC §§ 1.1, 1.2, 2.2, 2.3.1, 5.8.2.2).

The nearest land zoned residential lies in the City of Lancaster, one mile north of E Avenue M. The nearest existing sensitive noise receptors are homes in a residential neighborhood approximately 600 feet north of Avenue L and east of 10th Street, over 1.5 miles from the center of the PHPP plant site. In addition, ten residential structures (numbered R1 through R10), some apparently abandoned, lie in the industrial zone north of the site; the nearest of these is located approximately ¾ mile northwest of the center of the PHPP power block and approximately ¼ mile north of the plant site. Other noise sensitive receptors include hotels on the west side of Sierra Highway and north of E Avenue M, and the Lancaster Adult Day Center (numbered R11) on the northeast corner of E Avenue M and 4th Street, approximately one mile from the center of the power block and 1/3 mile from the northwest corner of the site boundary (COP 2008a, AFC §§ 1.4.7, 5.8.2.2). (See **Noise and Vibration Figures 1 and 2**, below.)

Existing noise sources in the area are vehicle noise on Sierra Highway and Avenue M, aircraft noise at Air Force Plant 42, rail traffic on the Union Pacific Railroad line west of the site, and industrial and commercial activity to the west and north of the project site (COP 2008a, AFC § 5.8.2.2).

Ambient Noise Monitoring

In order to establish a baseline for comparison of predicted project noise to existing ambient noise, the applicant has presented the results of an ambient noise survey (COP 2008a, AFC § 5.8.2.2; Tables 5.8-6, 5.8-7, 5.8-8, 5.8-9; Figure 5.8-2). The survey was performed May 29 through May 30, 2007.

The noise survey monitored existing noise levels at the following locations, shown on **Noise and Vibration Figure 1**:

1. Measurement Location 1 (ML 1): 42104 6th Street East, Lancaster. This lies in a residential neighborhood to the northwest of the project site, near the residence referred to as R2. This location represents the nearest residential receptor to the project site.

2. Measurement Location 2: West of the project site, and 85 feet east of the Union Pacific Railroad line.

3. Measurement Location 3: Southeast corner of the project site.

4. Measurement Location 4: East side of the project site.

Noise Table 2 summarizes these ambient noise measurements (COP 2008a, AFC Table 5.8-7):

Noise Table 2
Summary of Measured Ambient Noise Levels

Measurement Location	Measured Noise Levels, dBA			
	L_{eq} – Daytime[1]	L_{eq} – Nighttime[2]	L_{90} – Nighttime[3]	CNEL
1 – 42104 6th Street East, Lancaster (R2*)	59	55	39	63
2 – West of project site	67	65	40	74
3 – Southeast corner of site	62	45	34	62
4 – East side of site	62	49	35	62

Source: COP 2008a, AFC Table 5.8-7
* Numbering of residential receptors: see below, and COP 2008a, AFC Table 5.8-12
[1] Staff calculations of average of 15 daytime hours (1 p.m. to 1 p.m.)
[2] Staff calculations of average of nine nighttime hours
[3] Staff calculations of average of four consecutive quietest hours of the nighttime (Locations 1 & 2, 11 p.m. to 3 a.m.; Locations 3 & 4, 10 p.m. to 2 a.m.)

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term construction activities and by normal long-term operation of the power plant.

Construction Impacts and Mitigation

Construction noise is usually considered a temporary phenomenon. Construction of the PHPP is expected to last 27 months, typical of other combined cycle power plants in terms of schedule, equipment used, and other types of activities (COP 2008a, AFC §§ 1.2, 2.4.8, 5.8.3.2).

Compliance with LORS

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances.

The City of Palmdale General Plan Noise Element requires measures to reduce noise levels to no more than 65 dBA CNEL, and refers to the City of Palmdale Municipal Code. Section 8.28.030 of the Municipal Code restricts construction work within 500 feet of any residence, hotel, motel or recreational vehicle park to the hours between 6:30 a.m. and 8:00 p.m., Monday through Saturday (COP1993; COP2009a).

The City of Lancaster General Plan Noise Element establishes a maximum exterior noise level in residential land uses of 65 dBA CNEL and limits construction activities to the hours between sunrise and 8:00 p.m. Subchapter 8.24.040 of the City of Lancaster Municipal Code limits construction within 500 feet of an occupied dwelling, apartment, hotel, mobile home or other place of residence to the hours between 7:00 a.m. and 8:00 p.m., Monday through Saturday (COL2009a, COL2009b).

The applicant commits to limiting construction to the hours 6:00 a.m. and 6:00 p.m., Monday through Friday (COP 2008a, AFC § 5.8.3.2). Since the project lies more than 500 feet from any occupied residence, this schedule would comply with applicable LORS. Energy Commission staff proposes Condition of Certification **NOISE-6**, below, to ensure adherence to this schedule.

CEQA Impacts

Power Plant Site

To evaluate construction noise impacts, staff compares the projected noise levels to the ambient. Since construction noise typically varies continually with time, it is most appropriately measured by, and compared to, the L_{eq} (energy average) metric.

Aggregate construction noise can be expected to reach levels of 45 dBA L_{eq} at Measurement Location ML 1, also labeled R2, representing the nearest residence (COP 2008a, AFC Table 5.8-7). Comparing projected noise levels to the ambient noise levels at Measurement Location ML 1 (see **Noise Table 3**, below) shows an increase during

daytime and during nighttime of zero dBA. Construction noise would thus be inaudible, even at night, when people are sleeping. No impacts would result.

Noise Table 3
Predicted Power Plant Construction Noise Impacts

Measurement Location	Average Construction Noise Level[1] (dBA L_{eq})	Measured Existing Ambient[2] (dBA L_{eq})	Cumulative (dBA L_{eq})	Change (dBA)
1 - Nearest residence, R2	45	59 daytime	59 daytime	+0 daytime
		55 nighttime	55 nighttime	+0 nighttime

1 Source: COP 2008a, AFC Table 5.8-12
2 Source: COP 2008a, AFC Table 5.8-7; and staff calculations of average of daytime and nighttime hours

As described above, the applicant commits to limiting noisy construction work to daytime hours. In order to avoid any chance for annoyance, staff proposes such a limit. Proposed Condition of Certification **NOISE-6**, below, would restrict noisy construction to the hours between 6:00 a.m. and 6:00 p.m.

In the event that actual construction noise should annoy nearby residents, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a Notification Process to make nearby residents aware of the project, and a Noise Complaint Process that requires the applicant to resolve any problems caused by noise from the project.

Linear Facilities

New off-site linear facilities would consist of the following (COP 2008a, AFC §§ 1.1, 2.1, 2.4.7.1, 2.4.7.2, 2.4.7.3; AECOM 2009b):

- a one-mile long potable water pipeline;
- a one-mile long sanitary wastewater pipeline;
- a 7.4-mile long reclaimed water supply pipeline;
- an 8.7-mile long natural gas supply pipeline; and
- an electrical transmission interconnection line approximately 36 miles long.

Construction of linears moves along rapidly, so no area is exposed to noise for more than a few days. Limiting noisy construction to daytime hours should provide adequate mitigation of impacts. To ensure compliance with this restriction, staff proposes Condition of Certification **NOISE-6**.

Pile Driving

Pile driving should not be required for the PHPP (COP 2008a, AFC § 5.8.3.2).

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 comprises the steam path has 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 heat recovery steam generator 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, is performed several times daily over a period of two or three weeks. At the end of this procedure, the steam lines are connected to the steam turbine, which is then ready for operation. Alternatively, high-pressure compressed air can be substituted for steam.

High-pressure steam blows, if unsilenced, can typically produce noise levels as high as 129 dBA at a distance of 50 feet. The applicant proposes to install a silencer on the steam blow piping; this would reduce noise levels to 92 dBA at 50 feet. This, in turn, would yield less than 55 dBA at residence R2, the nearest residential receptor (see **Noise Table 5**, below). This is less than the ambient noise level of 59 dBA, and would likely be unnoticeable. Further, limiting steam blows to daytime hours would remove any potential for significant impacts.

Noise Table 5
Steam Blow Noise Impacts

Receptor	High-Pressure Steam Blow Noise Level (silenced) (dBA L_{eq})	Daytime Ambient Noise Level (dBA L_{eq})[1]	Cumulative Level (dBA L_{eq})	Change (dBA)
R2	55	59	60	+1

[1] See **Noise Table 2**, above

In order to ensure that steam blow noise does not produce significant adverse impacts, staff has proposed Condition of Certification **NOISE-7** below.

Vibration

The only construction operation likely to produce vibration that could be perceived off-site would be pile driving. As discussed above, pile driving should not be required for construction of the PHPP. Staff therefore believes there would be no significant impacts from construction vibration.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized those applicable LORS that would protect construction workers (COP 2008a, AFC § 5.8.3.2). 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 PHPP include the combustion turbine generator (CTG) air intakes and exhaust ducts, heat recovery steam generators and their exhaust stacks, steam turbine generator (STG), evaporative cooling tower, air compressors and electrical transformers, and various pumps and fans (COP 2008a, AFC §§ 1.1, 2.1, 2.4.2, 2.4.3.1, 2.4.3.2, 2.4.3.3). Staff compares the projected noise with applicable LORS. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.
The applicant proposes to include appropriate noise mitigation measures to limit noise impacts from project operation (COP 2008a, AFC § 5.8.4.2). Such measures commonly include:

- CTG inlet air silencers with acoustically lined elbows;
- CTG and STG sound-attenuated enclosures;
- CTG exhaust diffuser and duct acoustical barriers; and
- locate natural gas compressors in an acoustical enclosure.

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors. Project operating noise at Measurement Location ML 1 (the nearest noise-sensitive residences, northwest of the project site) is predicted to be approximately 40 dBA L_{eq} or 47 dBA CNEL (COP 2008a, AFC § Table 5.8-14). This figure complies with both the City of Palmdale General Plan Noise Element and the City of Lancaster General Plan Noise Element guideline of 65 dBA CNEL (see **Noise Table 1** above) Measurement Location ML 1; see **Noise Table 6**:

Noise Table 6
Plant Operating Noise LORS Compliance

Measurement Location	LORS	LORS Limit	Projected Noise Level[1]
ML 1	City of Palmdale General Plan Noise Element, Policy N1.1.3 and City of Lancaster General Plan Noise Element, Objective 4.3	65 dBA CNEL	47 dBA CNEL

[1] Source: COP 2008a, AFC § 5.8.3.3 and Table 5.8-14

CEQA Impacts

Power plant noise is unique. Essentially, a power plant operates as a steady, continuous, broadband noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, staff compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at the affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated in the project to reduce or remove the impact.

In most cases, a power plant will be intended to operate around the clock for much of the year. The applicant explains that the plant will be operated to serve electrical demand in Southern California (COP 2008a, AFC §§ 1.3, 2.4.2). As a worst case scenario, staff assumes the plant will operate 24 hours per day. Staff evaluates project noise emissions by comparing them to the nighttime ambient background level; this assumes the potential for annoyance due to power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than the daytime levels; differences of 5 to 10 dBA are common. Staff believes it is prudent to average the lowest nighttime hourly background noise level values to arrive at a reasonable baseline for comparison with the project's predicted noise level.

Power plant noise levels at Measurement Location ML 1 are predicted to reach 40 dBA L_{eq}, and 47 dBA CNEL; see **Noise Table 7**.

Noise Table 7
Power Plant Noise Impacts at Nearest Sensitive Receptors

Measurement Location	Power Plant Noise Level, dBA L_{eq}[1]	Ambient Background Level, dBA L_{90}[2]	Cumulative Noise Level, dBA	Change from Ambient Background Level
ML 1	40	39	43	+4

[1] Source: COP 2008a, AFC Table 5.8-14 [2] Source: COP 2008a, AFC Table5.8-7; and staff calculations of average of four quietest consecutive nighttime hours

As explained above, when evaluating noise impacts on residences, staff compares project noise to the average of the four quietest consecutive nighttime hours. At Measurement Location ML 1, representing the nearest sensitive receptors, this is the span from 11:00 p.m. to 3:00 a.m. (see AFC, Table 5.8-7). This value is 39 dBA L_{90} (see **Noise Table 7**).

When projected plant noise is added to the ambient value (as calculated by staff), the cumulative level is 4 dBA above the ambient value (see **Noise Table 7**). This increase is barely noticeable and is below the range that staff considers a potentially significant adverse impact. To ensure this noise level is not further exceeded, staff proposes Condition of Certification **NOISE-4** below.

Tonal Noises

One possible source of annoyance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. Typically, a power plant developer avoids the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design. While the applicant does not specifically address tonals, to ensure that tonal noises do not cause annoyance, staff proposes Condition of Certification **NOISE-4**.

Linear Facilities

New off-site linear facilities would consist of the following (COP 2008a, AFC §§ 1.1, 2.1, 2.4.7.1, 2.4.7.2, 2.4.7.3; AECOM 2009b):

- a one-mile long potable water pipeline;
- a one-mile long sanitary wastewater pipeline;
- a 7.4-mile long reclaimed water supply pipeline;
- an 8.7-mile long natural gas supply pipeline; and
- an electrical transmission interconnection line approximately 36 miles long.

The underground gas and water pipelines would be inaudible in operation, and therefore could cause no noise impacts. The electrical interconnection line could be expected to produce corona noise (COP 2009a, AFC § 5.8.3.3), but such noise is typically inaudible beyond the right-of-way of the line, and would thus cause no significant impacts.

Vibration

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration) and through the air (airborne vibration).

The operating components of a combined cycle power plant consist of high-speed gas and steam turbine generators, compressors, and various pumps. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors are attached to the turbines and generators. Based on experience with numerous previous projects employing similar equipment, Energy Commission staff believes that groundborne vibration from the PHPP would be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves and can rattle the walls of lightweight structures. In staff's experience, airborne vibration impacts from a plant such as the PHPP are typically imperceptible 1,000 feet from the plant. The PHPP's chief source of airborne vibration would be the gas turbines' exhaust. In a power plant such as the PHPP, however, the exhaust must pass through the heat recovery steam generators (HRSGs) before it reaches the atmosphere. The HRSGs act as efficient mufflers; this makes it highly unlikely that the PHPP would cause perceptible airborne vibration effects.

Worker Effects

The applicant has acknowledged the need to protect plant operating and maintenance workers from noise hazards and has committed to comply with applicable LORS (COP 2008a, AFC § 5.8.3.3). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required. To ensure that plant operation and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**.

CUMULATIVE IMPACTS AND MITIGATION

Section 15130 of the CEQA Guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, are considerable or that compound or increase other environmental impacts. The CEQA Guidelines require that the discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of the impacts attributable to the project alone.

The applicant has identified four projects in the vicinity of the PHPP, but has concluded that, due to their distance from the PHPP site, none would likely pose a potential for cumulative noise impacts (COP 2008a, AFC § 5.8.3.4). Staff agrees with this assessment, and thus concludes that there is no likelihood of cumulative significant noise impacts.

FACILITY CLOSURE

In the future, upon closure of the PHPP, all operational noise from the project would cease, and no further adverse noise impacts from operation of the PHPP would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it can be treated similarly. That is, noisy work could be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS that were in existence at that time would apply. Applicable conditions of certification included in the Energy Commission decision would also apply unless modified.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

Comment: The applicant has commented that the proposed Conditions of Certification **NOISE-3** and **NOISE-4** require the implementation of noise control programs which are also required by some Conditions of Certification for Worker Safety. The applicant requests that the requirements of **NOISE-3** and **NOISE-4** be incorporated into the Worker Safety conditions to streamline compliance (L&W 2010b).

Response: Staff acknowledges that the noise control program that would be submitted to comply with **NOISE-3** may be included in the plans that would be submitted in compliance with the Worker Safety conditions; however, staff does not agree that having the noise compliance condition separate from the Worker Safety conditions would complicate compliance submittals. Compliance reporting can include appropriate cross-references. Rather, having the conditions separate serves to flag those particular submittals for review by the pertinent staff. Additionally, if the noise control program were submitted as part of the worker safety plans then the submittal of those plans would apply to both the worker safety conditions and **NOISE-3**.

Condition of Certification **NOISE-4** is a noise restriction at the nearby noise receptors; it does not pertain to worker safety and does not correlate to the Worker Safety conditions specified. It would thus be inappropriate to incorporate **NOISE-4** into the Worker Safety conditions.

CONCLUSIONS AND RECOMMENDATIONS

The PHPP, if built and operated in conformance with these proposed conditions of certification, would comply with all applicable noise and vibration LORS for both operation and construction and would produce no significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one-half mile of the site and one-quarter mile of the linear facilities, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project and include that telephone number in the above-mentioned notice. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: 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-mentioned notification has been performed and describing the method of that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of the PHPP, 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 related to the complaint;
- take all feasible measures to reduce the noise at its source if the noise is project related; and

- submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts, and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form with the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a 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 implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program and a statement, signed by the project owner's project manager, verifying that the noise control program will be implemented throughout construction of the project. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal/OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program and the project owner's project manager's signed statement. The project owner shall make the program available to Cal/OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that operation of the project will not cause noise levels due solely to plant operation to exceed an average of 40 dBA L_{eq} measured at Measurement Location ML 1, near the residence identified as R2 in **Noise and Vibration Figure 2**. No new pure-tone components may 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.

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 residential locations to determine the presence of pure tones or other dominant sources of plant noise.

When the project first achieves a sustained output of 85 % or greater of rated capacity, the project owner shall conduct a community noise survey at Measurement Location ML 1 or at closer locations acceptable to the CPM. This survey shall

be performed during power plant operation and shall also include measurement of one-third octave band sound pressure levels to determine whether new pure-tone noise components have been caused by the project.

If the results from the noise survey indicate that the power plant average noise level (L_{eq}) at Measurement Location ML 1 exceeds the above value, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

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's 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.

NOISE-5 Following the project's first achieving a sustained output of 85 % or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the 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 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 that will be employed 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 TIME RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times of day delineated below:

Monday through Friday: 6:00 a.m. to 6:00 p.m.

Haul trucks and other engine-powered equipment shall be equipped with mufflers that meet all applicable regulations. 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.

STEAM BLOW RESTRICTIONS

NOISE-7 If a high-pressure steam blow is employed, the project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 92 dBA measured at a distance of 50 feet. The project owner shall conduct steam blows only during the hours of 8:00 a.m. to 5:00 p.m.

Verification: At least 15 days prior to the first steam blow, the project owner shall submit to the CPM drawings or other information describing the temporary steam blow silencer and the noise levels expected and a description of the steam blow schedule.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Palmdale Hybrid Power Project
(08-AFC-9)

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

AECOM 2009b – AECOM / S. Head (tn: 50094). Applicant Supplemental Responses to CEC Data Request Set 1. Dated on 03/02/09. Submitted to CEC / Docket Unit on 03/03/09.

COL 2009x – City of Lancaster General Plan, June 2009.

COL 2009xx – City of Lancaster Municipal Code, August 25, 2009.

COP 1993 – City of Palmdale General Plan, adopted January 25, 1993.

COP 2009x – City of Palmdale Municipal Code, September 2, 2009.

COP 2008a – City of Palmdale/ S. Williams (tn: 47383). Application for Certification for the Palmdale Hybrid Power Project. Dated on 07/30/08. Submitted to CEC/ Docket Unit on 08/04/08.

L&W 2010b – Latham & Watkins / P. Kihm (tn:55276) City of Palmdale's Comments on Volume 1 of the Preliminary Staff Assessment, dated 02/08/10. Submitted on 02/09/10.

[INSERT NOISE AND VIBRATION FIGURE 1]

[INSERT NOISE AND VIBRATION FIGURE 2]

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, those higher levels 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 would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about 7 decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (*Effects of Noise on People*, U.S. Environmental Protection Agency, December 31, 1971).

To help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** illustrates 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 7:00 p.m. to 10:00 p.m., and after addition of 10 decibels to sound levels in the night between 10:00 p.m. and 7:00 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 10:00 p.m. and 7:00 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, *Model Community Noise Control Ordinance*, California Department of Health Services 1976, 1977.

Noise Table A2 Typical Environmental and Industry Sound Levels			
Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- subjective effects of annoyance, nuisance, dissatisfaction.
- interference with activities such as speech, sleep, and learning.
- physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the

level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.
With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.

2. Outside of the laboratory, a 3-dB change is considered a barely noticeable difference.

3. A change in level of at least 5 dB is required before any noticeable change in community response would be expected.

4. A 10-dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response (Kryter, Karl D., *The Effects of Noise on Man*, 1970).

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a 3-dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). **Noise Table A3** indicates the rules for decibel addition used in community noise prediction.

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, as shown in **Noise Table A4**.

Noise Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 CFR §1910.95.

PUBLIC HEALTH

Testimony of Alvin Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the Palmdale Hybrid Power Project (PHPP) and does not expect any significant adverse cancer or short- or long-term noncancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed PHPP uses a highly conservative 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 PHPP would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

INTRODUCTION

The purpose of this Final Staff Assessment (FSA) is to determine if emissions of toxic air contaminants (TACs) from the proposed PHPP would have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

California Energy Commission (Energy Commission) staff addresses potential impacts of regulated or criteria air pollutants in the **Air Quality** section of this FSA, and impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section. Health effects from electromagnetic fields are discussed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project in wastewater streams to the public sewer system are discussed in the **Soil and Water Resources** section. Plant releases in the form of hazardous and nonhazardous wastes are described in the **Waste Management** section.

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)	The National Emissions Standards for Hazardous Air Pollutants (NESHAP) requires new sources that emit more than 10 tons per year of any specified Hazardous Air Pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology.
State	
California Health and Safety Code section 25249.5 et seq. (Proposition 65)	These sections establish thresholds of exposure to carcinogenic substances above which Prop 65 exposure warnings are required.
California Health and Safety Code section 41700	This section states that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Code of Regulations, Title 22, Section 60306	Requires that whenever a cooling system uses recycled water in conjunction with an air conditioning facility and a cooling tower that creates a mist that could come into contact with employees or members of the public, a drift eliminator shall be used and chlorine, or other, biocides shall be used to treat the cooling system recirculating water to minimize the growth of Legionella and other micro-organisms.
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	
Antelope Valley Air Quality	This rule requires notification for projects with a

Management District (AVAQMD) Rule 212	predicted cancer risk greater than or equal to one-in-one-million.
AVAQMD Rule 402	This rule prohibits the discharge of air contaminants or other materials that can cause nuisance or injury.
AVAQMD Regulation X	This regulation notifies sources of the requirements, enforceability, and practices for the California ATCM and Federal MACT standards for control of California TACs and Federal HAP emissions, respectively. It assigns a prioritization score for toxics and requires the preparation of a HRA by high risk facilities.
AVAQMD Rule 1000	This rule implements the Federal NESHAP promulgated under 40 CFR Part 61.
AVAQMD Rule 1401	This rule discusses the requirements for new source review for air toxics.
AVAQMD CEQA and Federal Conformity Guidelines	This rule provides significance thresholds under CEQA for exposure of sensitive receptors to cancer and noncancer public health risk impacts.

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Characteristics 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, affect public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

The project site is located in the City of Palmdale, California. Land in the vicinity of the proposed project is designated for Light Industry, Commercial, Office, and Business Park. There are several residential uses within a one-mile radius (COP 2008a, Section 5.10.2). The natural gas pipeline proposed for construction for this project would be approximately 8.7 miles long, running from the PHPP site along existing street right-of-ways to East Avenue S where it would connect with a Southern California Gas facility (COP 2008a, Section 2.4.7.1). Sensitive receptors and residences in the project vicinity (within a 3-mile radius) are listed in **Appendix G.7** and shown in **Figure 5.10-2** (COP 2008a). The nearest sensitive receptor is an adult day health care center located approximately 0.4 miles west of the site boundary (COP 2008a, Section 5.10.2).

The PHPP would have two stacks, one for each combustion turbine generator. The stack heights would be 145 feet (COP 2008a, Table 5.2-34). The location of elevated terrain is important in assessing potential exposure, as an emission plume may impact high elevations before impacting lower elevations. The site's elevation is about 2,500 feet above mean sea level, and the topography of the immediate vicinity is generally

flat. Terrain above stack height exists to the west and south of the project where the Tehachapi Mountains reach an elevation of about 5,000 feet within 10 miles (COP 2008a, Section 5.2.2).

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced, and localized exposure may be increased.

The climate at the project site is characterized as high desert, with very hot summers and mild winters. Clear skies, extreme temperature changes, low precipitation, and strong seasonal winds are common features of the Mojave Desert climate. 74% of the annual precipitation occurs between December and March with occasional summer thunderstorms producing flash flooding. The project area experiences transport winds from the northwest and southwest that bring pollutants from the Los Angeles Basin and the San Joaquin Valley causing periods of increased pollutant concentration in the Mojave Desert Air Basin (COP 2008a, Section 5.2.2). Quarterly wind roses for the region are provided in Appendix G.1 of the AFC (COP 2008a).

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **Air Quality** section presents more detailed meteorological data.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the Antelope Valley Air Quality Management District (AVAQMD). By examining average toxic concentration levels from representative air monitoring sites with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual in the United States is about 1 in 3, or 333,000 in 1 million.

The air monitoring site closest to the project is the Lancaster Division Street Monitoring Station, located approximately 1.5 miles northwest. However, this station does not monitor TACs. The nearest California Air Resources Board (ARB) air toxics monitoring station that actively reports values is located on Palm Avenue in Burbank, approximately 30 miles south-southwest of the project site. Although staff does not consider this location to be representative of air quality in the area of the proposed site, it does serve to show the upper-bound levels of toxic air contaminants found in the greater Los Angeles region. In 2008, the background cancer risk calculated by ARB for the Burbank site was 160 in one million. The pollutants 1,3-butadiene and benzene, emitted primarily from mobile sources, were the two highest contributors to risk and

together accounted for over half of the total risk. The risk from 1,3-butadiene was about 50 in one million, while the risk from benzene was about 53 in one million. Formaldehyde accounts for about 16% of the 2008 average calculated cancer risk based on air toxics monitoring results, with a risk of about 26 in one million. Formaldehyde is emitted directly from vehicles and other combustion sources, such as the proposed facility. The risk from hexavalent chromium was about 15 in one million, or ~9% of the total risk.

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. Assessing existing health concerns in the project area provides staff with a basis on which to evaluate the significance of any additional health impacts from the proposed PHPP project and evaluate any proposed mitigation. Three health studies were identified in the AFC within a 6-mile radius: 1) an Air Resource Board (ARB) study of the relationship between asthma and air pollution that included the cities of Lancaster and Palmdale amongst 10 other communities in Southern California. This study was conducted over a period of 10 years and concluded that current levels of air pollution in Southern California are associated with chronic health effects. 2) A study by the Los Angeles County Department of Public Health (LACDPH) on lung cancer estimated that the Antelope Valley Service Planning Area 1 (AVSPA1) had a higher lung cancer death rate than surrounding areas. 3) A LACDPH health survey conducted in 2005 found that AVSPA1 had the highest asthma rate in the county (COP 2008a, Section 5.10.2). Staff has considered this information in its analysis and conducted its own review of the existing rates of respiratory diseases including lung cancer and asthma. Staff found that Los Angeles County is comprised of eight Service Planning Areas (SPAs), one of which is the Antelope Valley SPA. LA County Department of Public Health (LACDPH 2009) presented the following lung cancer death rates.

Lung Cancer Mortality Rates 2009
Antelope Valley and Los Angeles County, California

	Lung Cancer Death Rate (age-adjusted per 100,000 population)
Healthy Persons 2010 goal	43.3
National	52.6
Los Angeles County	34.6
Antelope Valley SPA	50.9

A review of the above data show that while deaths due to lung cancer are higher in the Antelope Valley area than in LA County as a whole, they remain below the national average. Both Antelope Valley and LA County are above the Healthy People 2010 National Health Promotion & Disease Prevention Objectives goal. Of course, this data is not adjusted for other environmental, life style, or genetic causation and thus smoking, the single most preventable cause of lung cancer, is not factored out of the results.

The Los Angeles County Department of Public Health also has a system called “L.A.

HealthDataNow!" on a website that allows public health statistics and information to be generated on demand and accessed online (http://dqs.hasten.ladhs.org/). Staff conducted a query for lung cancer death rate for 2000-2007 for all races, male and female, all ages for Los Angeles County and for the Antelope Valley area and found the following:

Lung Cancer Mortality Rates
Antelope Valley and Los Angeles County, California

	Lung Cancer Death Rate 2000-2007 (age-adjusted per 100,000 population)
Los Angeles County	37.2 (36.7-37.6 95% C.I.)
Antelope Valley SPA	52.3 (48.9-55.7 95% C.I.)

Once again, this data is not adjusted for other environmental, genetic, or lifestyle causation and thus smoking, the single most preventable cause of lung cancer, is not factored out of the results.

Staff also reviewed the incidence rate for asthma and emphysema mortality and found that the LAC DPH reported in 2009 the following asthma rates and emphysema death rates.

Asthma Rates
Antelope Valley and Los Angeles County and California

	Percent with Current Asthma		Emphysema Mortality Rate (age-adjusted per 100,000 population)
	Children	Adults	
Los Angeles County	7.9	6.5	30.9
Antelope Valley SPA	9.7	9.9	67.3

Staff also reviewed the data from UCLA on their website ("askCHIS") concerning health statistics gathered by the California Health Interview Survey (http://www.chis.ucla.edu/). Staff conducted searches for asthma based on data from the 2007 California Health Interview Survey and results for California, Los Angeles County and Antelope Valley are presented here.

	Percent Ever Diagnosed with Asthma
California	13.6 (13.2-14.1 95% C.I.)
Los Angeles County	11.8 (10.9-12.7 95% C.I.)
Antelope Valley SPA	15.1 (11.1-19.2 95% C.I.)

The UCLA Center for Health Policy Research published a report of the 2007 CHIS results on asthma (UCLA 2010).

	Percent with Active Asthma	
	Children (0-17)	Adults (18+)
California	10.4	8.1
Los Angeles County	10.9	6.8
Antelope Valley SPA	11.8	10.0

What is clear from this data is that the residents of Antelope Valley in the northern desert region of LA County experience increased incidence of child and adult asthma, and deaths from emphysema and lung cancer. However, these data do not in any way speak to causation and it is well known that environmental, life-style, and demographic difference exist between the populations of Antelope Valley and LA County as a whole. In fact, a search of the studies revealed that smoking was 42% greater in the Antelope Valley population than in the LA County population as a whole. This difference alone could explain most – if not all – the increased respiratory disease incidence rates experienced in Antelope Valley ((LAC DPH 2009).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The **PUBLIC HEALTH** section of this staff assessment discusses toxic emissions to which the public could be exposed during project construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Air pollutants for which no ambient air quality standards have been established are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since noncriteria pollutants do not have such standards, a health risk assessment is used to determine if people might be exposed to those types of pollutants at unhealthy levels. The risk assessment consists of the following steps:

- identify the types and amounts of hazardous substances that PHPP could emit to the environment;
- estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
- estimate amounts of pollutants that people could be exposed to through inhalation, ingestion, and dermal contact; and
- characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Staff relies upon the expertise of the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) to identify contaminants that are known to the state to cause cancer or other noncancer toxicological endpoints and to calculate the toxicity and cancer potency factors of these contaminants. Staff also relies upon the expertise of the California Air Resources Board and the local air districts to conduct ambient air monitoring of toxic air contaminants and the state Department of Public Health to conduct epidemiological investigations into the impacts of pollutants on communities. It is not within the purview or the expertise of the Energy Commission staff to duplicate the expertise and statutory responsibility of these agencies.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case, risks and then using those conditions in the study. Such conditions include:

- using the highest levels of pollutants that could be emitted from the plant;
- assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- using the type of air quality computer model which predicts the greatest plausible impacts;
- calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
- assuming that an individual's exposure to cancer-causing agents occurs continuously for 70 years; and
- using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses).

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from noninhalation pathways of exposure (OEHHA 2003, Tables 5.1, 6.3, 7.1). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (OEHHA 2003, p. 5-3).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) noncancer effects, and cancer risk (also long-term). Acute health effects result from short-term (one-hour) exposure to relatively high concentrations of pollutants. Acute effects are temporary in nature and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those that arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately

from 12% to 100% of a lifetime, or from 8 to 70 years (OEHHA 2003, p. 6-5). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called *Reference Exposure Levels*, or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (OEHHA 2003, p. 6-2). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The Reference Exposure Levels are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformity with the California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (OEHHA 2003, pp. 1-5, 8-12). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance at the predicted level occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in chances per million and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called *potency factors* and established by OEHHA), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks due to project emissions are likely to be considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance

level, then further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate assessment of potential public health risks.

Significance Criteria

Energy Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above.

As described earlier, noncriteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer health effects, as well as cancer (long-term) health effects. The significance of project health impacts is determined separately for each of the three categories.

Acute and 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. The Total Hazard Index is calculated separately for acute and chronic effects. A Total Hazard Index of less than 1.0 indicates that cumulative worst-case exposures are less than the reference exposure levels. Under these conditions, health protection from the project is likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant noncancer project-related public health impacts.

Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, (Health & Safety Code, §§25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations section 12703(b) states that “the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure.” This level of risk is equivalent to a cancer risk of 10 in 1 million, which is also written as 10×10^{-6}. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that applied by Proposition 65. The significant risk level of 10 in 1 million is consistent with the level of significance adopted by many air districts. In general, these air districts would not approve a project with a cancer risk exceeding 10 in 1 million. The AVAQMD also uses 10 in 1 million as the level of “Significant Health Risk” (COP 2008a, Section 5.10.1.3).

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. Staff’s analysis also addresses potential impacts on all members of the population including the young, the elderly, people with existing medical conditions that

may make them more sensitive to the adverse effects of toxic air contaminants, and any minority or low-income populations that are likely to be disproportionately affected by impacts. To accomplish this goal, staff uses the most current acceptable public health exposure levels (both acute and chronic) set to protect the public from the effects of airborne toxics. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. Based on refined assumptions, if risk posed by the facility exceeds the significance level of 10 in 1 million, staff would require appropriate measures to reduce the risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than 10 in 1 million, staff would deem such risk to be significant and would not recommend project approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

CONSTRUCTION IMPACTS AND MITIGATION

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation, as well as diesel exhaust from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **Air Quality** analysis.

Site disturbances occur during 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 2008 identified 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 any other environmental concern that would require remedial action (COP 2008a, Section 5.16.2.3). In the event that any unexpected contamination is encountered during construction of the PHPP, 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 in **Waste Management** for a more detailed analysis of this topic.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by the California Air Resources Board (ARB) as toxic air contaminants.

Exposure to diesel exhaust may cause both short- and long-term adverse health effects. Short-term effects can include increased 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.

Based on a number of health effects studies, the Scientific Review Panel on Toxic Air Contaminants recommended a chronic reference exposure level (see discussion of reference exposure levels in Method of Analysis section above) for diesel exhaust particulate matter of 5 micrograms of diesel particulate matter per cubic meter of air ($\mu g/m^3$) and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP 1998, p. 6). The Scientific Review Panel did not recommend a value for an acute Reference Exposure Level 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 the panel's recommendations regarding health effect levels.

Appendix G.3 and Tables 5.2-16 through 5.2-18 of the AFC (COP 2008a) present the maximum daily and annual on-site and off-site emissions from construction of all project components. The maximum annual onsite emissions estimated by the applicant are 14.3 tons per year of particulate matter 10 (PM10) and 4.2 tons per year of PM2.5 (COP 2008a, Table 5.2-17). In addition, off-site emissions from construction of the linear facilities would occur. Construction of all project components would occur concurrently over a period of about 27 months (COP 2008a, Section 5.2.4.1). As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from 8 to 70 years. The applicant has stated that due to the short duration of construction for this project, health risks from construction emissions were not modeled (COP 2008a, Section 5.10.3).

Staff also did not conduct a quantitative assessment of construction impacts on public health because staff has found at numerous other siting cases using quantitative risk assessment tools that impacts due to construction vehicle diesel emissions are invariably less than significant even to close-in receptors. Staff has, however, proposed mitigation measures to ensure that the emissions are indeed reduced to the greatest extent possible. These measures include the use of extensive fugitive dust control measures and can be found in the **Air Quality** section of this FSA. The fugitive dust control measures are assumed to result in 90% reductions of emissions. In order to further mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, Energy Commission staff recommends the use of ultra-low sulfur diesel fuel and Tier 3 (or Tier 2 if Tier 3 not available) California Emission Standards for Off-Road Compression-Ignition Engines or the installation of an oxidation catalyst and soot filters on diesel equipment. 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 will reduce diesel emissions during construction and reduce any potential for significant health impacts.

OPERATION IMPACTS AND MITIGATION

Emissions Sources

The emissions sources at the proposed PHPP include two combustion turbine generators, two duct burners, one auxiliary boiler, one HTF heater, one 10-cell cooling tower, one diesel-fueled emergency generator and one diesel-fueled emergency firewater pump. As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility.

AFC Appendix G.3 and Tables 5.10-5 through 5.10-8 (COP 2008a) list toxic air contaminants expected to be emitted from all sources listed above as combustion byproducts along with their anticipated amounts (emission factors). Toxic Air Contaminant emission factors were obtained from the Environmental Protection Agency (EPA) AP-42 database of emission factors. Table 5.10-4 of the AFC lists toxicity values used to characterize cancer and noncancer health impacts from project pollutants. The toxicity values include Reference Exposure Levels, which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the OEHHA Guidelines (OEHHA 2003).

Public Health Table 2 lists the toxic emissions potentially emitted by the PHPP and shows how each contributes to the health risk analysis.

Public Health Table 2 Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Acetaldehyde			✔	✔	
Acrolein				✔	✔
Ammonia				✔	✔
Arsenic	✔	✔	✔	✔	✔
Benzene			✔	✔	✔
Beryllium			✔	✔	✔
Benzo(a)anthracene			✔		
Benzo(a)pyrene			✔		
Benzo(b)fluoranthene			✔		
Benzo(k)fluoranthene			✔		
1,3-Butadiene			✔	✔	
Chrysene			✔		
Chloroform			✔	✔	✔
Copper				✔	✔
Cyanide				✔	✔
Dibenz(a,h)anthracene			✔		
Diesel Exhaust			✔	✔	
p-Dichlorobenzene			✔	✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Indenol(1,2,3-cd)anthracene			✔		
Napthalene		✔	✔	✔	
Perchloroethylene			✔	✔	✔
Phenol				✔	✔
Propylene				✔	
Propylene oxide			✔	✔	✔
Selenium				✔	✔
Toluene				✔	✔
Trichloroethylene			✔	✔	
Vanadium					✔
Xylene				✔	✔

Source: OEHHA 2003, Appendix L and COP 2008a, Table 5.10-4

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a “worst case” analysis. Maximum hourly emissions are required to calculate acute

(one-hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The applicant's screening analysis was performed using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP). Ambient concentrations were used in conjunction with Reference Exposure Levels and cancer unit risk factors to estimate health effects that might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother's milk.

The above method of assessing health effects is consistent with OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA, 2003) referred to earlier and results in the following health risk estimates.

Impacts

The applicant's screening health risk assessment for the project including emissions from all sources resulted in an acute Hazard Index (HI) of 0.028 and a chronic HI of 0.0008 at the location of the maximum exposed individual resident (using 51 residences identified in the project area). The maximum exposed individual residences for the acute and chronic HI were located approximately 3.6 miles and 3.2 miles southwest of the project, respectively (COP 2008a, Section 5.10.3.4). As **Public Health Table 3** shows, both acute and chronic hazard indices are less than 1.0, indicating that no short- or long-term adverse health effects are expected.

As shown in **Public Health Table 3**, cancer risk at the maximum exposed individual residence was calculated by the applicant to be 0.36 in 1 million (at a residence approximately 3.2 miles southwest of the project). The cancer risk and acute and chronic HI calculated for the maximum exposed individual worker and the maximum exposed sensitive receptor were also found to be well below the level of significance.

Public Health Table 3
Operation Hazard/Risk at Maximum Exposed Individual Resident:

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.028	1.0	No
Chronic Noncancer	0.0008	1.0	No
Individual Cancer	0.36 in a million	10.0 in a million	No

Source: COP 2008a, Table 5.10-9

Staff conducted a quantitative evaluation of the health risk assessment results presented in the PHPP AFC (COP 2008a). Emitting units include two natural gas-fired

combustion turbine generators (CTGs), a diesel-fueled emergency generator, a diesel fire water pump, an auxiliary boiler, a high-temperature heat transfer fluid (HTF) heater, and a 10 cell cooling tower, for a total of 16 emitting sources evaluated at the proposed facility.

Two additional emitting sources that are not evaluated quantitatively in the AFC are:

- Construction equipment and vehicle emissions during construction of the proposed project.
- Vehicle emissions from maintenance vehicles performing routine maintenance such as mirror washing, inspections, repairs, herbicide application and dust suppressant application. Maintenance vehicle emissions were modeled by staff in a screening analysis (described below).

Staff's quantitative analysis of facility operations included the following:

- Stack parameters, building parameters, emission rates and locations of sources were obtained from the AFC and modeling files provided by the applicant.
- Emissions from the 2 combustion turbine generator stacks, the diesel emergency generator, the diesel fire water pump, the auxiliary boiler, the HTF heater and the 10 cell cooling tower were included in the analysis.
- Used a receptor grid of -5000 to 5000 m east and -5000 to 5000 m north, at 200 m increments. Also modeled risks at residential, worker and sensitive receptors identified in the AFC located in the southwestern quadrant of the 3-mile radius from the facility; this is the region in which the AFC identified the maximally impacted residential, worker and sensitive receptors to be located.
- Exposure pathways assessed include inhalation, ingestion of home-grown produce, dermal absorption, soil ingestion and mother's milk.

Atmospheric dispersion modeling was conducted using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a. Local meteorological data compatible for use in the HARP ISCST analysis for 2004 was used.

The emission factors used in staff's analysis of cancer risk and hazard were obtained from the AFC and are listed in **Public Health Table 4**. For cancer risk calculations using the HARP model, staff used the "Derived(Adjusted)Method" and for chronic noncancer hazard staff used the "Derived(OEHHA)Method". The location of the point of maximum impact, PMI, determined in the applicant's modeling was quantitatively evaluated in staff's analysis (70 year residential scenario).

Results of staff's analysis are summarized in **Public Health Table 5** and are compared to the results presented in the AFC for PHPP. Substance-specific cancer risks are presented in **Public Health Table 6** for the Point of Maximum Impact. Substance-specific chronic and acute noncancer hazards are presented in **Public Health Tables 7** and **8**, respectively, for the location of the PMI.

Public Health Table 4
Emission Rates Used in the Cancer Risk and Hazard Analyses Conducted by Staff

Substance	Annual Average Emissions (lbs/year)	Maximum 1-Hour Emissions (lbs/hour)
EMISSION RATES FROM OPERATION OF EACH COMBUSTION TURBINE		
Ammonia	1.20E+05	1.37E+01
Acetaldehyde	6.94E+02	7.93E-02
Acrolein	1.11E+02	1.27E-02
Benzene	2.08E+02	2.38E-02
1,3-Butadiene	7.46E+00	8.52E-04
Ethylbenzene	5.55E+02	6.34E-02
Formaldehyde	1.23E+03	1.41E-01
Naphthalene	2.26E+01	2.58E-03
Propylene Oxide	5.03E+02	5.75E-02
Toluene	2.26E+03	2.58E-01
Xylene	1.11E+03	1.27E-01
PAHs	7.61E+00	8.69E-04
EMISSION RATES FROM OPERATION OF EACH COOLING TOWER CELL		
Arsenic	1.87E-05	6.74E-09
Beryllium	2.16E-05	2.46E-09
Copper	6.58E-05	1.50E-08
Cyanide compounds	1.07E-07	1.84E-11
Selenium	3.13E-05	6.74E-09
Vanadium	5.94E-05	1.29E-08
p-Dichlorobenzene	1.73E-03	5.90E-07
Chloroform	1.21E+01	1.38E-03
Perchloroethylene	2.27E-05	2.60E-09
Trichloroethylene	1.03E-06	1.18E-10
Toluene	1.61E-03	1.84E-07
Xylenes	1.57E-03	1.79E-07
Phenol	8.27E-05	9.44E-09
DEHP	5.38E-05	6.14E-09
EMISSION RATES FROM OPERATION OF EMERGENCY GENERATOR		
Diesel PM	4.41E+01	8.80E-01
EMISSION RATES FROM OPERATION OF EMERGENCY FIRE PUMP		
Diesel PM	3.00E+00	6.00E-02

Public Health Table 4 (cont'd)
Emission Rates Used in the Cancer Risk and Hazard Analyses Conducted by Staff

Substance	Annual Average Emissions (lbs/year)	Maximum 1-Hour Emissions (lbs/hour)	Annual Average Emissions (lbs/year)	Maximum 1-Hour Emissions (lbs/hour)
	EMISSION RATES FROM OPERATION OF AUXILIARY BOILER		EMISSION RATES FROM OPERATION OF HTF HEATER	
Benzene	2.83E-01	5.66E-04	2.27E-01	2.27E-04
Formaldehyde	6.01E-01	1.20E-03	4.80E-01	4.80E-04
PAHs	1.95E-02	3.91E-05	1.56E-02	1.56E-05
Naphthalene	1.46E-02	2.93E-05	1.17E-02	1.17E-05
Acetaldehyde	1.51E-01	3.03E-04	1.21E-01	1.21E-04
Acrolein	1.32E-01	2.64E-04	1.05E-01	1.05E-04
Propylene	2.59E+01	5.18E-02	2.07E+01	2.07E-02
Toluene	1.29E+00	2.59E-03	1.04E+00	1.04E-03
Xylenes	9.62E-01	1.92E-03	7.70E-01	7.70E-04
Ethyl Benzene	3.37E-01	6.74E-04	2.70E-01	2.70E-04
Hexane	2.25E-01	4.49E-04	1.80E-01	1.80E-04

Public Health Table 5
Results of Staff's Analysis and the Applicant's Analysis for Cancer Risk and Chronic and Acute Hazard

	Staff's Analysis			Applicant's Analysis		
	Cancer Risk (per million)	Chronic HI	Acute HI	Cancer Risk (per million)	Chronic HI	Acute HI
PMI	0.70	0.00056	0.0048	n/a	n/a	n/a
MEIR	0.19	0.00015	0.0019	0.36	0.00080	0.028
MEIW	0.019	0.00016	-	0.040	0.00090	-
Sensitive Receptor	0.18	0.00014	0.0021	0.070	0.00080	-

Note:
PMI= point of maximum impact determined in staff's analysis; located approximately 1.7 miles northeast of the project for cancer risk, 2.3 miles northeast of the project for chronic HI, and 0.23 miles east of the project for acute HI
MEIR = maximally exposed individual, residential is located at a residence approximately 1.3 miles southwest of the project for cancer and acute HI and 2.3 miles southwest for chronic HI
MEIW = maximally exposed individual, worker (located at Sam's Club, approximately 2.4 miles southwest of the project)
Sensitive Receptor is located at Westside Christian School (approximately 2.5 miles southwest of the project) for cancer risk and chronic HI and at Head Start State Preschool approximately 2.6 miles south of the project) for acute HI
n/a = not addressed

Public Health Table 6 Results of Staff's Analysis: Contribution to Total Cancer Risk by Individual Substances from All Sources at the Point of Maximum Impact (PMI)

Substance	TURBINE 1	TURBINE 2	AUXILIARY BOILER	HTF HEATER	FIRE PUMP	EMERGENCY GENERATOR	COOLING TOWER	TOTAL
Acetaldehyde	4.4E-10	4.5E-10	3.6E-12	2.7E-12				9.0E-10
Benzene	1.3E-09	1.3E-09	6.7E-11	5.1E-11				2.8E-09
1,3-Butadiene	2.9E-10	2.9E-10						5.7E-10
Chloroform							7.5E-10	7.5E-10
p-Dichlorobenzene							2.2E-13	2.2E-13
Ethyl Benzene	3.1E-10	3.1E-10	7.0E-12	5.3E-12				6.3E-10
Formaldehyde	1.7E-09	1.7E-09	3.0E-11	2.3E-11				3.4E-09
Naphthalene	1.7E-10	1.7E-10	4.2E-12	3.2E-12				3.5E-10
PAHs-w/o	2.7E-07	2.8E-07	2.6E-08	2.0E-08				5.9E-07
Perchloroethylene							1.6E-15	1.6E-15
Propylene Oxide	4.2E-10	4.2E-10						8.4E-10
Trichloroethylene							2.4E-17	2.4E-17
Arsenic							1.1E-11	1.1E-11
Beryllium							5.9E-13	5.9E-13
DieselExhPM					1.0E-08	8.1E-08		9.1E-08
SUM	2.8E-07	2.8E-07	2.6E-08	2.0E-08	1.0E-08	8.1E-08	7.6E-10	7.0E-07

Public Health Table 7 Results of Staff's Analysis: Contribution to Total Chronic Hazard by Individual Substances from All Sources at the Point of Maximum Impact (PMI)

Substance	TURBINE 1	TURBINE 2	AUXILIARY BOILER	HTF HEATER	FIRE PUMP	EMERGENCY GENERATOR	COOLING TOWER	TOTAL
Acetaldehyde	1.16E-06	1.16E-06	6.12E-09	4.78E-09				2.33E-06
Acrolein	7.40E-05	7.42E-05	2.13E-06	1.67E-06				1.52E-04
Ammonia	1.40E-04	1.40E-04						2.80E-04
Benzene	8.09E-07	8.11E-07	2.67E-08	2.09E-08				1.67E-06
1,3-Butadiene	8.70E-08	8.72E-08						1.74E-07
Chloroform							3.86E-07	3.86E-07
p-Dichlorobenzene							2.06E-11	2.06E-11
Ethyl Benzene	6.47E-08	6.49E-08	9.54E-10	7.45E-10				1.31E-07
Formaldehyde	3.19E-05	3.20E-05	3.78E-07	2.95E-07				6.46E-05
Hexane			1.82E-10	1.42E-10				3.24E-10
Naphthalene	5.84E-07	5.86E-07	9.22E-09	7.20E-09				1.19E-06
Perchloroethylene							6.21E-12	6.21E-12
Phenol							3.96E-12	3.95E-12
Propylene			4.88E-08	3.82E-08				8.70E-08
Propylene Oxide	3.91E-06	3.92E-06						7.83E-06
Toluene	1.75E-06	1.76E-06	2.44E-08	1.91E-08			5.13E-11	3.55E-06
Trichloroethylene							1.65E-14	1.65E-14
Xylenes	3.70E-07	3.71E-07	7.78E-09	6.08E-09			2.15E-11	7.55E-07
Arsenic							1.79E-06	1.79E-06
Beryllium							2.95E-08	2.95E-08
Cyanide cmpds							1.14E-13	1.14E-13
Selenium							1.49E-11	1.49E-11
DieselExhPM					4.26E-06	3.71E-05		4.14E-05
SUM	2.54E-04	2.54E-04	2.61E-06	2.04E-06	4.26E-06	3.71E-05	2.18E-06	5.56E-04

Public Health Table 8 Results of Staff's Analysis: Contribution to Total Acute Hazard by Individual Substances from All Sources at the Point of Maximum Impact (PMI)

Substance	TURBINE 1	TURBINE 2	AUXILIARY BOILER	HTF HEATER	FIRE PUMP	EMERGENCY GENERATOR	COOLING TOWER	TOTAL
Acetaldehyde	2.6E-05	2.6E-05	4.2E-06	1.3E-06				5.7E-05
Acrolein	7.7E-04	7.7E-04	6.8E-04	2.2E-04				2.4E-03
Ammonia	6.5E-04	6.5E-04						1.3E-03
Benzene	2.8E-06	2.8E-06	2.8E-06	8.9E-07				9.2E-06
Chloroform							4.9E-05	4.9E-05
Formaldehyde	3.9E-04	3.9E-04	1.4E-04	4.5E-05				9.6E-04
Perchloroethylene							7.0E-13	7.0E-13
Phenol							8.7E-12	8.7E-12
Propylene oxide	2.8E-06	2.8E-06						5.6E-06
Toluene	1.1E-06	1.1E-06	4.5E-07	1.4E-07			2.7E-11	2.7E-06
Xylenes (mixed)	8.7E-07	8.7E-07	5.7E-07	1.8E-07			4.4E-11	2.5E-06
Arsenic							1.8E-07	1.8E-07
Copper							8.0E-10	8.1E-10
Cyanide compounds							2.9E-13	2.9E-13
Vanadium							2.3E-09	2.3E-09
SUM	1.8E-03	1.8E-03	8.3E-04	2.6E-04	0	0	1.8E-07	4.8E-03

Staff also assessed the potential impacts of using diesel-fueled vehicles for mirror washing. Atmospheric dispersion modeling of diesel particulate matter (DPM) emissions from the vehicles was conducted. Mirror washing involves a water truck spraying de-ionized water on the mirrors in a drive-by fashion, and is generally done at night. The annual DPM emission rate for mirror washing trucks and other maintenance vehicles was provided in Table 35 of Appendix G of the AFC, and is 0.0153 ton/year or 30.6 lbs/yr. The HARP model and local met data were used and emissions were modeled as a volume source and the following assumptions were made in the absence of site-specific information: vertical dimension of 10 feet, horizontal dimension of 50 feet by 50 feet and release height of 10 feet. For the model, the location of the vehicle emissions was assumed to be located in the western area of the site, approximately 880 feet east of the western fenceline and 1,375 feet north of the southern fenceline, in order to give an approximate average location across the mirror field.

In staff's analysis, the maximum predicted offsite concentration of diesel particulate matter was 0.009 ug/m^3 (at the western fenceline). Cancer risk due to diesel emissions was determined using HARP to be 2.9 in a million. At the site of the maximally exposed resident, risk was determined to be 0.045 in a million and at the site of the maximally exposed sensitive receptor, risk was determined to be 0.027 in a million. The procedure, assumptions, and results of this analysis are presented in **Public Health Table 9**. Even when this risk is added to the risk from stationary source emission, the risk to the public is less than significant.

Public Health Table 9
Staff's Screening Analysis of Diesel Emissions
and Risks from Mirror Washing Trucks and Other Maintenance Vehicles

Assumptions:	
Area Source	50 feet by 50 feet
Vertical dimension	10 feet
Release height	10 feet
Annual DPM emissions from maintenance vehicles: (from Table 35, Appendix G of the AFC)	30.6 lb/yr
Maximum DPM concentration predicted off-site: (at the western fenceline)	0.009 ug/m^3
Risk at location of maximum concentration: (at the western fenceline)	2.9 in a million
Risk at location of maximally impacted resident	0.045 in a million
Risk at location of maximally impacted sensitive receptor	0.027 in a million

In staff's review of other thermal solar power plant applications that propose to use Therminol as the heat transfer fluid (Blythe, Genesis, Palen, and Abengoa), volatile organic compound (VOC) emissions from the HTF expansion tank were estimated. The composition of fugitive VOC emissions from the HTF expansion tank may include HTF breakdown products such as benzene, toluene, xylene, phenol, naphthalene, methane, ethane, and biphenyl. Staff assessed substance- and source-specific cancer risks at the Point of Maximum Impact (PMI) for these other projects and determined that 91percent of the cancer risk at the PMI is attributed to emissions from two sources: 81percent due to emissions from the HTF ullage system and 10% due to emissions from the emergency diesel generator. Additional analysis indicates that 98% of cancer risk at the PMI is attributed to emissions of two substances: 81percent due to benzene emissions (from the auxiliary boiler, the HTF heater and ullage system) and 17% due to diesel particulate matter emissions (from onsite mobile sources as well as the two diesel engines). Therefore, staff concluded in those other solar power plant siting cases that emissions of benzene and other breakdown products contributed to the overall risk posed by emissions but that the risk at the Point of Maximum Impact remained well below the level of significance. Since the maximum estimated risk at the PMI is calculated by staff to be 0.7 in one million, even when adding the risk posed by the emissions of diesel trucks (2.9 in one million) and the risk posed by fugitive benzene emissions as estimated from a larger solar facility (0.97 in one million for the 1,000 MW Blythe Solar Power Plant), the risk at the PMI remains far below the level of significance (10 in one million). The risk at the nearest residential location would be even lower and therefore staff is confident that if it modeled fugitive benzene emissions from the PHPP HTF system, the risk would remain far below even these levels and be less than significant.

Cooling Tower

In addition to being a source of potential toxic air contaminants, the possibility exists for bacterial growth to occur in the cooling tower, including Legionella. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' Disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

As noted in the LORS section above, the State of California regulates recycled water for use in cooling towers in Title 22, Section 60303, California Code of Regulations. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms.

This regulation applies to the PHPP project since it intends to use recycled water provided by the City of Palmdale Water Reclamation Plant (PWRP) for cooling (COP 2008a, Section 2.1).

The U.S. EPA published an extensive review of Legionella in a human health criteria document (EPA 1999). The U.S. EPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. The U.S. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk - however small - of disease in humans.

In February of 2000 the Cooling Technology Institute (CTI) issued its own report and guidelines for the best practices for control of Legionella (CTI 2000). The CTI found that 40-60% of industrial cooling towers tested were found to contain Legionella. More recently, staff has received a 2005 report of testing in cooling towers in Australia that found the rate of Legionella presence in cooling tower waters to be extremely low, approximately three to 6%. The cooling towers all had implemented aggressive water treatment and biocide application programs similar to that required by proposed condition of certification **PUBLIC HEALTH-1**.

To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling towers, and the overall general control of microbiological populations.

Good preventive maintenance is very important in the efficient operation of cooling towers and other evaporative equipment (ASHRAE 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and biofouling and not to control Legionella.

The efficacy of any biocide in ensuring that bacterial and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures and effective monitoring.

In order to ensure that Legionella growth is kept to a minimum, thereby protecting both nearby workers as well as members of the public, staff has proposed Condition of Certification **PUBLIC HEALTH-1**. The condition would require the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are maintained within the cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and

that periodic cleaning is conducted to remove bio-film buildup. Staff believes that with the use of an aggressive antibacterial program coupled with routine monitoring and biofilm removal, the chances of Legionella growing and dispersing would be reduced to insignificance. The applicant has stated that a Cooling Water Management Plan consistent with CEC staff's guidelines would be implemented and that high efficiency drift eliminators would be installed and maintained to minimize cooling tower drift and further reduce potential impacts from Legionella (COP 2008a, Section 5.10.4).

CUMULATIVE IMPACTS

Cumulative public health impacts of the proposed project and other projects within a 6-mile radius were not evaluated in the AFC. The applicant has contacted the AVAQMD which identified two nearby facilities (Lockheed Martin and Northrop Grumman) that may contribute to a public health cumulative impact. However, based on an evaluation of potential health risks from these facilities, the AVAQMD ranked them as intermediate priority and did not require these facilities to prepare an HRA. This ranking indicates a low level of health risks and therefore the applicant stated that a significant cumulative impact with these facilities could not occur (COP 2008a, Section 5.10.3.6).

The maximum cancer risk for operations emissions from the PHPP (calculated by staff) at the point of maximum impact (PMI) is 3.6 in 1,000,000, which is well below the level of significance. Similarly, the maximum chronic HI calculated by staff is 0.00056 and the maximum acute HI is 0.0048. As described above, the contribution of the PHPP project to both cancer risk and chronic and acute noncancer disease are comparatively very small. Staff concludes that the proposed PHPP project would not contribute to cumulative impacts in the area of public health.

COMPLIANCE WITH LORS

Staff has considered the minority population as identified in **Socioeconomics Figure 1** in its impact analysis and has found no potential significant adverse impacts for any receptors, including environmental justice populations. In arriving at this conclusion, staff notes that its analysis complies with all directives and guidelines from the Cal/EPA Office of Environmental Health Hazard Assessment and the California Air Resources Board. Staff's assessment is biased toward the protection of public health and takes into account the most sensitive individuals in the population. Using conservative (health-protective) exposure and toxicity assumptions, staff's analysis demonstrates that members of the public potentially exposed to toxic air contaminant emissions of this project—including sensitive receptors such as the elderly, infants, and people with pre-existing medical conditions—will not experience any acute or chronic significant health risk or any significant cancer risk as a result of that exposure. Staff is aware that citizens in this area of the Antelope Valley are exposed currently to levels of air pollution that are associated with chronic health effects, that the population has a higher lung cancer death rate than surrounding areas, and that the Palmdale area has the highest asthma rate in LA County. However, the relationship between low levels of TACs emitted from burning natural gas in gas turbines and asthma, respiratory disease, and lung cancer are not at all clear in terms of causal effects or exacerbation of existing conditions. As the HRA shows, the risks and hazards posed by this project are insignificant, particularly when compared to risks and hazards posed by emissions from existing

stationary and mobile sources. Staff therefore believes that the small calculated incremental increase in risk – keeping in mind the conservative nature of this risk assessment - will not add to the public health burden of the population.

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 PHPP will be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of **Public Health**.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

A comment from Mr. R. Lyle Talbot was received expressing concern that emissions from the natural gas burning portion of the PHPP would result in emphysema, exacerbation of lung diseases, and asthma in “Down-Winders”.

Response:
Staff reviews existing health issues in any area where a power plant is proposed to be built and operated. As stated above in the first few pages of this Public Health assessment, staff identified and reviewed three studies regarding air pollution in the Palmdale area. These include: 1) an Air Resource Board (ARB) study of the relationship between asthma and air pollution that included the cities of Lancaster and Palmdale amongst 10 other communities in Southern California. This study was conducted over a period of 10 years and concluded that current levels of air pollution in Southern California are associated with chronic health effects. 2) a study by the Los Angeles County Department of Public Health (LACDPH) on lung cancer estimated that the Antelope Valley Service Planning Area 1 (AVSPA1) had a higher lung cancer death rate than surrounding areas. 3) a LACDPH health survey conducted in 2005 found that AVSPA1 had the highest asthma rate in the county. Staff considers these findings in its Public Health analysis and addresses those impacts that could possibly be caused by the emissions of Toxic Air Contaminants. Staff refers the reader to the section on Air Quality to learn of the assessment of impacts due to emissions of Criteria Pollutants.

According to a 2002 UCLA study, all of LA County has an asthma rate significantly below the state average. Even the 90% Confidence Interval for children in LA County is below the state 90% Confidence Interval. The TACs that would be emitted from this proposed hybrid power plant may not be responsible for causing or exacerbating asthma. The causes include particulate matter which is a Criteria Pollutant and for which offsets must be obtained. Furthermore, the resultant airborne concentration of TACs emitted will be very low (much less than one microgram per cubic meter of air) and thus would be incapable of causing or exacerbating asthma or other respiratory diseases. Furthermore, although the most recent data examined by staff and described above in an earlier section of the Public Health assessment shows that the residents of

Antelope Valley region of LA County experience increased incidence of child and adult asthma, deaths from emphysema and lung cancer, these data do not in any way speak to causation. It is well known that environmental, life-style, and demographic differences exist between the populations of Antelope Valley and LA County as a whole. In fact, a search of the studies revealed that smoking was 42% higher in the Antelope Valley population than in the LA County population as a whole. This difference alone could explain most – if not all – the increased respiratory disease incidence rates experienced in Antelope Valley. The following data on certain life-style demographics was found (LAC DPH 2009).

Disease Factor Rates
Antelope Valley and Los Angeles County and California

	HP2010	National	LA County	Antelope Valley
		(death rates are age-adjusted per 100,000 population)		
% of adults who smoke cigarettes	12.0	19.8	14.3	20.4
% of adults who are obese (BMI≥30)	n/a	26.2	22.2	28.0
Diabetes death rate	n/a	24.6	24.7	43.5

Finally, while staff agrees that asthma is a nationwide problem, there are many theories about the causes of asthma, including lifestyle factors, genetics, and environmental exposures. It is clear from the scientific literature that some air pollutants not only cause asthma, but exacerbate it as well. Staff believes, however, that natural gas-fired power plants in California produce limited amounts of pollutants capable of causing or exacerbating asthma and thus should be considered minor sources. Given the emissions controls and offsets required to permit such facilities, gas-fired power plants in California do not create any significant unmitigated direct or indirect adverse air quality or public health impacts. The emissions from the thermal solar portion of the power plant are even lower and hence the impacts on public health are also insignificant.

CONCLUSIONS

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

PROPOSED CONDITIONS OF CERTIFICATION

PUBLIC HEALTH-1 The project owner shall develop and implement a Cooling Water Management Plan to ensure that the potential for bacterial growth in cooling water is kept to a minimum. The Plan shall be consistent with either staff's "Cooling Water Management Program Guidelines" or with the Cooling Technology Institute's "Best Practices for Control of Legionella" guidelines but in either case, the Plan must include sampling and testing for the presence of Legionella bacteria at least every 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 Kristin Ford

SUMMARY OF CONCLUSIONS

Staff concludes that construction and operation of the Palmdale Hybrid Power Project (PHPP) would not cause significant direct, indirect, or cumulative adverse socioeconomic impacts on the study area's housing, schools, law enforcement, and parks. Staff also concludes that the project would not induce substantial growth or concentration of population, substantial increases in demand for housing or public services, or displace a large number of people.

INTRODUCTION

Staff's socioeconomics impact analysis evaluates the project's induced changes on existing population and employment patterns, and community services. Staff discusses the estimated impacts of the construction and operation of the PHPP Application for Certification (AFC) on local communities, community resources, and public services, and provides a discussion of the estimated beneficial economic impacts of the construction and operation of the proposed project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

SOCIOECONOMICS Table 1 contains socioeconomics laws, ordinances, regulations, and standards (LORS) applicable to the proposed project.

SOCIOECONOMICS Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

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.
California Revenue and Taxation Code Section 70-74.7	Property taxes are not assessed on solar facilities. Assembly Bill 1451 extended the current property tax exclusion for new construction of solar energy systems to January 1, 2017.

SETTING

The PHPP plant site is located in the City of Palmdale, Los Angeles County, California, on the southwestern edge of Antelope Valley of the Mojave Desert. The PHPP plant site would be located within approximately 377 acres of currently undeveloped land in the north-eastern part of the city of Palmdale, approximately 60 miles north of downtown Los Angeles. The proposed plant site of 377 acres would be a part of an approximately 600-acre site, owned by the city of Palmdale. The PHPP would be bound by Sierra Highway to the west, E Ave M to the north, and U.S. Air Force Plant 42 on the south and east. All project facilities with the exception of parts of the transmission lines and reclaimed water pipeline are located within the city of Palmdale.

Population centers located within the county of Los Angeles include the city of Lancaster and the unincorporated communities of Quartz Hill to the north; Lake Los Angeles to the east, Acton to the south; and Leona Valley to the west. The nearest sizeable cities to the project site include Santa Clarita (25 miles west), Adelanto (39 miles east), Victorville (40 miles east), Hesperia (41 miles east) and Apple Valley (44 miles east), all of which are located in San Bernardino county. The nearest residential area is located approximately one mile north of the plant site.

Demographic Screening

Staff's demographic screening is designed to determine the existence of a minority or below-poverty-level population or both within a six-mile area of the proposed project site. The demographic screening process is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (Council on Environmental Quality, 1997) and *Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses National* (Council on Environmental Quality, 1998). The screening process relies on Year 2000 U.S. Census data to determine levels of minority and below-poverty-level populations.

Minority Populations

According to *Environmental Justice: Guidance Under the National Environmental Policy Act*, minority individuals are defined as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population is identified when the minority population of the potentially affected area is greater than 50 percent or when one or more U.S. Census blocks in the potentially affected area have a minority population greater than 50 percent.

For the PHPP, the minority population within the six-mile radius of the proposed site is 100,297 persons or about 52.26 percent of the total population (see **Socioeconomics Figure 1**). Therefore, staff in several technical areas identified in the Executive Summary of this document, have considered environmental justice in their environmental impact analyses.

Below-Poverty-Level Populations

Staff also identified the below-poverty-level population based on Year 2000 U.S. Census block group data within a six-mile radius of the project site. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old. The below-poverty-level population within a six-mile radius of the PHPP is approximately 21.1 percent.

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The socioeconomic resource areas evaluated by staff are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines and shown in **Socioeconomics Table 2**. Staff's assessment of impacts on population, housing, emergency medical services, police protection, schools, medical services, and parks and recreation, are based on subjective judgments, input from local and state agencies, and the industry-accepted two-hour commute range for construction workers. Typically, substantial long-term relocation due to employment of people from regions outside the study area would have the potential to result in significant adverse socioeconomic impacts. Criteria for subject areas such as utilities, fire protection, water supply, and wastewater disposal are analyzed in the **Reliability**, **Worker Safety and Fire Protection**, and **Water Resources** sections of this document.

SOCIOECONOMICS Table 2
CEQA Environmental Checklist Form

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
POPULATION AND HOUSING —Would the project:				
A. Induce substantial population growth in a new area, either directly or indirectly.				X
B. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
C. Displace substantial numbers of people, necessitating construction of replacement housing elsewhere?				X
PUBLIC SERVICES —Would the project:				
D. Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
Emergency medical services				X
Police protection			X	

Schools Parks Other public facilities			X X	 X X
RECREATION—Would the project:				
Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

DIRECT/INDIRECT IMPACTS AND MITIGATION

Induce Substantial Population Growth

For the purpose of this analysis, staff defines "induce substantial population growth" as workers permanently moving into the project area because of project construction and operation, thereby encouraging construction of new homes or extension of roads or other infrastructure. To determine whether the project would induce population growth, staff analyzes the availability of the local workforce and the population within the region. Staff defines "local workforce" as the Los Angeles, San Bernardino and Kern County Statistical Areas (MSAs). **SOCIOECONOMICS Table 3** shows the historical and projected populations of the study area.

SOCIOECONOMICS Table 3
Historical and Projected Populations

Area	**2000 Population**	**2010 Population**	**2020 Population**
Los Angeles County	9,578,960	10,718,007	11,501,884
San Bernardino County	1,709,434	2,059,420	2,397,709
Kern County	665,519	1,086,113	1,352,628
Source: AFC, Table 5.11-2, PHPP, 2009			

SOCIOECONOMICS Tables 4 and 5 show that the total labor by skill for the Los Angeles, San Bernardino, and Kern MSAs would be more than adequate to provide construction labor for the proposed project.

SOCIOECONOMICS Table 4
Total Labor by Skill in
MSA Annual Average for 2016

Trade	Los Angeles MSA	Peak # of Workers for Project Construction by Craft
Construction – Combined Cycle Component		
Welders	8,890	40
Carpenters	30,050	35
Bricklayers	1990	35
Masons	1,220	35
Electricians	13,700	25
Ironworkers	770	15
Laborers	34,810	55
Millrights	N/A	20
Equipment Operators	4,780	12
Plasterers	3,860	5
Painters	14,250	3
Pipefitters	630	45
Sheetmetal Workers	2,860	12
Sprinklerfitters	N/A	10
Surveyors/ Designers	7,030	3
Insulation Workers	280	18

Supervisors/ Planners	16,440	38
Construction –Solar Component		
Unskilled Laborers	34,810	216
Pipefitters	630	18
Welders	8,890	18
Electrician	13,700	18
I & C	N/A	18
Management (Industrial Production Managers)	5,180	36
Engineering (Industrial Engineers)	5,760	36
Administration (Administrative Service Managers)	8,890	36
Masons	1,220	18
Operating Engineers	4,780	18
Construction – Pipelines (Gas, Water Supply, Etc.)		
Unskilled Labor	34,810	42
Welders	8,890	3
Pipefitters	630	3
Equipment Operators	4,780	14
Foremen	N/A	8

Supervisors	11,650	2
Construction – Transmission Lines		
General Foreman	1,440[1.]	6
Foreman	1,440[1]	16
Leadman	1,440[1]	20
Journey Lineman	1,440[1.]	51
Apprentice Lineman	1,440[1]	18
Groundman	1,440[1]	20
Equipment operators	4,780	40
Cement Truck Drivers (Cementing and Gluing Machine Operators and Tenders)	1,040	20
Welders	8,890	12
Mechanic (Electrical and Electronic Equipment Mechanics, Installers, and Repairers)	19,670	6
Skilled Laborers	34,810	28
Carpenters	30,050	9

[1.] Electrical Power-Line Installers and Repairers, Annual Average Projection for 2016 Source: Employment Development Department, Labor Market Information (http://www.labormarketinfo.edd.ca.gov), AFC for PHPP, July 2008

The applicant estimates construction would begin in the third quarter of 2013. As shown in Table 5.11-12 in the AFC, project construction would require an average of 367 employees per day over the entire 27-month construction period with manpower requirements peaking at approximately 767 workers in month 12 of construction.

The project would require 36 full-time employees; most workers are expected to commute to the project site from communities in Los Angeles, San Bernardino and Kern Counties. Given the large labor force within two hours commuting time of the project, staff does not expect potential employees to relocate to the immediate project area.

Staff concludes that the construction and operation workforce would not induce substantial growth or concentration of population, and the PHPP would not encourage people to permanently move into the area. The PHPP would have no direct or indirect impact on population growth in a new area.

Housing Supply

The U.S. Census Bureau Census 2000 data on housing showed that there were approximately 3,339,763 housing units in Los Angeles County and 39,988 housing units in the city of Palmdale. Housing units include; single-family, multi-family, and mobile home residences. There are approximately 14 hotels/motels in Palmdale and 20 motels/hotels in Lancaster with approximately 2,970 rooms available to accommodate workers who may choose to commute to the project site on a work week basis (DR, SOC-1, PHPP, 2009).

Because of the large labor force within commuting distance of the project, staff expects the majority of construction workers would commute to the project daily from their existing residences. No new housing construction would be required.

The project would have 36 full-time employees; the applicant expects all 36 employees would be hired within commuting distance of the project. Given the large labor force in Los Angeles County and surrounding counties within commuting distance of the project, staff does not expect employees would relocate to the immediate project area.

Staff concludes that the construction and operation workforce would not have a significant adverse impact on housing within the immediate project area and the regional areas of Los Angeles, San Bernardino and Kern counties, and would not displace existing housing or necessitate construction of replacement housing elsewhere.

Displace Existing Housing and Substantial Numbers of People

The project and facility site would be located on 377 acres of undeveloped land in the northeastern part of the city of Palmdale, approximately 60 miles north of downtown Los Angeles. In 2005, Palmdale had 39,988 housing units, with a vacancy rate of 3.7 percent. Lancaster had approximately 43,889 housing units with a vacancy rate of 3.7 percent. Renter occupied housing units represent 29.1 percent of Palmdale housing occupancy and 41.1 percent of the Lancaster housing occupancy (AFC, 5.11-5, PHPP, 2008). In 2005, Los Angeles County had approximately 3,339,763 housing units and had a housing vacancy rate of 4.7 percent. Renter occupied units totaled 1,621,543 units, or 50.9 percent of the market (AFC, 5.11-5, PHPP, 2008). Staff's analysis shows

that the project would not displace any people or necessitate construction of replacement housing elsewhere.

Result in Substantial Physical Impacts to Government Facilities

As discussed under the subject headings below, the PHPP would not cause significant impacts to service ratios, response times, or other performance objectives relating to emergency medical services, law enforcement, or schools. Fire protection, including the applicant's proposed onsite Fire Protection and Prevention Plan, is analyzed in the **Worker Safety** section of this document.

Emergency Medical Services

As stated in the AFC and verified by staff, the project site is within the Los Angeles County Fire Department's jurisdiction (http://www.fire.lacounty.gov). The Los Angeles County Fire Department is a full-service department which provides fire management, fire operations, fire and environmental safety, and emergency medical services to the residents of Los Angeles County. There are ten fire stations in the City of Palmdale, and seven stations in the City of Lancaster. The nearest fire station (Number 129) is located one mile to the west of the PHPP plant site in the City of Lancaster. Average response time is estimated to be less than two minutes. The station employs nine full-time fire fighters and is trained to handle hazardous materials releases.

As discussed in Section 5.18, **Worker Safety**, and Section 5.6, **Hazardous Materials**, the PHPP would be designed to meet all applicable standards to reduce the risk of an accidental hazardous materials release and operate in a manner that complies with safety standards and practices to provide a safe workplace for plant personnel. The applicant's proposed safety procedures and employee training would minimize potential unsafe work conditions and the need for outside emergency medical response.

As discussed in the Worker Safety section of this document, conditions of certification **WORKER SAFETY -1**, through **-9**, would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. In addition, as discussed in the Hazardous Materials section of this document, conditions of certification **HAZ-1** through **-9,** would ensure that the project is designed, constructed, and operated in compliance with applicable LORS, and would protect the public from significant risk of exposure to an accidental ammonia release.

Staff concludes that with implementation of the above mentioned conditions of certification, industrial safety and hazardous materials would not present a significant risk to the public and the emergency medical services provided by the Los Angeles County Fire Department would be adequate during construction and operation.

Law Enforcement

The Los Angeles Sheriff's Department is under contract with the city of Palmdale to provide police protection and public safety services (http://www.lasd.org). Services include traffic and neighborhood police protection and public safety services. The Palmdale Sheriff Station would respond to the PHPP plant site from the Palmdale Station located approximately four miles south of the site. The Palmdale Sheriff's Station is staffed by 189 sworn deputies and 56 non-sworn employees (AFC, 5.11-10,

PHPP, 2008). The station provides law enforcement services to an estimated 700 square miles. The Lancaster Sheriff Station located approximately 3.7 miles north of the PHPP plant site would respond to emergencies when needed. The Lancaster Station is staffed by 189 sworn personnel and 74 civilian personnel (AFC, 5.11-10, PHPP, 2008). The California Highway Patrol (CHP) is the primary law enforcement agency for state highways and roads. Services include law enforcement, traffic control, accident investigation and the management of hazardous material spill incidents. The nearest CHP office is located approximately four miles from the project site in Lancaster, California.

Unlike residential or commercial developments, power plants do not attract large numbers of people and thus require little in the way of law enforcement. Because of this factor and the proposed onsite safety and security measures, staff concludes that the existing law enforcement resources would be adequate to provide services to the PHPP during construction and operation.

Education

There are three school districts that are located near the project site area; Palmdale School District (PSD), Westside Union School District (WUSD), and the Antelope Valley Union High School District (AVUSHSD). The PSD has 21 elementary schools, and four intermediate schools. The WUSD consists of 12 schools/programs for kindergarten through 8th grade students. Total enrollment for the WUSD was approximately 8,900 students for the 2006-2007 school year. The AVUSHSD consists of 15 schools/programs serving student grades 9 through 12. Total enrollment for the AVUHSD was approximately 24,700 students for the 2007-2008 school year (AFC, 5.11-12,-13,-14, PHPP, 2008). Personal communication from representatives of each school district show that some schools within two of the three schools districts are at capacity (Swift, Joyce 2009), (Foster, Jeffery 2009) and (Thomas, Nelly 2009).

During construction, staff expects the labor force would commute daily from the region. Due to the commuting habits of construction workers, staff does not expect any construction workers to relocate their families to the area. Therefore, staff does not expect a significant adverse impact to the schools from construction of the proposed project.

A total of 36 workers are needed to operate the PHPP. As previously stated, the applicant expects to hire the operation workforce from within the area and no operation workers are expected to relocate with their families. However, if all 36 operation workers relocate within the Palmdale, Westside Union or Antelope Valley Union High School Districts, an average family size of 3.61 persons per household (U.S. Census Bureau, Household and Families, 2000 for Los Angeles County) would result in the addition of approximately 58 children to the local schools.

Because the proposed project would be located on property owned by the city of Palmdale, the PHPP would be exempt from paying school impact fees to the PSD, WUSD and AVUSHSD. Nevertheless, given the small number of students who potentially could relocate to schools within the PSD, WUSD and AVUSHSD, staff does not expect the construction or operation of the project to have a significant adverse impact on schools.

Increase the Use of Existing Recreation Facilities

The Los Angeles Parks and Recreation maintains over 63,000 acres of parks, gardens, lakes, trails, off highway vehicle, natural areas, and the world's largest public golf course system (http://parks.lacounty.gov).

Given the large labor force in Los Angeles, San Bernardino and Kern counties residing within two hours commuting time of the project, staff does not expect employees to relocate to the immediate project area. Staff concludes that there are a number and variety of parks within the regional project area and does not expect the construction or operation workforce to have a significant adverse impact on parks or necessitate construction of new parks in the area.

CUMULATIVE IMPACTS

A project may result in significant adverse cumulative impacts when its effects are cumulatively considerable; that is, when the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects [*Public Resources Code* Section 21083; *California Code of Regulations*, Title 14, Sections 15064(h); 15065 (c); 15130; and 15355]. Mitigation requires taking feasible measures to avoid or substantially reduce the impacts.

In a socioeconomic analysis, cumulative impacts could occur when more than one project in the same area has an overlapping construction schedule, thus creating a demand for workers that cannot be met locally. An increased demand for labor could result in an influx of non-local workers and their dependents, resulting in a strain on housing, schools, parks and recreation, law enforcement and emergency services.

As shown in **SOCIOECONOMICS Table 5,** the total construction labor force by MSA for the region is more than sufficient to accommodate the labor needs for construction of power generation facilities and other large industrial projects. Because of the robust local and regional construction labor force, staff does not expect an influx of non-local workers and their dependents to the project area. Therefore, staff does not expect any significant and adverse impacts on housing, schools, parks and recreation, law enforcement, and emergency services. Staff does not expect construction or operation of the PHPP to contribute to any significant adverse cumulative socioeconomic impacts.

SOCIOECONOMICS Table 5
Occupational Employment Projections by MSA

Construction and Extraction Occupations for Selected MSAs	Average Annual Employment for 2006	Average Annual Employment for 2016
Los Angeles – Long Beach - Glendale County MSA	174,940	187,580
San Bernardino – Riverside –Ontario MSA	137,160	155,250
Kern County MSA	27,690	31,410
Source: EDD 2009 Projections of Employment by Industry and Occupation		

NOTEWORTHY PUBLIC BENEFITS

Noteworthy public benefits include the direct, indirect, and induced impacts of a proposed power plant. For example, the dollars spent on or resulting from the construction and operation of the PHPP would have a ripple effect on the local economy. This ripple effect is measured by an input-output economic model. The model relies on a series of multipliers to provide estimates of the number of times each dollar of input or direct spending cycles through the economy in terms of indirect and induced output, or additional spending, personal income, and employment. The typical input-output model used by economists and the one used for this analysis by the applicant is the IMPLAN model. IMPLAN multipliers indicate the ratio of direct impacts to indirect and induced impacts. Staff reviewed the results of the IMPLAN model and found them to be reasonable considering data provided by the applicant as well as data obtained by staff from governmental agencies, trade associations, and public interest research groups.

PHPP owners would employ workers and purchase supplies and services for the life of the project. Employees would use salaries and wages to purchase goods and services from other businesses. Those businesses make their own purchases and hire employees, who also spend their salaries and wages throughout the local and regional economy. This effect of indirect (jobs, sales, and income generated) and induced (employees' spending for local goods and services) spending continues with subsequent rounds of additional spending, which is gradually diminished through savings, taxes, and expenditures made outside the area.

For purposes of this analysis, direct impacts were said to exist if the project resulted in permanent jobs and wages; indirect impacts, if jobs, wages, and sales resulted from project construction; induced impacts, from the spending of wages and salaries on food, housing, and other consumer goods. The economic benefits of the proposed project are shown below in **Socioeconomics Table 6**.

SOCIOECONOMICS Table 6,
PHPP Economic Benefits (2009 dollars)

Fiscal Benefits	
Estimated annual property taxes	Los Angeles County tax rate of 1.115433 percent would create annual property tax revenues estimated at $685,000 to $797,000.
State and local sales taxes: Construction	$4.9 million
State and local sales taxes: Operation	$310,000 would be generated annually or approximately $9.3 million for the nominal 30-year operating life of the project.
School Impact Fee	Exempt
Non-Fiscal Benefits	
Total capital costs	$615 to 715 million
Construction payroll	$106 million
Annual Operations and Maintenance	
Construction materials and supplies	$59 million
Operations and maintenance supplies	$3.7 million
Direct, Indirect, and Induced Benefits	
Estimated Direct	
Construction	367 jobs (average per month for 27 months)
Operation	36 full-time positions
Estimated Indirect	
Construction Jobs	937
Construction Income	$142,000,000
Operation Jobs	64 workers
Operation Income	N/A
Estimated Induced	
Construction Jobs	1,018
Construction Income	$134,000,000
Operation Jobs	59 workers
Operation Income	N/A
Source: AFC, PHPP, 5.11 Socioeconomics.	

PROPERTY TAX

California Revenue and Taxation Code Section 73 excludes new construction of active solar energy systems from the definition of “new construction” for property tax reassessment purposes. California Assembly Bill (AB) 1451 extends the current property tax exclusion for new construction of solar energy systems to January 1, 2017. Under this legislation, any non-solar components of a project would be assessed by the county assessor where the project is constructed. In this case, Los Angeles County would be responsible for assessing the PHPPs property value. Components included under the exemption are storage devices, power conditioning equipment, transfer equipment, and parts. Capital costs for the combined-cycle portion of the PHPP are estimated at $615 million to $715 million (2011 dollars). Assuming the property tax rate for the project site is 1.115433 percent, Los Angeles County annual property tax revenues are estimated at approximately $685,000 to $797,000 (AFC, 5.11-32, PHPP, 2008).

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received no agency or public socioeconomic comments on this project.

CONCLUSIONS

Estimated gross public benefits from the PHPP include employment and income for the project area and region. Staff concludes that construction and operation of the PHPP would not cause significant direct, indirect or cumulative adverse socioeconomic impacts on the study area's housing, schools, law enforcement, emergency services and parks.

Staff concludes that the project would not cause significant direct or cumulative adverse impacts to emergency services. Staff also concludes that the PHPP would not induce substantial growth or concentration of population; induce substantial increases in demand for housing or public services; or displace a large number of people.

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SOIL AND WATER RESOURCES

Testimony of Christopher Dennis, PG

SUMMARY OF CONCLUSIONS

Based on the assessment of the proposed Palmdale Hybrid Power Project (PHPP), California Energy Commission (Energy Commission) staff finds that:

- Implementation of Best Management Practices (BMPs) during the PHPP construction and operation in accordance with a construction Storm Water Pollution Prevention Plan (SWPPP) and Drainage, Erosion, and Sediment Control Plan (DESCP) required pursuant to **SOIL&WATER-1** and **-2** would avoid potential adverse erosion and flood impacts to onsite structures, adjacent properties, and water quality. During operation of the project, there would be no offsite discharge from storm events of 100-years or less.
- The use of recycled water for construction would be in compliance with state water use policy and would have no adverse environmental impact provided the requirements of Conditions of Certification **SOIL&WATER-3** and **-6** are met.
- The use of recycled water for operation processes and potable water for operation drinking water and sanitation would be in compliance with state water use policy and would have no adverse environmental impact provided the requirements of Condition of Certification **SOIL&WATER-4** are met.
- The proposed powerblock and solar field would not impact waters of the State or U.S. The service utilities and the transmission line could potentially impact waters of the U.S. and waters of the State. However, potential impacts to these waters would be avoided by spanning and prohibiting construction in any of these waters and implementing BMPs as recommended by Condition of Certification **BIO-23**.
- The use of a zero liquid discharge (ZLD) system to treat and reuse operational process wastewater would avoid potential wastewater discharge impacts to water quality provided the requirements of Condition of Certification **SOIL&WATER-7** are met, and would be consistent with the policies set forth in the Energy Commission's 2003 *Integrated Energy Policy Report (IEPR).*
- The discharge of sanitary wastewater to the Sanitation Districts of Los Angeles County (LACSD) sewer system would ensure appropriate treatment and disposal of sanitary wastes and would be in compliance with applicable federal, state, and local laws, ordinances, regulations, and standards (LORS) and would have no adverse environmental impact provided the requirements of Condition of Certification **SOIL&WATER-9** are met.
- The proposed project would comply with all applicable federal, state, and local LORS with the adoption of the recommended conditions of certification.
- Construction and operation of PHPP would not result in project-specific or cumulatively significant impacts to soil or water resources with the adoption of the recommended conditions of certification.

INTRODUCTION

The California Environmental Quality Act (CEQA) requires that the significant environmental effects of a proposed project be identified and that such impacts be eliminated or mitigated to the extent feasible (Pub. Resources Code, § 21002). CEQA defines a “significant effect” on the environment as a “substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including … water” (Cal. Code Regs., tit. 14, § 15382).

This section analyzes potential impacts to soil and water resources from the construction and operation of the PHPP. Where potential impacts are identified, staff has proposed mitigation to reduce the significance of the impacts and, as appropriate, has recommended conditions of certification. Similarly, staff has included conditions of certification to ensure that the project complies with all laws that are applicable to the project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental LORS apply to the PHPP and similar facilities, and help ensure the best and appropriate use and management of both soil and water resources by protecting human health and the environment.

Soil and Water Table 1
Laws, Ordinances, Regulations, and Standards

Federal LORS	
Clean Water Act (33 U.S.C. Section 1257 et seq.)	The Clean Water Act (CWA) (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which includes regulation of storm water and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the CWA under the Porter-Cologne Water Quality Control Act. The CWA also establishes protection of wetlands through section 401 and protection of navigable waters of the U.S. from discharges of dredge and fill material through section 404. Navigable waters can include perennial and ephemeral drainages, streams, washes, ponds, pools, and wetlands. If a discharge would impact navigable waters, then the impacts need to be quantified and mitigated. Section 401 is administered by the states, and in California, through the State Water Resources Control Board/Regional Water Quality Control Boards (SWRCB/RWQCBs). The RWQCB maintains the quality of the State's water by protecting the function and value of its use. Section 404 is administered and enforced by the U.S. EPA and Army Corps of Engineers (ACOE). Individual permit decisions and jurisdiction determinations are made by the ACOE.

State LORS	
California Constitution, Article X, Section 2	The California Constitution requires that the water resources of the State be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use or unreasonable method of use of water is prohibited.
California Water Code Section 1210, 1211, 1212	Section 1210 states that a wastewater treatment plant holds exclusive right to the water discharged to the water treatment and collection system. However, section 1210 does not mean that the wastewater treatment plant holds the exclusive right to effluent leaving the treatment plant, because downstream rights may develop that are dependent on that effluent. Section 1211 requires a permit from the SWRCB prior to making any change in the point of discharge, place of use, or purpose of use of treated wastewater, but only if the treated water is discharged to a watercourse and instream or riparian habitat could be adversely affected. Section 1212 requires discharge flows to be maintained when the flow to a watercourse is intended to maintain or enhance instream beneficial uses (such as fishery, wildlife, or recreation).
The Porter-Cologne Water Quality Control Act of 1967, Water Code Sec 13000 et seq.	Requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those regulations require that the RWQCBs issue waste discharge requirements (WDRs) specifying conditions for protection of water quality as applicable. Section 13000 also states that the State must be prepared to exercise its full power and jurisdiction to protect the quality of the waters of the State from degradation. Although Water Code 13000 et seq. is applicable in its entirety, the following specific sections are included as examples of applicable sections.
California Water Code Section 13050	Defines "waters of the State."
California Water Code Section 13240, 13241, 13242, 13243, & Water Quality Control Plan for the Lahontan Region (Basin Plan)	The Basin Plan establishes water quality objectives that protect the beneficial uses of surface water and groundwater in the Region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provides comprehensive water quality planning. The following chapters are applicable to determining appropriate control measures and cleanup levels to protect beneficial uses and to meet the water quality objectives: Chapter 2, Present and Potential Beneficial Uses; Chapter 3, Water Quality Objectives, and the sections of Chapter 4, Implementation, entitled "Requirements for Site Investigation and Remediation," "Cleanup Levels," "Risk

	Assessment," "Stormwater Problems and Control Measures," Erosion and Sedimentation," "Solid and Liquid Waste Disposal to Land," and "Groundwater Protection and Management."
California Water Code Section 13260	This section requires filing, with the appropriate RWQCB, a report of waste discharge that could affect the water quality of the state unless the requirement is waived pursuant to Water Code section 13269.
California Water Code Section 13523	If a RWQCB determines that it is necessary to protect public health, safety, or welfare, the RWQCB may prescribe water reclamation requirements for water which is or proposed to be used as recycled water.
California Water Code 13550	This section states that the use of potable domestic water for non-potable uses, including, but not limited to, 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: 1. The source of recycled water is of adequate quality for the proposed use and is available for this use. 2. The recycled water may be furnished for these uses at a reasonable cost to the user. 3. After concurrence with the State Department of Health Services, the use of recycled water from the proposed source would not be detrimental to public health. 4. The use of recycled water for the proposed use would not adversely affect downstream water rights, would not degrade water quality, and is determined not to be injurious to plantlife, fish, and wildlife.
California Water Code Section 13551	This section requires that water resources of the State be put to the highest possible beneficial use, and that waste or unreasonable use or unreasonable method of use of water be prevented. This section also requires the conservation of water in a manner that is reasonable and for a beneficial use that is in the interest of the people and for the public welfare.
California Water Code Section 13552.6	This section specifically identifies the use of potable domestic water for industrial cooling towers as a waste or unreasonable use of water if suitable recycled water is available. The availability of recycled water is determined by the SWRCB based on criteria listed in Section 13550 of the Water Code.
California Water Code Section 13552.8	States that any public agency may require the use of recycled water in cooling towers if recycled water is available, meets the requirements set forth in Section 13550, that there would be no adverse impacts to any existing water right and that if public exposure to cooling tower mist is possible, appropriate mitigation or control is provided.
Water Recycling Act of 1991 (Water Code 13575 et. seq.)	The Water Recycling Act states that retail water suppliers, recycled water producers, and wholesalers should promote the substitution of recycled water for potable and imported water in order to maximize the appropriate cost-effective use of recycled water in California.
California Code of Regulations, Title 17, Division 1, Chapter 5, Group 4, Articles 1 and 2	These articles address the requirements for backflow prevention and cross connections of potable and non-potable water lines.
California Code of Regulations, Title 22, Division 4, Chapter 3, Article 1	This article specifies the use of recycled water for dust control must be disinfected to at least a secondary-23 level. This article also requires that recycled water used for industrial or commercial cooling or air conditioning that involves the use of a cooling tower, evaporative condenser, spraying or any mechanism that creates mist shall be disinfected tertiary recycled water.
California Code of Regulations, Title 23, Division 3, Chapter 15	This chapter applies to waste discharges to land and requires the RWQCB issue WDRs specifying conditions for protection of water quality as applicable.
Regional Water Quality Control Board Waste	Requires obtaining a new or modifying an existing WDRs Permit and a Wastewater Reclamation Permit to reuse effluent from wastewater treatment plants for

Discharge and Waste Reclamation Permits	industrial cooling.
State Water Resources Control Board 2009-0009-DWQ	The 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 National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges associated with construction activity. Projects can qualify under this permit if specific criteria are met and an acceptable Storm Water Pollution Prevention Plan (SWPPP) is prepared and implemented after notifying the SWRCB with a Notice of Intent.
State Water Resources Control Board 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. Projects can qualify under this permit if specific criteria are met and an acceptable SWPPP is prepared and implemented after notifying the SWRCB with a Notice of Intent.
State Water Resources Control Board 2003-003-DWQ	This general permit applies to the discharge of water to land that has a low threat to water quality. Categories of low threat discharges include piping hydrostatic test water.
Local LORS	
County of Los Angeles Sanitation District No.14 and No. 20 – Requirements for Recycled Water Users	The Recycled Water Users Handbook, by the Sanitation Districts of Los Angeles County (2008), identifies the process to obtain permission to use recycled water, operational requirements, and best management practices, requirements for site inspection and site access, corrective action, notification, and record keeping. These requirements apply to all users of tertiary recycled water distributed by Districts No. 14 or No. 20 directly or through an intermediary.
County of Los Angeles Sanitation Districts No.14 and No. 20 – Wastewater Ordinance	This ordinance establishes the requirements for industrial wastewater sewer construction and use, the imposition of fees and charges, the implementation of federal and state pollution control regulations and other methods to control and regulate the discharge of wastewater.
County of Los Angeles Sanitation Districts No.14 and No. 20 Connection Fee Ordinance, Master Ordinances, and Rate and Mean Loadings Ordinances	This ordinance establishes sewer connection fee requirements and loading limitations for a connection to LACSD Districts No. 14 and No. 20 sewer service.
Los Angeles County Code Title 12 Environmental Protection, Chapter 12.80 Stormwater and Runoff Pollution Control	This code is intended to protect the health and safety of the residents of the county by protecting the beneficial uses, marine habitats, and ecosystems of receiving waters within the county from pollutants carried by stormwater and non-stormwater discharges and to enhance and protect the water quality of the receiving waters of the county and the United States.
Los Angeles County Code Title 11 Health and Safety, Chapter 11.38, Part 2 Water and Wells	Ordinances in Part 2 of Title 11, Chapter 11.38 provide requirements for protection of water quality for domestic water supplies.
Los Angeles County Code Title 11 Health and Safety, Chapter 11.38, Part 3 Sanitation, Sewage Disposal and Industrial Waste	Ordinances in Part 3 of Title 11, Chapter 11.38 specify requirements for sewage and industrial waste disposal systems.
City of Palmdale Storm Water Management Plan Ordinance	Requires a storm water management plan for grading activities occurring between October 1 and April 15
City of Palmdale Water-Efficient Landscape Ordinance	As a condition of approval for any development proposal, landscape plans must be submitted to the City Planning Department. The landscape plan must be scored according to water efficiency criteria and must achieve a minimum score in order to

	be approved.
City of Palmdale Floodplain Management Ordinance	A floodplain development permit must be obtained before construction or development begins within a Special Flood Hazard Area.
City of Palmdale Building Code	The City of Palmdale requires a grading permit for earth moving activities exceeding 3 feet in depth or 20 cubic yards in volume.
State Policies and Guidance	
Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq.)	In the 2003 Integrated Energy Policy Report (IEPR), consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the Energy Commission clearly outlined the state policy with regards to water use by power plants, stating that the Energy Commission would approve the use of fresh water for cooling purposes only where alternative water supply sources and alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound."
SWRCB Res. 2009-0011 (Recycled Water Policy)	This policy supports and promotes the use of recycled water as a means to achieve sustainable local water supplies and reduction of greenhouse gases. This policy encourages the beneficial use of recycled water over disposal of recycled water. This policy states the following recycled water use goals: • "Increase the use of recycled water over 2002 levels by at least one million acre-feet per year (AF/y) by 2020 and by at least two million AF/y by 2030; • Increase the use of stormwater over use in 2007 by at least 500,000 AF/y by 2020 and by at least one million AF/y by 2030; • Increase the amount of water conserved in urban and industrial uses by comparison to 2007 by at least 20 percent by 2020; and • Included in these goals is the substitution of as much recycled water for potable water as possible by 2030."
State Water Resources Control Board (SWRCB) Statement of Policy with Respect to Maintaining High Quality Waters in CA / Res. No. 68-16	The "Antidegradation Policy" mandates that: 1) existing high quality waters of the State are maintained until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial uses, and will not result in waste quality less than adopted policies; and 2) requires that any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters, must meet WDRs which will result in the best practicable treatment or control of the discharge necessary to assure that: a) a pollution or nuisance will not occur and b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.
SWRCB Res. No. 75-58	The principal policy of the SWRCB that addresses siting of energy facilities is the Water Quality Control Policy on the *Use and Disposal of Inland Waters Used for Power Plant Cooling*, adopted by the Board on June 19, 1976, by Resolution 75-58. This policy states that use of fresh inland waters should only be used for cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound.
State Water Resources Control Board (SWRCB) Res. 77-1	SWRCB Resolution 77-1 encourages and promotes recycled water use for non-potable purposes and use of recycled water to supplement existing surface and groundwater supplies.
SWRCB Res. No. 2005-0006	Adopts the concept of sustainability as a core value for SWRCB programs and directs its incorporation in all future policies, guidelines, and regulatory actions.
Los Angeles County General Plan	The General Plan describes the policies, goals, and implementation measures for water resources, flood and erosion control, and storm water protection within the county.

SETTING

The PHPP would be built on a relatively flat and undeveloped 383-acre parcel in the Antelope Valley in the western part of the Mojave Desert. This parcel is located in the northern portion of the City of Palmdale in Los Angeles County (COP2008a). Water

resources in this area are extremely limited and vegetation sparse. Due to these limitations, there is a need for a high degree of water use management and protection against accelerated soil erosion.

ANTELOPE VALLEY

The Antelope Valley is defined by the San Gabriel Mountains to the south, the Tehachapi Mountains to the west, and hills, ridges, and buttes to the east and north, The San Andreas and Garlock fault zones intersect in the northwest part of the valley (USGS1978). The valley is closed topographically with all surface water draining internally to the valley's ephemeral desert playas – the Rosamond, Buckhorn, and Rogers Lakes (USGS2003). In such closed basins, minerals in groundwater are typically concentrated in the groundwater by evapotranspiration (USGS2009). Evapotranspiration is the only natural method of groundwater discharge in the basin. While annual precipitation is less than 8 inches in the valley with over 90 percent of the rainfall typically occurring from November to April (WRCC2009), the average annual evapotranspiration rate is estimated at 66.19 inches (CIMIS2009). This is over eight times the rate of precipitation.

The soils at the PHPP site developed from alluvial fan deposits of silts and sands (COP2008a). These alluvial deposits in the proposed power block and construction laydown areas consist of fine to coarse sandy loam to loamy sand, which have a moderate potential for water erosion, drain well, and have moderate to high potential for wind erosion (COP2008a). The utility service pipelines and transmission line would be constructed in a variety of soil types that generally have a moderate potential for water erosion and a higher potential for wind erosion (COP2008a). Strong winds prevailing from the west can develop in the spring (COP2008a), dislodge fine-grained sediment and create dust storms.

Surface water bodies nearest to the PHPP are the ephemeral Amargosa Creek (0.6 miles to the east), Lake Palmdale and Una Lake (5.5 miles to the south), and the California Aqueduct (6 miles to the south). The applicant has submitted the results of a preliminary jurisdiction determination survey in a report of potential impacts to waters of the U.S. and waters of the state (AECOM2009g). A 250-foot buffer around the proposed PHPP, service utilities, and transmission line was used in the jurisdictional water survey. The report concluded that the California Aqueduct is federal water and that the Palmdale Ditch Aqueduct may be federal water. In addition, 43 state jurisdiction washes were identified (AECOM2009g).

Groundwater beneath the PHPP occurs in the AVGB (DWR2003) in three main aquifers (Durbin1978). Each aquifer has a gradient towards the center of the basin (Durbin1978). The principal aquifer is shallow and unconfined, and nearly all groundwater pumping occurs in this shallow aquifer (Durbin1978). The deeper aquifers are separated from the principal aquifer by lacustrine deposits (Durbin1978), and are regionally contaminated with arsenic (DWR2003). The depth to first-encountered groundwater beneath the PHPP has historically ranged from approximately 350 to 400 feet below ground surface (bgs) (COP2008a; DWR2003).

Changes in groundwater elevation in the AVGB are the result of seasonal changes in groundwater pumping, precipitation and evapotranspiration. Groundwater pumping has caused ground subsidence and earth fissures in Lancaster and at Edwards Air Force Base (DWR2003). Due to continued groundwater pumping, by 1992 approximately 292 square miles of Antelope Valley had subsided more than one foot (DWR2003). This subsidence has permanently reduced aquifer-system storage by approximately 50,000 acre-feet (DWR2003).

Groundwater pumping appears to be exceeding sustainable yield in the AVGB (LACDWP2009). Due to this apparent continued overdraft, one groundwater pumper has sued other groundwater pumpers in the basin and initiated what is now an ongoing litigation in the basin (LACDWP2009; SC2009). A concern of some of the parties involved in the AVGB litigation is how reclaimed water is and could be used after it has been treated by the Palmdale and Lancaster Water Reclamation Plants (WRPs) (AVUPG2010; MF2010O). Please refer to the Response to Agency and Public Comments section for further discussion.

PROJECT DESCRIPTION

The PHPP would be a nominal 570-MW combined-cycle generating power plant consisting of two natural-gas-fired combustion turbine generators (CTGs), two heat recovery steam generators (HRSGs) and one steam turbine generator (STG) (COP2008a). The CTGs would use evaporative inlet coolers to achieve a higher air compression ratio. Supplementing 10 percent of the peak power generation during daytime peak energy demands would be a 251-acre solar thermal field (COP2008a). The plant is expected to operate 24 hours per day, 7 days a week, under normal operating conditions (COP2008a). Thirty-six full-time personnel would be required to operate the plant (COP2008a).

The solar field would consist of rows of parabolic mirrors (collectors) that would heat a transfer fluid (HTF - therminol) inside piping placed at the focal point of each mirror row (COP2008a). The hot therminol would pass through a series of coils to boil water and create steam for the STG. The solar field would be kept free of vegetation by hand pulling or the use of spot spraying of commercially available herbicides (AECOM2009a).[1] The potential for wind erosion would be minimized by the use of Soil Cement™ or a similar product (AECOM2009a). Mirror washing would be conducted at regular intervals. An additional 50 acres west of the solar field would be used as the PHPP laydown area (COP2008a).

The PHPP would include a 230-kV switchyard, operations buildings, control warehouse, maintenance and administration buildings, and a gas metering station. Operations are planned to begin during 2012 (AECOM2009a). Construction of the PHPP is estimated to take 27 months to complete with a peak workforce of 767 persons and average workforce of 360 persons (COP2008a).

[1] Herbicides would not be used during periods of precipitation or on windy days. If herbicide use is necessary during periods when standing water is present, non-water soluble herbicides would be used. All weed debris would be collected and properly disposed of offsite. Equipment would not travel through weed infested areas.

Soil Erosion and Storm Water Control

The PHPP proposes to manage stormwater in accordance with PHPP-specific grading plans, a construction and industrial SWPPP, a Drainage Erosion and Sediment Control Plan (DESCP), and in accordance with Los Angeles County Stormwater Runoff and Pollution Control ordinance, and the City of Palmdale Floodplain Management and Storm Water Management Plan ordinances. These plans and ordinances would establish methods of when and how to control and manage storm water flow as it reaches, flows across, and then leaves project sites.

Water Supply and Use

The PHPP proposes using secondary-treated water for construction and tertiary-treated water for plant operations. Construction water would be trucked to the PHPP site from the Palmdale WRP (LACSD District No. 20) (COP2008a). The Los Angeles County Waterworks No. 40 (Waterworks) would supply the PHPP operations water from a regional tertiary water supply pipeline that is currently under construction (COP2008a). The Waterworks would also supply drinking water; however, the source of water would come from a connection to an existing Waterworks potable water service pipeline.

Wastewater Management

Sanitary Waste

Sanitary waste would be contained in portable facilities during construction and routinely disposed of at a local wastewater treatment plant (COP2008a). During plant operation, sanitary wastewater systems would be connected to the LACSD sewer system by a one-mile long, 6-inch diameter service connection (COP2008a). Approximately 5,400 gallons per day (gpd) of wastewater are expected to be disposed of through this sewer connection (COP2008a).

Construction Wastewater

Hydrostatic testing of the project's piping and vessels would use tertiary-treated water from the Waterworks' regional water supply pipeline (AECOM2010a). Up to 1.2 million gallons of hydrostatic test water would be generated during piping and vessel leak testing (COP2009a). Most of the hydrostatic test water would be used in carbon steel piping which is expected to release only low levels of heavy metals (AECOM2010a). The remaining test water would be used in non-carbon steel piping systems, which could release higher concentrations of heavy metals (AECOM2010a). All test water would be disposed either to the Palmdale WRP sewer system or at an appropriate water treatment facility in compliance with California state laws and regulations, and LACSD and Los Angeles County ordinances (AECOM2010a).

Process Wastewater

Process wastewater would be generated from the following sources (COP2008a):

- Cooling Tower Circulating Water System Blowdown
- HRSG Blowdown
- CTG Inlet Air Evaporative Cooler Blowdown

- Demineralization System Wastewater
- Chemical Feed Area and General Plant Drains

The blowdown and demineralized wastewater would be purified by the plant's ZLD system and pumped to the plant's raw water storage tank for reuse (COP2008a). Solids, including nutrients associated with the recycled water, would be generated by the ZLD process at an estimated average rate of 15.5 cubic feet per day and would be routinely transported to a local landfill (COP2008a).

Wastewater from the chemical feed area and general plant drains would be processed through an oil/water separator (COP2008a). The separated oil and sludge would be containerized and transported to an offsite oil recycling facility. The remaining wastewater would be pumped to the plant's raw water storage tank for later reuse (COP2008a).

Contaminated Soil and Water

A Phase I Environmental Assessment prepared in May 2008 for the PHPP site concluded that the PHPP site has been undeveloped since the early 1900s (COP2008a). Visual observations were made of debris and unauthorized disposal at various locations at the PHPP site, and removal of this debris was recommended prior to the start of construction (COP2008a). No onsite recognized environmental conditions (RECs) were identified and no additional assessment was recommended in the Phase 1 (COP2008a; AECOM2009g).

RECs were indentified offsite at Air Force Plant 42 and the Palmdale Regional Airport, located to the south and east of the PHPP. Historical operations at Air Force Plant 42 led to the release of trichloroethylene (TCE) which has migrated to the groundwater and formed a measurable plume in the groundwater (COP2008a). According to a 2007 Monitoring Report, the TCE plume does not extend to the PHPP site, but remains confined to areas underlying Air Force Plant 42 (COP2008a). Groundwater remediation at Plant 42 is ongoing and overseen by the California Department of Toxic Substances Control (DTSC) and the Lahontan Regional Water Quality Control Board (RWQCB) (COP2008a). Please refer to the **Public Health** and **Waste Management** sections for additional information related to soil and groundwater contamination associated with Plant 42.

An additional environmental database review was conducted in March 2009 for the proposed generator transmission line, construction areas, and the associated construction staging areas (AECOM2009g). Sites with RECs were identified; however, none of these sites are expected to impact construction of the transmission line (AECOM2009g). Please refer to the **Waste Management** section for additional discussion of the environmental database review and for conditions of certification related to construction of the generator transmission line.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section provides an evaluation of the expected direct, indirect, and cumulative impacts to soil and water resources that could be caused by construction, operation, and maintenance of the PHPP. Staff's analysis of potential impacts consists of a description of the potential effect, an analysis of the relevant facts, and application of the threshold criteria for significance to the facts. If mitigation is warranted, staff provides a summary of the applicant's proposed mitigation and a discussion of the adequacy of the proposed mitigation. If necessary, staff presents additional or alternative mitigation measures and refers to specific conditions of certification related to a potential impact and the required mitigation. Mitigation is designed to reduce the effects of potentially significant PHPP impacts to a level that is less than significant.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Impacts leading to soil erosion or depletion or degradation of water resources are among those staff believes could be most potentially significant soil and water resource issues associated with the PHPP. The thresholds of significance for these issues are discussed below.

Soil Resources

Staff evaluated the potential impacts to soil resources including the effects of construction and operation activities that could result in erosion and downstream transportation of soils and the potential for contamination to soils and groundwater. There are extensive regulatory programs in effect that are designed to prevent or minimize these types of impacts. These programs are effective, and absent unusual circumstances, an applicant's ability to identify and implement BMPs to prevent erosion or contamination is sufficient to ensure that these impacts would be less than significant. In addition, soils would be protected by the development and implementation of grading plans, a DESCP, and a construction SWPPP. Staff's overall evaluation is that the PHPP can be built and operated in accordance with existing LORS. The LORS and policies presented in **Soil and Water Table 1** were used to determine the significance of PHPP impacts.

Water Resources

Staff evaluated the potential of the PHPP's proposed water use to cause a significant depletion or degradation of groundwater resources. Staff considered compliance with the LORS and policies presented in **Soil and Water Table 1** and whether there would be a significant impact under the California Environmental Quality Act (CEQA).

To evaluate if significant CEQA impacts to soil or water resources would occur, the following criteria were used. Where a potentially significant impact was identified, staff or the applicant proposed mitigation to ensure the impacts would be less than significant.

- Would the project violate any water quality standards or waste discharge requirements?

- Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?
- Would the project 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 on- or off-site?
- Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?
- Would the project 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?
- Would the project otherwise substantially degrade water quality?
- Would the project place housing 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?
- Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?
- Would the project 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?
- Would the project inundation by seiche, tsunami, or mudflow?
- Would the project result in substantial soil erosion or the loss of topsoil?
- Does the project 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)?
- Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

DIRECT/INDIRECT IMPACTS AND MITIGATION

A discussion of the direct and indirect PHPP construction and operations impacts and mitigation is presented below. For each potential impact evaluation, staff describes the potential effect and applies the threshold criteria for significance to the facts. If mitigation is warranted, staff provides a summary of the applicant’s proposed mitigation and a discussion of the adequacy of the proposed mitigation. In the absence of an applicant-proposed mitigation or if mitigation proposed by the applicant is inadequate, staff mitigation measures are recommended.

Construction of the PHPP would include soil excavation, grading, and the installation of the power block, solar field, and service utility connections. A summary of the major PHPP elements and their areal impact is presented below in **Soil and Water Table 2**.

Soil and Water Table 2
Description of Land Potentially Impacted by the Proposed Project

Structure	Existing Land Use	Areal Impact
Powerblock	Undeveloped land	26 acres
Detention Basins	Undeveloped land	20 acres
Access Roads	Undeveloped land	24 acres
Setbacks and Slopes	Undeveloped land	12 acres
Solar Field	Undeveloped land	251 acres
Construction Laydown Area	Undeveloped land	50 acres
Power Plant Total Area	**Approximately 383 acres**	
Recycled Water Pipeline (7.4 miles long, 50 feet wide)	Existing road right-of-way	44.9 acres
Potable Water Pipeline (1 miles long, assumed to be 50 feet wide)	Existing road right-of-way	0.12 acres
Natural Gas Pipeline (8.7 miles long, 50 feet wide)	Existing road right-of-way	52.7 acres
Sanitary Wastewater Pipeline (1 miles long, 50 feet wide)	Existing road right-of-way	0.12 acres
Transmission Lines (35.6 miles long, 50 foot wide right-of-ways)	Existing road right-of-ways and undeveloped land	215.8 acres
Utility Service Pipelines and Transmission Line Total Area	**Approximately 314 acres**	

Source: COP2008a; AECOM2009g.

As indicated in **Soil and Water Table 2**, the PHPP would require the installation of several service utilities and a transmission line that would connect to Southern California Edison's Vincent Substation on the north side of the San Gabriel Mountains. These service utilities and the transmission line would require approximately 10 road crossings and 33 wash and culvert crossings (AECOM2009n). Existing paved roads, Arizona crossings, or directional drilling would be used for the wash and culvert crossings to minimize potential impacts (see the **Biological Resources** section for more information).

During construction, secondary-treated reclaimed water would be used for dust suppression (COP2008a). Tertiary treated reclaimed water would be used for hydrostatic testing of piping and vessels (AECOM2010a). Potential impacts to soils and water quality related to increased erosion or the release of hazardous materials could occur during construction. Potential storm water impacts could result if runoff flow and volume discharge rates increased from the site and increased flooding downstream.

Operation of the PHPP could lead to potential impacts to soil, storm water runoff, water quality, and water supply. Soils may be potentially impacted through accelerated erosion or the release of hazardous materials used in the operation of the PHPP. Storm water runoff from the proposed site could result in potential impacts if increased runoff flow rates and volumes discharged from the PHPP increase erosion or downstream flooding. Water quality could be impacted by discharge of eroded sediments from the PHPP or by the discharge of hazardous materials released during operation. Potential impacts to soil, storm water, water quality, and water supply related to the construction and operation of the PHPP, including the applicant's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

Wind Erosion

The topography of the PHPP site is relatively flat, which naturally reduces susceptibly of the soil to wind and water erosion. However, construction and operation of the PHPP would affect soil resources, and without proper BMPs, wind and water erosion could be significant. Construction would disturb the naturally developed surficial soil armor and existing vegetative cover, leaving the soil susceptible to erosion. Approximately 940,743 cubic yards of cut and 466,612 cubic yards of fill would be generated with 475,000 cubic yards of excess cut soil spread west of the proposed solar field (COP2008a). The net result is that the undeveloped site, with elevations ranging from 2,493 to 2,535 feet above mean sea level (amsl), would be graded to an elevation of approximately 2,500 feet amsl (COP2008a). In addition, nearly all vegetation would be removed during construction for the operation of the PHPP (COP2008a). The applicant states that soil would not be imported to the PHPP site or exported offsite (COP2008a). The proposed pipeline and transmission line installations are not expected to generate soil that would require offsite disposal. Construction of the PHPP would be completed over a 27-month period (COP2008a) and could lead to adverse impacts to soil resources, including increased soil erosion, soil compaction, loss of soil productivity, and disturbance of soils crucial for supporting vegetation.

Soil losses would be created by construction and grading activities that would expose and disturb the soil and leave soil particles vulnerable to detachment by wind and water. Soil erosion results in the loss of topsoil and increases in sediment loading to nearby receiving waters or sewer systems. In the absence of proper BMPs, and due to the soil type at the PHPP site, the PHPP earthwork could cause significant fugitive dust and erosion. Soil losses would be ongoing after the PHPP is constructed. The applicant estimated, using an optimistic 90-percent dust suppression level, that the onsite soil subject to erosion is expected to be 134 pounds per year (lbs/yr) of fugitive dust from the site and an additional 0.02 lbs/yr from the service utility corridors (COP2008a). Once construction is completed, operation of the PHPP is expected to continue for 30 years (COP2008a).

The magnitude, extent, and duration of those impacts would depend on several factors, including weather patterns in the vicinity of the PHPP site, the types of soil that could be affected, and the method, duration, and time of year of construction activities. Prolonged periods of precipitation, or high intensity and short duration runoff events coupled with earth disturbance activities could result in accelerated onsite erosion. In addition, high winds during grading and excavation activities could cause wind borne erosion leading

to increased particulate emissions that adversely impact air quality. The implementation of appropriate erosion control measures would help conserve soil resources, maintain water quality, prevent accelerated soil loss, and protect air quality.

Conditions of Certification in the **Air Quality** section would prevent significant impacts from fugitive dust and wind erosion of the soil by requiring dust control to disturbed land during construction. These prevention measures include: limiting vehicle speed to 10 miles per hour during construction; requiring all unpaved roads and disturbed areas in the PHPP and linear construction sites to be watered as frequently as necessary during grading and stabilized thereafter with a non-toxic soil stabilizer or soil weighting agent to comply with the dust mitigation objectives; and establish performance standards for controlling fugitive dust and requirements for response should they be exceeded.

In additional Conditions of Certification **SOIL&WATER-1** and **-2** would require the use of BMPs designed to prevent and control soil loss due to wind erosion during project construction and operation. These conditions of certification would require the project owner to prepare a final DESCP and construction SWPPP. These plans would specify temporary and permanent BMPs, including the use of soil binders as discussed above and the use of straw mulch, geotextiles, mats, erosion control blankets, silt fences, and BMPs for stockpile management. These plans would incorporate recommendations from the City of Palmdale, County of Los Angeles, California Department of Fish and Game (CDFG), and Lahontan RWQCB, and would include a plan for monitoring and maintenance of the soil erosion BMPs. Staff has found that the use of these BMPs and the plans incorporating them have been used to protect soil resources successfully at projects licensed by the Energy Commission.

Storm Water Erosion

The storm water would either evaporate, supply water to vegetation, infiltrate into the soil, or flow overland to downgradient properties. When the overland flow volume or rate increases, so does the potential for downgradient soil erosion and flooding. Several PHPP features would contribute to the potential for erosion during construction including the high volume of earth displacement, the long duration for construction, and the properties of the soil on which the PHPP would be built. Construction of the PHPP would change natural drainages, remove natural vegetation, disturb the soil structure, and add impervious areas to the site. These changes would cause an increase in storm water runoff volume and rate.

In addition, potentially significant water quality impacts could occur during construction, excavation, and grading activities, if contaminated or hazardous soil or other materials used during construction were to contact storm water runoff. Water quality could also be impacted if the storm water drainage pattern concentrates runoff to downstream properties or to areas that are not properly protected with BMPs. Drainage and erosion control measures creating a separate drainage system for the PHPP are proposed. BMPs would be used to control storm water flow and prevent potential storm water impacts. These BMPs include the installation of sediment basins and check dams to control storm water flow in addition to the use of fiber rolls, sand bag barriers, straw bale barriers, and earthen dikes and drainage swales.

During operation of the proposed project, the applicant has proposed permanent erosion control measures to prevent potential soil related impacts. The PHPP power block would be covered predominantly with gravel and landscaping, which would serve to prevent wind and water erosion and maintain a high degree of the pre-PHPP water infiltration capacity of the soil. The balance of the PHPP power block would be covered by foundations and paving. The mirror fields would be graded, de-vegetated, and maintained by the use of soil weighting or binding agents. Adding impervious areas, removing vegetation, and using soil weighting or bonding agents would decrease storm water infiltration and increase its runoff velocity. However, the PHPP has been designed to retain all storm water run on from a 100-year storm event and manage it using onsite using infiltration basins.

Soil loss due to water erosion during project construction and operation would be prevented and controlled by the use of BMPs required in Conditions of Certification **SOIL&WATER-1** and **-2**. Temporary and permanent BMPs would be specified in a final DESCP and construction SWPPP and would incorporate recommendations from the City of Palmdale, County of Los Angeles, CDFG, and Lahontan RWQCB. These plans would also specify procedures for monitoring and maintenance of the storm water BMPs. The DESCP would be required to be consistent with the grading and drainage plan required in the **Facility Design** section of this Final Staff Assessment (FSA). As mentioned above, staff has found that the use of these plans and incorporating BMPs into them have been successfully used to protect soil resources at many of the power plant projects licensed by the Energy Commission.

Flooding, Tsunami, and Seiche

Unlined stormwater retention and infiltration basins would be constructed at the PHPP site to retain storm water onsite from a 100-year, 24-hour storm event and allow it to infiltrate into the subsurface (COP2008a). The basins would cover approximately 10.51 acres. Based on calculations provided by the applicant, the storm water basins would retain and infiltrate storm water for up to 48-hours or less after a storm event and no storm water from storm events up to 100-year storm events would leave the PHPP site (AECOM2009i). The construction and use of these storm water basins would reduce potential impacts from storm water related flooding to a level that is less than significant.

The PHPP site is too far inland to be affected by tsunami or seiche, and the proposed powerblock is not located within the 100-year floodplain as defined by Federal Emergency Management Agency (FEMA). However, the service utilities and the part of the transmission line route that has been established for the project would cross a 100-year flood plain zone. To mitigate potential impacts, staff recommends Conditions of Certification **SOIL&WATER-1** and **-2** that would require BMPs, as discussed above, to ensure that the service utilities line and transmission line would not be affected by or exacerbate flooding.

Water Supply

A summary of the PHPP proposed construction and operation water supply demand, source, and volume requirements is provide in **Soil and Water Table 3** below.

Soil and Water Table 3
Proposed Annual Project Water Source and Use[1]

	Water Demand	Water Supply Source	Estimated Average Volume of Water Required	Estimated Maximum Volume of Water Required
Construction	Power Block Construction and Dust Suppression	Secondary Treated Water trucked in from the Palmdale WRP	---	65,000 gpd (73 AF/y)
Construction	Solar Field Construction and Dust Suppression	Secondary Treated Water trucked in from the Palmdale WRP	560,000 gpd (627 AF/y)	650,000 gpd (728 AF/y)
Construction	Hydrostatic Testing	Waterworks Regional Recycled Water Pipeline	---	Up to 1,174,116 gallons (3.6 acre-feet)
Construction	Drinking Water[2]	Bottled Water	720 gpd (0.79 AF/y)	1,534 gpd (1.7 AF/y)
Operation	Cooling Water; Boiler Makeup; Maintenance and Landscaping	Tertiary Treated Water from the Waterworks Regional Recycled Water Pipeline	3,045 AF/y (75%)	4,075 AF/y
Operation	Mirror Washing	Tertiary Treated Water from the Waterworks Regional Recycled Water Pipeline	46 AF/y	46 AF/y
Operation	Fire Protection (used as necessary)	Tertiary Treated Water from the Waterworks Regional Recycled Water Pipeline	250,000 gallons (0.8 AF)	250,000 gallons (0.8 AF)
Operation	Drinking and Sanitation	Potable Water from the Los Angeles County Waterworks No. 40	2.2 AF/y (amount of the will-serve letter)	3.6 AF/y

Source: COP2008a; AECOM2009a.
Notes: (1) Construction water use is based on a 27-month construction schedule. Operations water use assumes the PHPP would operate at 100 percent of the plant's total capacity over the life of the project. (2) Estimated at 2 gallons per day per person.

Construction

To meet the estimated construction water demand, an average daily volume of 65,000 gallons per day (73 AF/y) during construction of the power block and an average of 560,000 gpd during construction of the solar field would be needed (COP2008a). An additional 1,174,116 gallons (3.6 AF) would be required during hydrostatic testing of the PHPP piping and vessels (COP2008a). As illustrated in **Soil and Water Tables 4** and **6** below, the Palmdale WRP is producing over 10,000 AF/y of secondary-treated water. This supply would be more than enough to satisfy the PHPP's construction water needs. Staff recommends requiring the applicant comply with Condition of Certification **SOIL&WATER-3** to ensure the applicant can obtain the necessary construction water supply and has a negotiated and executed agreement with LACSD No. 20 (Palmdale WRP) for the supply of the PHPP's construction water.

The PHPP construction water would be delivered from the Palmdale WRP by either 4,000-gallon capacity water trucks or by pipeline if construction of the recycled water pipeline is completed before the end of PHPP construction (COP2008a). Trucking this water with 4,000-gallon watering trucks, as proposed by the applicant (AECOM2009i), would require 16.25 truckloads per day during construction of the power block and up to 162.5 truckloads per day during construction of the solar field. The potential impacts associated with the number of truck deliveries are discussed in the **Air Quality** and **Traffic** sections of this FSA.

The supply of secondary-treated water from the Palmdale WRP must conform to the requirements of the California Code of Regulations (CCR) Titles 17 and 22. CCR Title 22 requires the California Department of Public Health (DPH) to review and approve the use and disposal of recycled water to ensure public health and safety. One of the primary conditions for the use of recycled water is protection of public health. The current Water Recycling Criteria (Title 22, CCR, sections 60301 through 60355) require the submission of an engineering report to the RWQCB and DPH and obtain approval from the DPH before recycled water projects are implemented.

The engineering report would describe the production, distribution, and use of recycled water, and would be prepared by a properly qualified California registered engineer experienced in the field of wastewater treatment. The report would verify whether Palmdale WRP's recycled water meets the standards for unrestricted use and whether the plumbing constructed for PHPP is designed for prevention of backflow and cross connection with the potable water supply. Staff recommends the adoption of condition of certification **SOIL&WATER-3** to ensure the applicant compliance with DPH requirements. Staff also recommends Condition of Certification **SOIL&WATER-5** to ensure the project owner meters the water used for the project.

Operation

Waterworks District No. 40 would supply the PHPP operation with potable water at an annual volume of up to 3.6 acre-feet. District No. 40 obtains its potable water from the State Water Project (California Aqueduct), surface water from the Little Rock Reservoir, and groundwater from the AVGB via 36 groundwater wells (LACDWP2005). Potable water would be supplied to the PHPP by the District No. 40 potable water supply pipeline through a routine service connection. The Los Angeles County Department of Public Works' (LACDWP) Urban Water Management Plan for the Antelope Valley (LACDWP2005) shows that potential impacts to the proposed supply have been evaluated and measures for potential impacts have been identified consistent with the normal water year, single-dry water year, and multiple dry water years planning scenarios. To ensure that the PHPP's potable water is supplied by a service connection to the District No. 40 potable water supply pipeline, staff recommends Condition of Certification **SOIL&WATER-4**. Staff also recommends Condition of Certification **SOIL&WATER-5** to ensure that this water connection is metered and its use is consistent with this analysis.

The PHPP primary and backup industrial process water supply source would be tertiary-treated water from the Waterworks regional recycled water pipeline. Use of this water would be in compliance with Water Code section 60306, which requires that any

recycled water used in an industrial cooling tower, evaporative condenser, spraying or any mechanism that creates mist must be disinfected tertiary recycled water. The disinfected tertiary water would originate from the Palmdale WRP (District No. 20) and Lancaster WRP (District No. 14). The Palmdale and Lancaster WRPs are part of a partnership of 24 independent special districts that form the LACSD. Both the Palmdale WRP and Lancaster WRP are under RWQCB orders to protect beneficial uses of groundwater. These orders require the WRPs to limit the contributions of salt and nutrients to the groundwater from the WRPs (RWQCB2002; RWQCB2003a). To provide additional treatment capacity and reduce the potential for adverse impacts to groundwater, the WRPs are now in the process of upgrading their facilities to add activated sludge and secondary and tertiary wastewater treatment processes. This treatment will reduce the nutrient content in the recycled water produced, and provide a municipal and industrial supply for consumptive use that would in turn limit discharge of wastewater to land thus reducing the potential for nutrient and salt loading of the groundwater basin.

Tertiary-treated water will be supplied to Waterworks under a 25-year[2] contract between the Waterworks and Districts No. 14 and No. 20 for an annual total delivery of 13,500 acre-feet (PA2008). Waterworks plans to resell this water to third parties, including the proposed PHPP. Waterworks and the applicant have entered into a contract for delivery of recycled water to the PHPP project for the life of the project (LACDWP2010). This agreement specifies that Waterworks would provide the PHPP with 4,121 AF/y under maximum operation conditions and 3,091 AF/y while operating at 75 percent capacity (LACPW2010). However, the following additional elements must be completed before the PHPP would have a reliable water supply for plant operations.

1. The tertiary treatment systems at the Palmdale and Lancaster WRPs;

2. Revised Lahontan RWQCB's Waste Discharge Requirements (WDRs) for the Palmdale WRP[3]; and

3. The regional recycled water supply pipeline by the Waterworks.

The tertiary-treated water would be delivered by Waterworks through an 8.7-mile, 24-inch diameter pipeline that would be installed underground along existing road right-of-ways (LACDWP2010). Once delivered to the PHPP, this water would be stored onsite in a raw water tank along with purified water from the PHPP's demineralizer and ZLD systems (COP2008a). The raw water storage tank would have a one million gallon storage capacity and could supply the PHPP with cooling water for up to 4 hours of operation (COP2008a). Water for washing the solar mirrors would come from the demineralized water storage tank, free of detergents, surfactants, or other additives, and would consume approximately 46 acre-feet annually (COP2008a; AECOM2009b).

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[2] The contract has a provision for an option to extend the term of the contract for an additional 25 years (PA2008).

[3] The Palmdale WRP is not currently permitted to provide recycled water for uses other than its effluent management site area (EMS) or to its storage ponds. LACSD No. 20 Master Water Recycling Requirements are expected to be in place late 2010 or early 2011. LACSD No. 14 currently is permitted to supply water for power plant cooling if permitted by the Regional Water Board or the Energy Commission under the Warren-Alquist Act.

The mirrors would be washed using a specialized diesel truck equipped with a 4,000-gallon water tank, cab-controlled spray nozzles, and brush trailer (COP2008a; AECOM2009i).

The PHPP would require a continuous supply of water due to evaporative losses by the PHPP's wet cooling tower, CTGs, ZLD, and routine solar mirror washing activity (COP2008a). Over 95 percent of this evaporative loss would be caused by the PHPP's wet cooling tower heat rejection process (COP2008a). The remaining evaporative water loss would be by the CTGs inlet air fogging system (COP2008a) and during the routine washing of the solar mirrors. To conserve water, the PHPP cooling tower water would be reused three to ten times (cycles of concentration) before being rejected as cooling tower blowdown (COP2008a). This blowdown water, concentrated with minerals, would be processed by a cooling tower blowdown clarifier and ZLD to remove the minerals. The processed water would be stored in the raw water storage tank for later reuse (COP2008a).

The ability of Waterworks to supply the PHPP with tertiary-treated water is dependent on the tertiary-treated water production rates of the Palmdale and Lancaster WRPs. The annual volume of secondary-treated water produced at the Palmdale and Lancaster WRPs over the last thirteen years is presented below in **Soil and Water Table 4**. As the population grew, and will likely continue to grow, the volume of wastewater processed by the WRPs has and will likely increase. On average, over the last five years, the annual production of secondary treated wastewater by the Palmdale WRP has been 9,178 acre-feet and 13,666 acre-feet by the Lancaster WRP. Staff believes there is a sufficient volume of wastewater available for tertiary treatment to meet the PHPP water requirement.

Soil and Water Table 4
Historical Recycled Water Production

Year	Palmdale Water Reclamation Plant Total Annual Volume (AF/y)	Lancaster Water Reclamation Plant Total Annual Volume (AF/y)
1997	8,446	10,641
1998	9,163	11,986
1999	8,737	11,201
2000	9,275	10,865
2001	9,454	11,986
2002	8,726	12,322
2003	9,185	12,434
2004	9,297	13,778
2005	9,409	13,890
2006	8,961	13,890
2007	9,219	13,778
2008	9,320	13,554
2009	8,860	13,106
Annual Average	**9,081**	**12,572**
2004 to 2009 Annual Average	**9,178**	**13,666**

Source: LACSD2010b.
Note: Staff has revised the total annual production volumes as were presented in the Preliminary Staff Assessment, based on a review of the production numbers by the LACSD (LACSD2010b).

Both WRPs are undergoing upgrades that will allow the plants to produce tertiary-treated water. Concurrent with the upgrades is the construction of a regional recycled water pipeline system by the Waterworks. The upgrades, regional pipeline components, and completion schedule are summarized below in **Soil and Water Table 5**. All of the components are expected to be completed no later than 2012, which would allow the PHPP to receive tertiary-treated water in time for the estimated PHPP startup date of 2013.

Soil and Water Table 5
Regional Tertiary Supply Pipeline Component Completion Schedule

Component	Estimated Completion Date	Funding Source	Funding Status
Piping – Palmdale WRP to Blackbird Lane/Sierra Highway	First Quarter 2011	Waterworks and the City of Palmdale	Funding Agreement between the City of Palmdale (the applicant) and Waterworks District No. 40 Complete
Piping – Blackbird Lane/Sierra Highway to Avenue M/Sierra Highway	November 2011 (currently under construction)		
Piping – Avenue M/Sierra Highway to Avenue K/Sierra Highway	November 2011 (currently under construction)	Federal Stimulus Funds and the Army Corps of Engineers: 25% local match provided by City of Lancaster and LACSD Districts No. 14 and No. 20 SEP fund	Funding Agreement between Army Corps of Engineers and City of Lancaster Complete
Piping –Avenue K/Sierra Highway to Avenue E/Division Street	Completed	Waterworks and the City of Lancaster	Component Complete
Piping – Avenue E/Division Street to the Lancaster WRP	Completed	Waterworks	Component Complete
Palmdale WRP Upgrade to Tertiary Treatment	First Quarter 2012	LACSD District No. 20 and the State Water Resources Control Board	SWRCB Funding Approved
Lancaster WRP Upgrade to Tertiary Treatment	First Quarter 2011	LACSD District No. 14 and the State Water Resources Control Board	SWRCB Funding Approved
Piping – Connection from the Proposed Project to Avenue M/Sierra Highway	During construction of the Proposed Project	Applicant (PHPP project)	Funding Agreement between the LACDPW and Applicant Complete

Source: AECOM2009l; LACSD2010a; LACSD2010b.

The actual annual production and capacity of the Palmdale and Lancaster WRPs to produce tertiary-treated water are summarized below in **Soil and Water Table 6**. Understanding the volume of tertiary-treated water that will be available to the Waterworks to purchase is important to understanding the ability of Waterworks to fulfill their contractual obligation to the PHPP on a long-term basis. The 2012 estimated tertiary treatment capacity will be sufficient to treat all of the secondary-treated water now produced by the Palmdale and Lancaster WRPs.

Soil and Water Table 6
Tertiary Treatment Capacity of the Palmdale WRP and Lancaster WRP

Actual and Estimated Wastewater Treatment Volumes	Palmdale WRP (annual average daily volume)	Lancaster WRP (annual average daily volume)	Combined Total Annual Volume
2004 to 2009 Actual Average Secondary Treatment	8.2 mgd (9,178 AF/y)	12.2 mgd (13,666 AF/y)	20.4 mgd (22,844 AF/y)
Current Secondary Treatment Capacity	15 mgd (16,813 AF/y)	16 mgd (17,934 AF/y)	31 mgd (34,747 AF/y)
2012 Designed Tertiary Treatment Capacity	12 mgd (13,451 AF/y)	18 mgd (20,176 AF/y)	30 mgd (33,627 AF/y)

Source: AECOM2009I; LACSD2010a; LACSD2010b.
Note: The Lancaster WRP is currently producing tertiary water and has a capacity to produce 1.6 mgd of tertiary water. Current WDRs issued by the RWQCB limit the treatment of reclaimed water to 15 mgd at the Palmdale WRP and 16 mgd at the Lancaster WRP (AVGC2006). Staff understands the WDRs would be revised prior to operation of the tertiary treatment systems.

The expected demand on the tertiary-treated water is summarized below in **Soil and Water Table 7**. As shown in the table, there would be an existing 724 AF/y average surplus of recycled water available from the Palmdale and Lancaster WRPs after all existing recycled water supply commitments have been fulfilled, including the 13,500 contracted allotment to Waterworks. Of the 13,500 AF/y that the Waterworks is allotted, the PHPP would require 4,121 AF/y for plant operations. Based on current recycled water demands, there would be a sufficient volume of tertiary-treated water available from the Waterworks to supply the PHPP's water demand.

Soil and Water Table 7
Tertiary-Treated Water Supply and Demand

Recycled Water Source and Use		Volume (AF/y)
Supply	Average Volume of Tertiary-Treated Water Available between 2004 to 2009	22,844
Existing Demand	Piute Ponds (estimated demand: 3,200 – 5,000 AF/y)	-5,000
	L.A. County Waterworks Contracted Annual Volume	-13,500
	City of Lancaster Contracted Annual Volume	-950
	City of Palmdale Contracted Annual Volume	-2,000
	L.A. County Dept of Parks and Recreation – Apollo Community Regional Park (contracted annual volume: 670 AF/y, annual average demand: 250 AF/y)	-670
Volume of Recycled Water Remaining – Annual Average		**724**

Source: KJ2006; RWQCB2002; PA2008; LACSD2010c.
Note: Staff revised the recycled water volumes as were presented in the Preliminary Staff Assessment, based on a review of the existing commitments and volumes by the LACSD (LACSD2010b).

Future demands for the recycled water produced by the Palmdale and Lancaster WRPs would likely be accompanied by increased production in recycled water. Upgrades to the Palmdale and Lancaster WRPs expected to be complete by 2012 would provide a tertiary-treatment capacity of 33,627 AF/y. These upgrades would allow tertiary treatment of an additional 10,783 AF/y beyond the average production volume of the last five years (2004 to 2009). Staff, therefore, believes there will be sufficient recycled water supply to meet future demands.

However, the groundwater in storage in the AVGB is currently subject to litigation, and some of the many litigants believe that at least a portion of the water reclaimed by the Palmdale and Lancaster WRPs should be used to recharge the groundwater in storage. Wastewater reclaimed by the Palmdale WRP is treated to secondary water quality standards and discharged to an effluent management site (EMS) where it is further treated in oxidation ponds. This water is then used as a supply for orchards, an ornamental tree nursery, and fodder and fiber crops (RWQCB2005). A portion of the wastewater reclaimed by the Lancaster WRP is treated to tertiary water quality standards and delivered to the Apollo Lakes Regional County Park. The remaining wastewater treated by the Lancaster WRP is delivered as secondary-treated water to Nebeker Ranch or stored in unlined reservoirs, with excess water disinfected and discharged to the receiving waters of Amargosa Creek and the Piute Ponds (RWQCB2002). This receiving water is effluent dominated and commingles with seasonal storm water. Recycled water discharged to the creek and ponds is done in accordance with a 1981 Letter of Agreement between the California Department of Fish and Game, Edwards AFB, and LACSD District No. 14 (LACSD2004).

Past land application practices by the Palmdale WRP have caused the groundwater quality in the vicinity of the WRP to be impacted by nitrates. To protect the quality of groundwater, the Lahontan RWQCB issued WDRs, followed by a Cleanup and Abatement Order and a Cease and Desist Order. The RWQCB has also issued WDRs for the Lancaster WRP (RWQCB2002). The reuse of wastewater by municipal and industrial users would help to reduce the potential for adverse impacts to the groundwater by salts and nutrients contained in the wastewater.

To remain in compliance with the RWQCB requirements and comply with the statewide policies to put recycled water to beneficial use, the Lancaster and Palmdale WRPs have been seeking municipal and industrial users of their recycled wastewater. District No. 20 developed in September 2005 what is called the 2025 Plan (Final Palmdale Water Reclamation Plant 2025 Facilities Plan and Environmental Impact Report). This plan addresses the issue of managing wastewater for an increasing population, increasing regulatory requirements, and increasing demand for recycled water (AVGC2006). District No. 14 developed a similar plan, the 2020 Plan (Final Lancaster Water Reclamation plant 2020 Facilities Plan) in May 2004. This plan addresses means to accommodate increasing wastewater flows and seasonal fluctuations in demand. In addition, a multi-party commitment has been made to develop infrastructure that would allow access by municipal and industrial users to this wastewater. This infrastructure includes SWRCB funding, tertiary wastewater treatment upgrades, and construction of a regional distribution system as part of a 2005 Integrated Regional Water Management Plan (see **Soil and Water Table 5**).

The Palmdale and Lancaster WRPs operate exclusively for the purpose of treating wastewater and under Water Code section 1210 have the right to all water delivered to the treatment plants and the responsibility to maintain downgradient, instream beneficial uses that are dependent on the flow of treated wastewater (AVGC2006). **Soil and Water Table 7** lists all of the existing commitments of the recycled water. None of these commitments are specifically intended for the recharge of groundwater in the AVGB. Therefore, staff believes the use of reclaimed water by the PHPP would not significantly affect the groundwater in storage in the AVGB.

Staff also believes that the PHPP's proposed use of recycled water purchased from Waterworks is consistent with state law and policy. The PHPP's proposed use of recycled water would contribute towards increasing quality of the groundwater in the AVGB by consuming up 4,122 AF/y of this water. While the PHPP would be a new water user and would consume/evaporate the water, the PHPP would efficiently use the recycled water it receives. There would be no wastewater discharged from the PHPP. In addition, a portion of the recycled water used for municipal and industrial purposes would be reclaimed again for further reuse. This is a desirable and efficient use of water.

Water Quality

Construction activities can impact surface water through the use of construction equipment or by grading that alters wetlands or stream beds. Construction and operation activities can also impact surface waters by causing increases in sediment

and storm water. To protect surface waters, standardized BMPs have been developed and would be required by staff as conditions of certification.

The ACOE determined that all proposed discharges of dredged or fill material by the PHPP would occur outside the high water mark, and hence, outside of the ACOE jurisdiction (ACOE2010). This determination means that water of the U.S. would not be impacted and no section 404 permit would be required (ACOE2010). However, waters of the State could be impacted. The proposed power block and solar field would not impact waters of the State (AECOM2009g). However, construction of service utility lines and the electrical interconnection could impact waters of the State. To minimize these potential impacts, Condition of Certification **BIO-23** would ensure that appropriate BMPs, consistent with California Department of Fish and Game Streambed Alteration Agreement requirements, would be used during the construction and installation of the service utilities and electrical transmission interconnection.

Construction and operation activities can impact surface water quality by increasing sediment and storm water at the proposed PHPP. However, staff believes these impacts would be less than significant through the preparation and implementation of a DESCP and construction SWPPP as required by Conditions of Certification **SOIL&WATER-1** and **-2. SOIL&WATER-2** would require the construction SWPPP to be developed in accordance with requirements specified in the State Water Resources Control Board's National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities Order No. 2009-0009-DWG, NPDES No. CAS000002. Both the DESCP and SWPPP would contain requirements to implement, monitor, and maintain BMPs designed to minimize the potential for increased sediment or contaminants to be conveyed offsite. Hazardous materials would also be handled in accordance with applicable BMPs.

Groundwater quality in the AVGB would benefit from the PHPP. The PHPP would use recycled water instead of groundwater for plant construction and operation. Although the use of recycled water would remove a potential source of groundwater recharge from the AVGB, it would also remove a potential source of salt and nutrient loading to the groundwater. Past practices of land application and agricultural reuse of recycled water from the Palmdale WRP at application rates greater than could be utilized by crops or vegetation were determined by the RWQCB to contribute to a nitrate impact to the groundwater quality in the vicinity of the Palmdale WRP effluent reuse fields. The Palmdale and Lancaster WRPs are encouraging municipal and industrial use for the recycled water, such as supplying the proposed PHPP with construction and process water (COPA2008a). Staff believes the applicant's proposed use of recycled water would reduce the potential for adverse impacts to groundwater quality and may actually improve the quality of groundwater consistent with existing RWQCB orders.

As discussed in the LORS section below, Conditions of Certification **SOIL&WATER-3** and **-4** would require the project to comply with the requirements of California Code of Regulations Titles 17 and 22 during project construction and operation. Title 22 specifies the level of treated recycled water that can be used during project construction and operation. Title 17 specifies procedures to prevent backflow from non-potable water lines and cross connecting potable and non-potable water lines. These LORS would

ensure the recycled water supply would be delivered and managed on site so that public health and safety would be protected based on the quality of water provided.

Wastewater Management

Construction related wastewater would come from hydrostatic testing of the project piping and pressure vessels and from equipment washing. Improper handling or containment of construction wastewater could cause a broad dispersion of contaminants to soil or groundwater. The discharge of any non-hazardous wastewater during construction would be required to be in compliance with regulations for discharge. Equipment wash water would be transported to an appropriate treatment facility. Hydrostatic test water would be discharged either to District No. 20's sanitary sewer in accordance with the District's Wastewater Ordinance or at a water treatment facility. The water used in the test would be tertiary treated and would be analyzed by a state-certified laboratory to ensure compliance with appropriate LORS as recommended in Condition of Certification **SOIL&WATER-6**. This condition would also require the PHPP project to notify the Palmdale WRP prior to discharge into the sanitary sewer. Provided the PHPP project complies with District No. 20's Wastewater Ordinance, the Industrial Wastewater Surcharge Rate Ordinance, and Condition of Certification **SOIL&WATER-6**, staff concludes that the applicant's proposed management and disposal of wastewater during construction would not result in any significant impact.

During plant operations, process wastewater would be generated from the circulating water system blowdown, HRSG blowdown, CTG evaporative cooler blowdown, demineralization system wastewater, and chemical feed area and general plant drains. The blowdown water would be processed through the plant's proposed ZLD. Wastewater from the chemical feed area and general plant drains would be processed through an oil/water separator. Both systems would treat and reuse water, thereby minimizing water consumption and eliminating process wastewater discharge. Removal of salts and nutrients from the wastewater stream would help protect and improve the basin's groundwater quality. The ZLD would produce solids and the oil/water separator would produce oil and sludge. The ZLD solids and oil/sludge would be removed offsite to a recycling facility or landfill. No significant impact is expected to be associated with these two waste treatment systems. Staff proposes Condition of Certification **SOIL&WATER-7** to ensure appropriate management of the ZLD system and appropriate disposal of the solid residue generated by the ZLD system. To ensure that all wastewater that cannot be recycled and reused onsite will be tested, classified, transported, and disposed of in accordance with all applicable LORS, staff proposes Condition of Certification **SOIL&WATER-8**.

The sanitary wastes from sinks, toilets, and other sanitary facilities would be discharged to a sanitary sewer line connected to the Palmdale WRP (District No. 20). This water would be treated and made available as recycled tertiary water in the regional recycled water pipeline system. No significant impacts are expected to be associated with recycling of the sanitary wastewater. Staff proposes Condition of Certification **SOIL&WATER-9** to ensure that the sanitary waste system is installed and operated in accordance with Title 22 and the RWQCB requirements.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of reasonably foreseeable future projects (California Code of Regulations, Title 14, section 15130).

Construction and operation of the PHPP would result in both temporary and permanent changes to the soil and storm water drainage patterns at the PHPP site. Without the use of BMPs that would be incorporated into a final DESCP and construction SWPPP, these changes could incrementally increase local soil erosion and storm water runoff. However, as discussed above, these potential impacts would be prevented or reduced to a level of less than significant through the implementation of BMPs, a final DESCP, and construction SWPPP, and compliance with all applicable erosion and storm water management LORS. As identified in the **Land Use** Cumulative Impacts and Mitigation section of this FSA, four large projects within a three-mile radius of the proposed PHPP have been approved or are currently under construction. The existing development in the vicinity of the proposed PHPP consists of predominantly commercial and industrial facilities which would have undergone a similar approval process. These projects have the potential to increase local soil erosion and storm water runoff. However, these projects are also required to comply with all applicable erosion and storm water management LORS. Compliance with these LORS would ensure cumulative impacts would be prevented or reduced to a level of less than significant. With the implementation of **SOIL&WATER-1** and **-2**, staff believes the PHPP would not significantly contribute to the cumulative soil erosion and storm water impacts from other development within the vicinity of the proposed PHPP.

Construction and operation of the PHPP would require the use of up to 4,125 AF/y recycled water. Use of this recycled water would comply with existing regulations and policies and help remove existing nutrient and salt loading to the groundwater basin. The AVGB and groundwater users would benefit by the PHPPs proposed use of recycled water. Therefore, staff believes that there would be no significant cumulative impacts to the groundwater resources in the AVGB as a result of the PHPP.

COMPLIANCE WITH LORS AND POLICIES

SWRCB RESOLUTIONS 68-16, 75-58, 77-1, 2005-0006, 2009-0011, ENERGY COMMISSION'S 2003 INTEGRATED ENERGY POLICY REPORT, AND THE WARREN-ALQUIST ACT

California state policy supports the use of reclaimed water for industrial use. At the same time, the state's policies discourage the use freshwater (surface water) and groundwater for industrial purposes. The California Energy Commission, under legislative mandate specified in the *2003 Integrated Energy Policy Report (IEPR)*, would approve the use of fresh water for power plant cooling purposes only where alternative water supply sources and alternative cooling technologies are shown to be environmentally undesirable or economically unsound. SWRCB Resolution 75-78 states

that fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. The Warren-Alquist Act promotes all feasible means of water conservation (California Public Resources Code, Division 15, Section 25000 et seq.). SWRCB Resolution 77-1 promotes the use of reclaimed water for non-potable uses and to supplement existing surface and groundwater supplies. SWRCB Resolution 2005-0006 adopts the concept of sustainability as a core value for the SWRCB programs and directs its incorporation into all future policies, guidelines, and regulatory actions. SWRCB Resolution 2009-0011 promotes the use of reclaimed water as a means to achieve sustainable local water supplies and to reduce greenhouse gases. Consistent with these policies the proposed PHPP would use reclaimed water for its construction and operations water demand.

The proposed PHPP would further reduce its water demand and would eliminate discharge of plant process wastewater by the use of a ZLD system. Use of a ZLD system is consistent with the Energy Commission's 2003 IEPR, which specifies that ZLD technologies are required unless such technologies are shown to be environmentally undesirable or economically unsound. The proposed use of reclaimed water and a ZLD system would meet the goals of SWRCB Resolution 68-16 by eliminating industrial discharges and protecting against degradation of the surface and groundwaters of the state.

CLEAN WATER ACT, FISH AND GAME CODE SECTION 1600, AND SWRCB 2009-0009-DWQ

The Clean Water Act (CWA) (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which include regulations of storm water and wastewater discharge during construction and operation of a facility. California established its regulations to comply with the CWA under the Porter-Cologne Water Quality Control Act. The SWRCB regulates storm water discharges associated with construction of projects affecting areas greater than or equal to 1 acre. Under Order 2009-0009-DWQ, the SWRCB has issued a National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges associated with construction activity. Projects can qualify under this permit if specific criteria are met and an acceptable Storm Water Pollution Prevention Plan (SWPPP) is prepared and implemented after notifying the SWRCB with a Notice of Intent.

The PHPP would satisfy the requirements of the RWQCB and SWRCB 2009-0009-DWQ with the development of a DESCP in accordance with Condition of Certification **SOIL&WATER-1** and the development of a construction SWPPP in accordance with **SOIL&WATER-2**. An industrial SWPPP is not required for this project because there would be no offsite discharge of storm water from 100-year or less storm events that originated from the project site. In addition, all storm water from 100-year or less storm events entering the PHPP site from offsite sources would be retained on the PHPP site.

The CWA also establishes protection of wetlands through section 401 and protection of navigable waters of the U.S. from discharges of dredge and fill material through section 404. Navigable waters can include perennial and ephemeral drainages, streams, washes, ponds, pools, and wetlands. If a discharge would impact navigable waters,

then the impacts need to be quantified and mitigated. Section 401 is administered by the states, and in California, through the SWRCB/RWQCBs. The RWQCB maintains the quality of the State's water by protecting the function and value of its use. Section 404 is administered and enforced by the U.S. EPA and Army Corps of Engineers (ACOE). Individual permit decisions and jurisdiction determinations are made by the ACOE.

The ACOE stated in an April 2010 letter that all PHPP proposed discharges of dredged or fill material would occur outside the high water mark, which would be outside of the ACOE jurisdiction and, therefore, no section 404 permit would be required (ACOE2010). In addition, the project applicant indicated that all jurisdictional waters of the State would be avoided by the project or spanned by the proposed service utilities and generator transmission line. Condition of Certification **BIO-23** would require the PHPP to implement BMPs to protect jurisdictional waters of the State occurring along the service utilities and transmission line and ensure compliance with Fish and game Code Section 1600 Lake and Streambed Alteration Agreement requirements.

CALIFORNIA CODE OF REGULATIONS TITLE 17 AND 22, AND CALIFORNIA WATER CODE SECTION 13523

These California Code of Regulations (CCRs) and Water Code sections are to protect the public health, safety, and welfare. Section 13523 requires the RWQCB to prescribe water reclamation requirements for water that is or proposed to be used as reclaimed water. These requirements may be placed upon the person reclaiming the water and the user of the water. These requirements are to be developed by the RWQCB after consultation with and receipt of recommendations from California Department of Public Health (DPH) and any party who has requested in writing to be consulted. Through compliance with Conditions of Certification **SOIL&WATER-3** and **-4**, the DPH would review and comment on the Engineering Report and Cross Connection inspection results for the transmission and use of recycled water. During project construction, recycled water use and handling would be required to comply with the requirements specified in Title 22. All water used for project construction and operation would be treated to the levels necessary for the respective use. Also, backflow prevention and possible cross connections between potable and non-potable water lines would be required to comply with the requirements specified in Title 17.

CALIFORNIA WATER CODE SECTION 13550, 13551, 13552.6, 13552.8, AND 13575 ET SEQ. (WATER RECYCLING ACT)

These sections of the California Water Code require that the water resources of the State be put to the highest possible beneficial use and prohibit the use of potable domestic water for non-potable uses if recycled water is available. Within these sections, use of potable domestic water for industrial cooling towers is identified as a waste or unreasonable use of water if suitable recycled water is available. With the use of recycled water for PHPP construction and operation processes, the PHPP would be fully compliant with this section of the water code. Staff proposes Condition of Certification **SOIL&WATER-3** and **-4** to ensure that recycled water would be used for the PHPP construction and plant operation processes.

PUBLIC RESOURCES CODE SECTIONS 25300 THROUGH 25302

Through compliance with Conditions of Certification **SOIL&WATER-3** and **-4**, information required by staff to conduct assessments and forecasts of potable and industrial water consumption by PHPPs is achieved.

ORDINANCE OF THE COUNTY OF LOS ANGELES SANITATION DISTRICTS NO. 14 AND 20

These ordinances of the LACSDs establish requirements for sewer line connections and discharges to the sewer system. Conditions of Certification **SOIL&WATER-8** would require the project to comply with these ordinances.

ORDINANCES OF THE COUNTY OF LOS ANGELS AND CITY OF PALMDALE

Los Angeles County ordinances specify requirements for storm water management, protection of domestic water supplies, and sewage and industrial waste disposal systems. City of Palmdale ordinances also specify requirements for storm water management and also include grading requirements. Through Conditions of Certification **SOIL&WATER-1** and **-2** the project would comply with the storm water and grading requirements. Compliance with Conditions of Certification **SOIL&WATER-3** and **-4** would ensure protection of domestic water supplies. Condition of Certification **SOIL&WATER-9** would require the project to comply with the sewage and industrial waste disposal requirements.

NOTEWORTHY PUBLIC BENEFITS

Staff has not identified any noteworthy public benefits of the PHPP that are associated with soil and water resources.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Agency and public comments were received relating to soil and water resources and have been incorporated into this FSA section. A summary of these comments and staff's response is presented below.

City of Lancaster
September 5, 2008

Comment: Before the Energy Commission received the Application for Certification for the PHPP, the City of Lancaster had presented a letter to the Energy Commission that described several concerns the city had related to the proposed PHPP's water use. These questions include identifying the source of construction and operation backup water; source of potable water during project operation; and evaluation of alternative water supplies and cooling technologies.

> Response: All of the City's questions were addressed either by the applicant in the AFC or in Data Requests made by the Energy Commission. The applicant's

responses to those requests have been incorporated into this FSA. The source of the construction water would come from the Palmdale WRP as secondary-23 recycled water. The Los Angeles County Waterworks would supply water for plant operations. Waterworks has entered into a supply contract with the Lancaster and Palmdale WRPs for the purchase of 13,500 AF/y of tertiary-treated water to be supplied by a regional recycled water supply pipeline currently under construction. Waterworks would also supply the plant with potable water from their District No. 40 distribution system. The project's proposed water supply is further discussed in the Water Supply section of this FSA. While alterative water supplies or cooling technologies may be available, the applicants proposed use of recycled water will assist in cleanup and abatement of salt and nutrient impacts to the groundwater basin in accordance with orders issued by the RWQCB (RWQCB2002; RWQCB2003a). Use of recycled water is also consistent with the requirements of California Water Code section 13550, and SWRCB Resolution 75-58, the Energy Commission's 2003 IEPR, and the Warren-Alquist Act (Public Resources Code, Section 25000 et seq.).

Antelope Valley United Municipal Group (AVUMG)
March 9, 2010

Comment: The AVUMG is a group composed of fifteen mutual water companies in the Antelope Valley. The AVUMG stated the PSA did not adequately discuss the relation of recycled water in the context of ongoing litigation of the groundwater supplies in the basin.

Response: Staff has addressed this comment in the operations Water Supply section above.

- Water Code sections 1210, 1211, and 1212 apply to the wastewater received and discharged by the Palmdale and Lancaster WRPs. Water Code section 1210 states that wastewater treatment plants have the right to all water delivered to their treatment facility and the responsibility to maintain downgradient, instream beneficial uses that are dependent on the flow of treated wastewater. The Palmdale WRP discharges all of its water to reuse fields (orchards, an ornamental tree nursery, and fodder and fiber crops) and historically to evaporation/percolation ponds which resulted in nitrate impacts to the groundwater quality. The Lancaster WRP discharges its water to the Apollo Lakes Regional County Park, Nebeker Ranch, unlined reservoirs, and Amargosa Creek/Piute Ponds. However, none of these commitments are specifically intended for the recharge of groundwater in the AVGB.
- Past land application practices by the Palmdale WRP resulted in nitrate impacts to the groundwater quality. The Lahontan RWQCB issued WDRs, followed by a Cleanup and Abatement Order and a Cease and Desist Order to protect the groundwater quality. WDRs have also been issued for the Lancaster WRP. The reuse of wastewater by municipal and industrial users would help to reduce the potential for adverse impacts to the groundwater by salts and nutrients contained in the wastewater.

- To remain in compliance with the RWQCB requirements and comply with the statewide policies to put recycled water to beneficial use, the Lancaster and Palmdale WRPs seek municipal and industrial users of their recycled wastewater. Water reclamation plans were developed by both the Palmdale and Lancaster WRPs to address means to accommodate increasing wastewater flows and seasonal fluctuations in demand. In addition, a multi-party commitment has been made to develop infrastructure that would allow access by municipal and industrial users to this wastewater. This infrastructure includes SWRCB funding, tertiary wastewater treatment upgrades, and construction of a regional distribution system as part of a 2005 Integrated Regional Water Management Plan.
- Staff believes that the PHPP's proposed use of a ZLD system and recycled water purchased from Waterworks is beneficial to the quality of groundwater in the AVGB and is consistent with state law and policy.

Antelope Valley Groundwater Agreement Association (AGWA)
March 8, 2010

Comment: The AGWA submitted a comment letter which is an exact copy of the letter from the AVUMG, except that the AGWA letter is missing an attachment that was part of the AVUMG letter.

Response: Please refer to the AVUMG comment response above.

County Sanitation Districts of Los Angeles County (LACSD)
March 12, 2010

Comment: The LACSD submitted comments correcting and clarifying information in the Preliminary Staff Assessment that related to the Palmdale and Lancaster WRPs.

Response: The corrections and clarifying information submitted by the LACSD have been incorporated into this FSA.

CONCLUSIONS

Based on the assessment of the proposed PHPP project, Energy Commission staff finds that:

- Implementation of BMPs during construction and operation in accordance with a construction SWPPP and DESCP required pursuant to Conditions of Certification **SOIL&WATER-1** and **-2** would avoid potential adverse erosion and flood impacts to onsite structures, adjacent properties, and water quality. During operation of the project, there would be no offsite discharge from storm events of 100-years or less.
- The use of recycled water for construction would be in compliance with state water use policy and would have no adverse environmental impact provided the requirements of Conditions of Certification **SOIL&WATER-3** and **-6** are met.
- The use of recycled water for operation processes and potable water for PHPP operation drinking water and sanitation would be in compliance with state water use

policy and would have no adverse environmental impact provided the requirements of Condition of Certification **SOIL&WATER-4** are met.

- The proposed powerblock and solar field would not impact waters of the State or U.S. The service utilities and the transmission line would not impact waters of the U.S., but could temporarily impact waters of the State. Potential impacts to these waters would be avoided by spanning and prohibiting construction and implementing BMPs as recommended by Condition of Certification **BIO-23**.
- The use of a ZLD system to treat and reuse operational process wastewater would avoid potential wastewater discharge impacts to water quality provided the requirements of Condition of Certification **SOIL&WATER-7** are met, and would be consistent with the policies set forth in the Energy Commission's 2003 IEPR.
- The discharge of sanitary wastewater to the LACSD sewer system would ensure appropriate treatment and disposal of sanitary wastes and would be in compliance with applicable federal, state, and LORS and would have no adverse environmental impact provided the requirements of Condition of Certification **SOIL&WATER-9** are met.
- The proposed project would comply with all applicable federal, state, and local LORS with the adoption of the recommended conditions of certification.
- Construction and operation of PHPP would not result in project-specific or cumulative significant impacts to soil or water resources with the adoption of the recommended conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

DRAINAGE EROSION AND SEDIMENTATION CONTROL PLAN

SOIL & WATER-1: Prior to site mobilization, the Palmdale Hybrid Power Project (PHPP) owner shall obtain the Compliance Project Manager's (CPM's) approval for a site specific DESCP that ensures protection of water quality and soil resources of the PHPP site and all linear facilities for both the construction and operation phases of the PHPP. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, and identify all monitoring and maintenance activities. The PHPP owner shall complete all necessary engineering plans, reports, and documents necessary for the CPM to conduct a review of the PHPP and provide a written evaluation as to whether the proposed grading, drainage improvements, and flood management activities comply with all requirements presented herein. The plan shall be consistent with the grading and drainage plan condition of certification in the **Facility Design** section of this Final Staff Assessment and shall contain the following elements:

Vicinity Map: A map shall be provided indicating the location of all PHPP elements (including service utilities and the generator transmission line) with depictions of all significant geographic features to include

watercourses, washes, irrigation and drainage canals, major utilities, and sensitive areas.

Site Delineation: The site and all PHPP elements (including service utilities and the generator transmission line) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, underground utilities, roads, and drainage facilities. Adjacent property owners shall be identified on the vicinity map. All maps shall be presented at a legible scale

Drainage: The DESCP shall include the following elements:

a. Topography. Topography for offsite areas are required to define the existing upstream tributary areas to the site and downstream to provide enough definition to map the existing storm water flow and flood hazard. Spot elevations shall be required where relatively flat conditions exist.

b. Proposed Grade. Proposed grade contours shall be shown at a scale appropriate for delineation of onsite ephemeral washes, drainage ditches, and tie-ins to the existing topography.

c. Hydrology. Existing and proposed hydrologic calculations for onsite areas and offsite areas that drain to the site; include maps showing the drainage area boundaries and sizes in acres, topography and typical overland flow directions, and show all existing, interim, and proposed drainage infrastructure and their intended direction of flow.

d. Hydraulics. Provide hydraulic calculations to support the selection and sizing of the onsite drainage network, diversion facilities and Best Management Practices (BMPs).

Watercourses and Critical Areas: The DESCP shall show the location of all onsite and nearby watercourses including washes, irrigation and drainage canals, and drainage ditches, and shall indicate the proximity of those features to the construction site. Maps shall identify high hazard flood prone areas.

Clearing and Grading: The plan shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross-sections, cut/fill depths or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography tying in proposed contours with existing topography shall be illustrated. The DESCP shall include a statement of the quantities of material excavated at the site, whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there would be no clearing and/or grading conducted for each element of the PHPP. Areas of no disturbance shall be properly identified and delineated on the plan maps.

Soil Wind and Water Erosion Control: The plan shall address exposed soil treatments to be used during construction and operation of the PHPP 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 PHPP 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 the CPM prior to use.

Project Schedule: The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, PHPP element construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each PHPP element for each phase of construction.

Best Management Practices: The DESCP shall show the location, timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during PHPP element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule shall include post-construction maintenance of treatment-control BMPs applied to disturbed areas following construction.

Erosion Control Drawings: The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion-control specialist.

Agency Comments: The DESCP shall include copies of recommendations, conditions, and provisions from the County of Los Angeles, California Department of Fish and Game (CDFG), and Lahontan Regional Water Quality Control Board (RWQCB).

Monitoring Plan: Monitoring activities shall include routine measurement of the volume of accumulated sediment in the onsite drainage ditches, and storm water diversions.

Verification: The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**, and shall be approved by the chief building official (CBO) and Compliance Project Manager (CPM). In addition, the PHPP owner shall do all of the following:

a. No later than sixty (60) days prior to start of site mobilization, the PHPP owner shall submit a copy of the DESCP to the City of Palmdale, County of Los Angeles, and the RWQCB for review and comment. The CBO and CPM shall consider the comments received from the City of Palmdale, County of Los Angeles, and RWQCB in their approval of the DESCP.

b. During construction, the PHPP owner shall provide a monthly compliance report on the effectiveness of the drainage, erosion, and sediment control measures and the results of monitoring and maintenance activities. Reporting the effectiveness shall include a table listing: (1) each drainage, erosion, and sediment control measure; (2) the monitoring frequency of the drainage, erosion, and sediment control measure; and (3) the maintenance performed, if any, to that measure during the monthly reporting period.

c. Once operational, the PHPP owner shall provide in the annual compliance report information on the results of storm water BMP monitoring and maintenance activities.

d. Provide the CPM with two (2) copies each of all monitoring or other reports required for compliance with Los Angeles County, CDFG, and RWQCB.

CONSTRUCTION – STORM WATER POLLUTION PREVENTION PLAN

SOIL&WATER-2: The project owner shall fulfill the requirements contained in State Water Resources Control Board's *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities Order No. 2009-0009-DWG, NPDES No. CAS000002* and all subsequent revisions and amendments. The project owner shall develop and implement a construction Storm Water Pollution Prevention Plan (SWPPP) for the construction of the project.

Verification: Thirty (30) days prior to site mobilization, the project owner shall submit the construction SWPPP to the CBO and CPM for approval. A copy of the approved construction SWPPP shall be kept accessible onsite at all times.

WATER SUPPLY – CONSTRUCTION WATER

SOIL&WATER-3: The PHPP's proposed use of secondary-treated water during construction for dust control, and soil compaction shall be secondary-23 recycled water from the Palmdale Water Reclamation Plant (District No. 20) and shall meet the requirements of CCR Title 22, Division 4, Chapter 3 and Title 17, Division 1, Chapter 5. Hydrostatic test water shall be disinfected tertiary treated recycled water from District No. 20 and shall also meet the requirements of CCR Title 22, Division 4, Chapter 3 and Title 17, Division 1, Chapter 5. The project owner shall provide the CPM two (2) copies of the executed agreement between the applicant and the County of Los Angeles Sanitation District No. 20 for the supply of recycled water for PHPP construction. This agreement shall specify all terms and costs for the receipt and use of recycled water by the PHPP. The PHPP shall not use recycled water from District No. 20 for PHPP construction until this agreement is executed.

Verification: No later than sixty (60) days prior to construction, the PHPP owner shall submit two (2) copies of the executed agreement for the supply and onsite use of secondary-23 and tertiary recycled water from District No. 20 for PHPP construction. If construction water is provided by a pipeline connected to the Palmdale WRP, then the PHPP owner shall submit to the CPM two (2) copies of the Engineering Report and

Cross Connection inspection report and include all comments from the Lahontan RWQCB and the California Department of Public Health (DPH) prior to the delivery of recycled water from District No. 20.

WATER SUPPLY – OPERATION WATER

SOIL&WATER-4: The project's use of water for PHPP operations shall be tertiary-treated water from the Los Angeles County Waterworks regional supply and shall comply with CCR Title 22, Division 4, Chapter 3 and Title 17, Division 1, Chapter 5.

Verification: No later than sixty (60) days prior to operation, the PHPP owner shall submit the Engineering Report and Cross Connection inspection report to the Lahontan RWQCB, California DPH, and CBO. The PHPP owner shall submit to the CPM two (2) copies of the Engineering Report and Cross Connection inspection report and include all comments from the Lahontan RWQCB and California DPH prior to the delivery of recycled water from the Waterworks.

WATER METERING

SOIL&WATER-5: Prior to the use of potable or recycled water for construction and operation of the PHPP, the project owner shall install and maintain metering devices as part of the water supply and distribution system to monitor and record the volume of potable and recycled water supplied to the PHPP. The metering devices shall be operational for the life of the project.

A semi-annual summary of the PHPP construction daily maximum, monthly average, monthly total, and annual total water use, differentiating between potable and recycled water, shall be submitted to the CPM in the annual compliance report. An annual summary of the PHPP operation daily maximum, monthly average, monthly total, and annual total water use, differentiating between potable and recycled water, shall be submitted to the CPM in the annual compliance report.

The daily and monthly water use shall be reported in gallons per day, and the semi-annual and annual water use shall be reported in acre-feet per year. For calculating the total water use, the term "year" would correspond to the date established for the annual compliance report submittal.

Verification:

1. At least sixty (60) days prior to use of any water source for PHPP construction and operation, the PHPP owner shall submit to the CPM evidence that metering devices have been installed and are operational on the potable and recycled pipelines serving the PHPP construction and operation. The PHPP owner shall provide a report on the servicing, testing, and calibration of the metering devices in the annual compliance report.

2. Beginning six (6) months after the start of construction, the PHPP owner shall prepare a semi-annual summary of the daily maximum, monthly average, monthly total, and annual total amount of water used for construction purposes.

3. Annually, the PHPP owner shall prepare a summary of the daily maximum, monthly average, monthly total, and annual total water use.

HYDROSTATIC TEST WATER DISCHARGE REQUIREMENTS

SOIL&WATER-6: The PHPP owner shall discharge all hydrostatic test water in accordance with the Palmdale NPDES permit. The project owner shall comply with the Sanitation Districts of Los Angeles County (LACSD) Wastewater Ordinance requirements for appropriate management of these discharges.

Verification: Prior to the discharge of hydrostatic test water into the LACSD sewer system, the project owner shall do all of the following:

1. Analyze both carbon and non-carbon steel piping test water in accordance with LACSD specified analyses prior to discharge or disposal of the test water;

2. Submit those analyses together with a tabulated summary of the analytical results and corresponding acceptable limits to the CPM for review and the LACSD for approval and a copy to the CBO. If discharge to the sewer system is approved by the LACSD, include a copy of the approval letter in the annual compliance report.

3. If discharge of either the carbon or non-carbon steel piping test water to the sewer system is not approved by the LACSD, then submit a copy of the disposal receipt issued by a water treatment plant in the annual compliance report.

ZERO LIQUID DISCHARGE SYSTEM REQUIREMENTS

SOIL&WATER-7: The PHPP owner shall treat all process wastewater streams with a zero liquid discharge (ZLD) system. The PHPP owner shall operate the ZLD system in accordance with a ZLD management plan approved by the CPM. The ZLD management plan shall include the following elements:

a. A flow diagram showing all water sources and wastewater disposal methods at the PHPP;

b. A narrative of expected operation and maintenance of the ZLD system;

c. A narrative of the redundant or back-up wastewater disposal method to be implemented during periods of ZLD system shutdown or maintenance;

d. A maintenance schedule;

e. A description of on-site storage facilities and containment measures;

f. A table identifying influent water quality; and

g. A table characterizing the constituent concentrations of the solid waste or brine and specifying the permit limits of the selected landfill.

The PHPP operation and wastewater production shall not exceed the treatment capacity of the ZLD system or result in an industrial wastewater discharge.

Verification: At least sixty (60) days prior to the start of commercial operation, the PHPP owner shall submit to the CPM evidence that the final design of the ZLD system has the approval of the CBO. At least sixty (60) days prior to the start of commercial operation, the PHPP owner shall prepare a ZLD management plan for review and approval by the CPM. The ZLD management plan shall be updated by the PHPP owner and submitted to the CPM for review and approval if a change in water source or infrastructure is needed.

In the annual compliance report, the PHPP owner shall submit a status report on operation of the ZLD system, including dates and length of disruptions, maintenance activities performed, and volumes of interim wastewater streams stored onsite. The annual compliance report shall contain an evaluation of whether the ZLD is being operated within the parameters described in the ZLD management plan. The ZLD management plan shall be updated by the PHPP owner if the CPM has determined it is necessary based on information presented in the Annual Compliance Report.

WASTEWATER COLLECTION SYSTEM REQUIREMENTS

SOIL&WATER-8: The PHPP owner shall recycle and reuse all process wastewater streams to the extent practicable. Prior to transport and disposal of any facility operation wastewaters that are not suitable for treatment and reuse onsite, the PHPP owner shall test and classify the stored wastewater to determine proper management and disposal requirements. The PHPP owner shall ensure that the wastewater is transported and disposed of in accordance with the wastewater's characteristics and classification and all applicable LORS (including any CCR Title 22 Hazardous Waste and Title 23 Waste Discharges to Land requirements).

Verification: In the annual compliance report, the PHPP owner shall provide the CPM with a report of test results of any wastewater that is not suitable for treatment and reuse onsite, the classification of this wastewater, and documentation of the proper management and disposal of this wastewater, including but not limited to non-hazardous and hazardous waste manifest.

SEWER SERVICE CONNECTION

SOIL&WATER-9: Prior to commercial operation, the project owner shall provide the CPM and the County of Los Angeles Sanitation District No. 20 (Palmdale WRP) all information and documentation required to satisfy LACSD No. 20 Wastewater Ordinance, Master Ordinance and Rate and Mean Loadings Ordinance for the discharge of sanitary wastewater into the LACSD No. 20 sewer system. During operation, any monitoring reports provided to LACSD No. 20 shall also be provided to the CPM. The CPM shall be notified of any violations of discharge limits or amounts.

Verification: At least sixty (60) days prior to commercial operation, the project owner shall submit the information and documentation required to satisfy LACSD No. 20 Wastewater Ordinance, Master Ordinance and Rate and Mean Loadings Ordinance for review and comment, and to the CPM and the CBO for review and approval.

During PHPP operation, the project owner shall submit any wastewater quality monitoring reports required by LACSD No. 20 to the CPM in the annual compliance report. The project owner shall submit any notice of violations from LACSD No. 20 to the CPM within ten (10) days of receipt and fully explain the corrective actions taken in the annual compliance report.

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APPENDIX A

Acronyms Used in the Soil and Water Resources Section

amsl	above mean sea level	gpd/ft	gallons per day per foot
AF	acre-feet	gpm	gallons per minute
AF/y	acre-feet per year	IEPR	Integrated Energy Policy Report
AVGB	Antelope Valley Groundwater Basin	LACSD	Sanitation Districts of Los Angeles County
bgs	below ground surface	LORS	laws, ordinances, regulations, and standards
BMP	best management practices	MCL	maximum contaminant level
CEQA	California Environmental Quality Act	mg/l	milligrams per liter
cfs	cubic feet per second	MW	megawatt
CPM	Compliance Project Manager	NPDES	National Pollutant Discharge Elimination System
DESCP	Drainage, Erosion, and Sediment Control Plan	PHPP	Palmdale Hybrid Power Project
DPH	Department of Public Health	RCRA	Resource Conservation and Recovery Act
DTSC	Department of Toxic Substances Control	REC	recognized environmental condition
DWR	Department of Water Resources	ROC	Record of Conversation
ESA	Environmental Site Assessment	RWQCB	Regional Water Quality Control Board
FEMA	Federal Emergency Management Agency	SWPPP	Storm Water Pollution Prevention Plan
ft/day	feet per day	SWRCB	State Water Resources Control Board
fps	feet per second	TDS	total dissolved solids
FSA	Final Staff Assessment	µS/cm	microsiemens per centimeter
ft/ft	feet per foot	USCS	Unified Soil Classification System
ft/yr	feet per year	WRP	wastewater reclamation plant
gpd	gallons per day	ZLD	zero liquid discharge

TRAFFIC AND TRANSPORTATION

Testimony of James Adams, Marie McLean, and Greg Irvin

SUMMARY OF CONCLUSIONS

The Palmdale Hybrid Power Project (PHPP or project) would be consistent with the Circulation Elements in the cities of Palmdale and Lancaster General Plans and all other applicable laws, ordinances, regulations, and standards (LORS) related to traffic and transportation. However, staff has not reviewed a Federal Aviation Administration (FAA) consistency determination (No Hazard to Navigable Air Space) regarding the potential impact of some of the transmission towers, ten cell cooling tower, clarified water storage tank, crystallizer, and construction crane on aircraft operations at the U.S. Air Force Plant 42. However, since the FAA has determined that two of the tallest structures (145 feet tall HRSGS) would not be a hazard to navigable airspace, it is very likely that similar determinations would be issued for the other project structures noted above. It is staff's opinion that these structures would bot be a hazard to air navigation given the elevation of the Plant 42 traffic pattern (1,500 feet above ground level (AGG)), and with staff's proposed Condition of Certification **TRANS-2** the project would comply with Code of Federal Regulations Part 77.

During the construction and operation phases of the PHPP, local roadway and highway activity resulting from the daily movement of workers and materials would not increase beyond significance thresholds established by the cities of Palmdale and Lancaster. Construction and operational impacts on the local and regional road/highway network related to the project would be reduced to less than significant with the implementation of staff's proposed Conditions of Certification **TRANS-1** through **TRANS-9**.

INTRODUCTION

The **Traffic and Transportation** section addresses the extent to which the PHPP may affect the transportation system within the vicinity of the project site. This analysis focuses on whether construction and operation of the PHPP would cause traffic and transportation impact(s) under CEQA and whether the project complies with the applicable laws, ordinances, regulations and standards (LORS).

The traffic and transportation analysis considers existing transportation related conditions as the basis for determining potential future impacts induced by the proposed project. This analysis is organized by: a) presenting and determining compliance with applicable traffic and transportation LORS, b) assessing the transportation systems and, c) measuring the significance of project induced traffic and transportation effects consistent with the California Environmental Quality Act (CEQA), Guidelines Appendix G, Environmental Checklist[1].

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

[1] California Code of Regulations, Title 14, § 15063

Federal, state and local traffic transportation LORS applicable to the project are contained in Traffic and Transportation Table 1. A description of the project's compliance with applicable LORS are contained in Traffic and Transportation Table 6.

TRAFFIC AND TRANSPORTATION Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
Code of Federal Regulations (CFR) Title 14, Chapter 1, Part 77	Includes standards for determining obstructions in navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alteration. Also, provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace.
Title 49, Subtitle B	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures), and provides safety measures for motor carriers and motor vehicles who operate on public highways.
State	
California Vehicle Code, Division 2, Chapter. 2.5, Div. 6, Chap. 7, Div. 13, Chap. 5, Div. 14.1, Chap. 1 & 2, Div. 14.8, Div. 15 California Streets and Highway Code, Division 1 & 2, Chapter 3 & Chapter 5.5	Includes regulations pertaining to licensing, size, weight and load of vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials. Includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits.
Local	
City of Palmdale General Plan Circulation Element	Includes goals, policies, and implementation measures that will balance traffic patterns with land uses to minimize existing road congestions while expanding the circulation network to serve the City's future growth areas. In addition, includes standards to govern the design of various roadways in the community, and identifies the location where improvements to existing roadways should be programmed as well as indicating the general location of rights-of-way for future roads.
City of Lancaster General Plan 2030 Plan for Physical Mobility	This section of the General Plan presents the City's existing traffic and transportation condition and plans for the anticipated impact associated with growth. It also establishes goals, objectives and policies pertaining to streets and highways, parking facilities, alternative transportation modes, commodity movement and air transportation.

SETTING

The PHPP site is located within the city of Palmdale and in the Antelope Valley region of Southern California. Surrounding land uses include United States Air Force Plant 42, vacant land and other industrial uses. **Traffic and Transportation Figures 1** and **2** illustrate important aspects of the regional and local transportation system.
The transportation system within the proposed project's affected environment includes; existing and planned regional and local roads, routes and traffic patterns, railways, public transportation operations, school bus routes, bikeways and pedestrian pathways, airport flight traffic patterns and flight zones, transmission lines, pipelines and waterways.

The site proposed for the PHPP is readily accessible via the Antelope Valley Freeway

(State Route 14 or SR-14). PHPP would be approximately 1 mile east of the Antelope Valley Freeway along Avenue M (Columbia Way). Other regional and local roadways serving the site include State Routes (SR) 138 and 58, East Avenue M, and Sierra Highway. Avenue M provides access to the project site. The centerline for Avenue M, near the project, provides the boundary between the cities of Palmdale and Lancaster. Both jurisdictions are responsible for maintaining or improving their half of Avenue M and traffic signalization.

CRITICAL ROADS AND FREEWAYS

The regional roadway network is comprised of state and local roads. There are no interstate highways within the proposed project's vicinity. Regional access to the PHPP site would most likely occur via the Antelope Freeway (SR-14) then east on Avenue M. Antelope Valley Freeway is the primary north-south regional roadway corridor. SR-138, approximately four miles south of the proposed project site, and SR-58, approximately 25 miles north of the proposed project site, are the primary east-west regional roadway corridors. Sierra Highway, formerly the primary north-south regional serving roadway remains an important transportation corridor serving the Antelope Valley and is maintained by the city of Palmdale (within the city limits). Avenue M, a.k.a. Columbia Way, is the primary and most immediate connection to the proposed project site from the SR-14 and Sierra Highway.

PHPP's affected roadway environment includes the area in which equipment, materials and labor travel occurs for the project's construction, operation and maintenance. Due to the temporary nature of power plant construction, it is anticipated that workers will commute from distances of up to two hours or more from a power plant project. Material and equipment transport for the project's construction, operation and maintenance can also affect these roadways.

Palmdale's roadway system consists of a wide range of traffic corridors designed to serve two basic functions, mobility and land access. Mobility means providing the ability for traffic to travel between the origin and destination. Land access includes parking, storage or driveways. The city of Palmdale and city of Lancaster General Plans contain transportation policy elements that provide typical definitions for the following types of facilities:

- **Freeway**: Mobility with very limited access
- **Expressway**: Mobility with more frequent access to arterial streets than a freeway, but no direct land access.
- **Arterial**: Mobility with access to collectors, some local streets and major traffic corridors.
- **Collector**: Connects local streets with arterials and also provides access to adjacent land uses; thus balancing mobility with access.
- **Local**: Provides access to adjacent land uses and collector roads.

For example, SR-14 is a freeway and Avenue M and Sierra Highway are arterials within the proposed project's vicinity.

Existing Roadway Function and Conditions

Antelope Valley Freeway (SR-14)

SR-14 is a north-south six-lane freeway located approximately one mile west of the subject site. According to the Palmdale's Speed Limits Map, SR-14's posted speed limit is 65 miles per hour (mph). It is the primary route serving northern Los Angeles County and, if traveling south, extends from US Highway 395 near Inyo Kern in Kern County to Interstate-(I-5) at Newhall Pass. Similar to Interstate-5 and SR-99, SR-14 links northern California with Los Angeles with SR-14 serving the eastern side of the Sierra Nevada Mountains.

A large segment of SR-14 traffic consists of commuters traveling between the Antelope Valley and Los Angeles. Many trucks travel along this route because SR-14 provides a direct link to other important commerce routes, commerce centers and military bases. SR-14 becomes limited in its capacity through Palmdale because the high occupancy vehicle lane south of Palmdale ends and interchanges are more closely spaced. Passenger car and truck conflicts intensify in this area. Recreational travelers make up another significant segment of vehicles traversing along SR-14. Weekend travelers use SR-14 to access destinations such as Mount Whitney and Mammoth Mountain. SR-14 becomes extremely congested on weekends and holidays, usually on Friday evenings and Sunday nights.

PHPP AFC Table 5.13-6, shows the volume of traffic on SR-14 is 60% (north of Avenue L) and 75% (south of Avenue M) of capacity within the vicinity of the proposed project. Traffic volume capacity is divided by each direction, meaning that the one way capacity is half of 132,000 vehicles or 66,000. Average Daily Traffic (ADT) and AM and PM peak hour volume Level of Service (LOS) for SR-14 are not discussed in the AFC. Caltrans data shows that at post mile 59.80 (SR-14 near Palmdale Blvd.)[2] AM peak hour volume in May 2007 was 3,281 or 51% of the peak direction capacity and 65% during PM peak hour[3]. The PHPP AFC Table 5.13-6 shows truck traffic accounting for 9.2% of the ADT volume or 7,268 (north of Ave. L) and 9,108 (south of Ave. L) trucks per day on average.

Avenue M

Avenue M is a major arterial that forms a boundary between the cities of Palmdale and Lancaster and is the primary access to the proposed project site. It is an east-west oriented 4-lane regional roadway. The speed limit for Avenue M is 55 mph between SR-14 and 10th Street West, increases to 60 mph between 10th Street West and 10th Street East and then increases to 65 mph east of 10th Avenue East. Avenue M is part of a larger grid system that is employed throughout the Antelope Valley. The east-east running arterials are spaced at approximate one mile intervals. Avenue L is located approximately one mile north and Avenue N is located approximately one mile south of Avenue M. Avenue M's primary purpose is to move vehicles and goods from the Antelope Valley Freeway to points east and west and provides direct access from SR-14 and the U.S. Air Force Plant 42. Avenue M is a City designated truck route (refer to **Traffic and Transportation Figure 2** for truck routes).

[2] http://www.dot.ca.gov/dist07/maps/pdf/D7_base_postmile.pdf

[3] http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2007kndfactors.PDF

PHPP AFC Table 5.13-6, shows the volume of traffic on Avenue M, east of SR-14 to Sierra Highway, is approximately 61% of capacity, between Sierra Highway and 10th Street West 58% of capacity and between 10 Street West to 20th Street West 39% of capacity. Without the project (PHPP AFC Table 5.13-6), Avenue M's projected 2011 volumes for the segments described above are 78%, 74% and 50% of capacity, respectively. Using the 2011 no project conditions scenario data, the ADT is expected to increase by approximately 28% for all the segments described above.

Sierra Highway

Sierra Highway is a 4-lane, 65 mph regional arterial providing a localized travel route between industrial centers, businesses along Sierra Highway and residential neighborhoods in the cities of Palmdale and Lancaster. It also provides an alternative route between SR-138 from the east through Palmdale to the proposed project site. Sierra Highway is a City designated truck route.

PHPP AFC Table 5.13-6, shows the volume of traffic on Sierra Highway. According to the City of Palmdale Traffic Volume Map 2008[4], Sierra Highway north of Avenue N has an ADT of 25,000 and south of Avenue N an ADT of 31,000. The Palmdale General Plan Circulation Element Table C-5 shows Sierra Highway between Avenue M and Avenue P at LOS F in 1993. In 1993, Sierra Highway had an ADT capacity of 30,000. The current volume to capacity ratio (v/c) is over 1.0 for Sierra Highway south of Avenue N.

Traffic and Transportation Table 2 summarizes the most recently available data characteristics of the roadway segments studied for the proposed PHPP project, plus Sierra highway.

Level of Service

It is standard practice to assess traffic in terms of Level of Service (LOS). LOS is a qualitative measure describing operational conditions within a traffic stream. LOS is a term used to describe and quantify the congestion level on a particular roadway or intersection, and generally describes these conditions in terms of such factors as speed, travel time, and delay. The Caltrans *Highway Capacity Manual* (HCM)[5] defines six levels of service for roadways or intersections ranging from LOS A representing the best operating conditions and LOS F the worst. According to the Palmdale's General Plan Circulation Element, LOS C is the lowest (level of congestion) acceptable LOS roadway but a LOS D may be acceptable for a short duration during peak periods.
To quantify the existing baseline traffic conditions, the study area intersections were analyzed in the AFC to determine their operating conditions. Based on the traffic volumes, the turning movement counts, and the existing number of lanes at each intersection, the volume/capacity (V/C) ratios and levels of service (LOS) have been determined for each intersection.

[4] http://www.cityofpalmdale.org/departments/traffic/maps/08-21-2008_GIS_00011-33_TrafficVolumeMap.pdf

[5] National Research Council, Highway Capacity Manual, Third Edition, 2000.

Traffic and Transportation Table 2
Existing and 2011 No Project Roadway Segment Characteristics

Roadway Segment	Roadway Classification / Lanes	ADT[1] Volume	Percent of Capacity	Number of Trucks	2011 Est. ADT	Percent of Capacity	2011 Est. Trucks
SR-14 South of Ave M	Arterial/6	99,000	75%	9108	126,675	96%	11,654
Ave M Sr-14 to Sierra Hwy	Arterial/4	21,800	61%	NA	27,900	78%	NA
Ave M Sierra Hwy. to 10th W	Arterial/4	20,750	58%	NA	26,500	74%	NA
Ave M 10th St. W to 20th St W	Arterial/4	14,010	39%	NA	17,950	50%	NA
Sierra Hwy North of Avenue N	Arterial/4	25,000	83%	NA	NA	NA	NA
Sierra Hwy South of Ave N	Arterial/4	31,000	103%	NA	NA	NA	NA

1 ADT = Average Daily Traffic

Source: Adapted from PHPP 2008a, Table 5.13-6, pg. 5.13-9

Existing Intersection Function and Conditions

Traffic and Transportation Table 3 summarizes the results of the existing morning and afternoon peak-hour LOS analysis for the study area intersections. As shown, two area intersections operate at an acceptable LOS (LOS C or better) during the morning and afternoon peak hours. **Table 3** also summarizes the results of the 2011 No project conditions morning and afternoon peak-hour LOS analysis for the study area intersections. As shown, three intersections would operate at an acceptable LOS (LOS C or better) during the morning peak and one intersection during afternoon peak hours.

Traffic and Transportation Table 3
Intersection Level of Service Summary

Intersection	Direction	AM Peak Hour		PM Peak Hour	
		Existing	2011 No Project	Existing	2011 No Project
SR-14 SB/ E. Ave. M	East/ North	E	F	F	F
SR-14 SB/ E. Ave. M	West/ South	B	B	F	F
SR-14 NB/ E. Ave. M	West/ South	E	F	F	F
SR-14 NB/ E. Ave. M	East/ North	D	F	C	C
Sierra Highway/ E. Ave. M	East/ West	D	D	D	D

Source: Adapted from PHPP 2008a, Table 5.13-5, pg. 5.13-8

Railways

Union Pacific Railroad (UPRR) operates a mainline that extends northerly from Los Angeles to Mojave through Santa Clarita and the Antelope Valley. In Southern California, Union Pacific serves major automobile distribution centers. Union Pacific trains carry extensive varieties of import-export traffic through its Intermodal Container Transfer Facility near the Los Angeles and Long Beach harbors. The railroad also moves chemicals and manufactured goods, as well as fruits, vegetables and canned goods. From Mojave the UPRR connects with an east-west railroad corridor that serves Las Vegas, NV and Fresno. UPRR mainline is the only railway with immediate access to the subject site as it is located along Sierra Highway 1/4 mile to the west of the subject site. The AFC states that there are a number of rail sidings and expects to use rail sidings in the immediate vicinity of the proposed plant but does not discuss if there are accessible rail/truck transfer points as predicated.

The Avenue M crossing is an at-grade. UPRR provides active warning devices at this juncture to control cross railroad traffic.

Bicycle and Pedestrian Access

A Class I bike path is located adjacent to Sierra Highway. It is a regional serving bike and multi-purpose trail. Class I bike paths are located in a separate right-of-way and are for the exclusive use of bicycles and pedestrians with minimal cross flow by motor vehicles. Sidewalks are not typically considered Class I facilities.

According to the City's Bikeway and Multi-Purpose Trail Plan, Avenue M is designated as a Class II master planned route (refer to **Traffic and Transportation Figure 2**). Class II bike paths are typically striped or separated routes along major corridors. Currently Avenue M is neither striped nor separated for a Class II bike path.

Public Transportation

Public bus transportation is provided by Antelope Valley Transit Authority[6]. There are two bus routes located in the vicinity of the proposed plant site. These routes are AVTA local routes 1 and 4 and stops are provided at Avenue M at 10th Street West for Route 1 and Avenue M at Sierra Highway for Route 4 (see **Traffic and Transportation Figure 2**). Route 1 serves the Palmdale transfer center and Route 4 serves the Lancaster transfer center where riders can commute to various points within the Antelope Valley. For workers commuting to and from the Los Angeles region, AVTA provides express service from its transfer center in Palmdale. The city of Palmdale School District and the Antelope Valley School Transportation Agency[7] operates school bus routes in the area. School bus routes include Avenue L, Avenue M, 10th Street East and Sierra Highway.

Airports

PHPP is located adjacent to and northwest of United States Air Force (USAF) Plant 42. AirNav.com provides current information for various airports around the country. The

[6] http://www.avta.com/

[7] http://www.manta.com/coms2/dnbcompany_0wz0d8

following is a summary of information pertaining to USAF Plant 42[8] as provided by AirNav.com:

- Aircraft Operations: Average 96 operations per day
- Elevation: 2,543 feet
- Use: Public but USAF approval
- Control Tower: Yes
- Altitude: Traffic Pattern Altitude (TPA) overhead 1,500 feet military, 1,500 feet for aircraft less than 50,000 lbs. and 2,000 feet for all others
- Lights: Dusk to dawn
- Communications: Radio and navigation aids
- Runway 7/25: 12,002 feet in length x 150 feet in width (plus 1,000 feet for emergency)
- Runway 7/25 Traffic Pattern: Runway 7 is left and runway 25 is right
- Runway 4/22: 12,001 feet in length x 150 feet in width
- Runway 4/22 Traffic Pattern: Runway 4 is right and runway 25 is left
- Operations: 80% military, 8% local general aviation, 8% transient general aviation, 25 air taxi and 2% commercial
- Warnings: Migratory bird Hazard potential from October to March

Plant 42 Runway 7/25 is located approximately 3,000 feet south of the power plant's proposed power block. Runway 4/22 is located approximately 10,000 feet south of the proposed project. Runway 7 air traffic uses a recommended left turn traffic pattern but in case of an aborted landing the aircraft would be routed to the north and circle back to the runway. Runway 25 observes a recommended right turn traffic pattern. In addition, when aircraft perform a closed (touch and go) pattern on Runway 25, or in case of an aborted landing, aircraft are directed to the north and circle back to the runway. Aircraft using Runway 4 fly a right-hand traffic pattern and Runway 22 traffic use a left-hand pattern.

The US Air Force prepared the Air Installation Compatible Use Zone Study (AICUZ) for Plant 42 in 2002. Flight information contained in the AICUZ is consistent with the information on the AirNav.com web-site. The AICUZ program is contained in Air Force Instruction bulletin 32-7063 which implements the Department of Defense Instruction 4165.57. Its scope encompasses the area within the decibel noise level (DNL) 65 dB and greater noise exposure area. The purpose is to complement local government planning efforts and to prevent impacts associated with incompatible land uses.

According to the AICUZ, runway 4/22 is generally oriented east-west and runway 7/25 is oriented in a northeast-southwest direction. Both runways are about 12,000 feet in length and 150 feet wide. Traffic patterns are flown at an altitude of approximately 1,500

[8] http://www.airnav.com/airport/KPMD

feet above ground level (AGL) for military aircraft to 2,000 feet AGL for civilian aircraft. Arrival and departure altitudes vary depending on the direction and speed of prevailing winds. Flight patterns are oriented to the southeast of Runway 04/22 and north of Runway 07/25.

The project site is not in established FAA clear zones or accident potential zones. Clear zones and accident potential zones are areas beyond the ends of runways and along approach and departure paths determined by the Department of Defense to have greater potential for aircraft accidents.

The AICUZ depicts arrival, departure and closed flight tracks. Aircraft at Plant 42 use the following basic flight patterns:

- Straight-out departures and straight-in approaches
- Visual Flight Rules (VFR) or overhead landing pattern to the southeast of Runway 04/22 and north of Runway 0725
- Instrument Flight Rules (IFR) or radar closed patterns to the north of the airfield
- VFR rectangular closed patterns pattern to the southeast of Runway 04/22 and north of Runway 07/25
- Re-entry VFR patterns

Other airports within the vicinity of US AF Plant 42 include:

- USAF Fox Airfield, 10 miles northwest of Plant 42
- Edwards Air Force Base (AFB) restricted zone, 10 miles north of Plant 42
- Brian Ranch Airport, a private use airport located 18 miles east of Palmdale
- Gray Butte Field Airport, a private use airport located 25 miles east of Palmdale
- Nichols Farms, a private use airport located 7 miles northeast of Palmdale

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Significance criteria are based on California Environmental Quality Act (CEQA) Guidelines, the CEQA Environmental Checklist and on performance standards and thresholds established by interested agencies. A project may have a significant effect if the project would:

- cause an increase in traffic that would be substantial in relation to the existing traffic load and capacity of the street system (i.e., would result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections or roadway segments);
- exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways;
- substantially increase hazards due to a design feature (e.g., sharp curves or

dangerous intersections) or incompatible uses (e.g., farm equipment, oversized vehicles);

- result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- result in inadequate parking capacity;
- result in inadequate emergency access, and;
- conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

DIRECT/INDIRECT IMPACTS AND MITIGATION

Construction Impacts and Mitigation

The project could generate construction related traffic that substantially increases volumes and trips on certain routes. Any significant increases in volume or trips that a project may generate attributable to construction related traffic is likely to be temporary. A project's potential impact on the local transportation system is assessed based on the potential degradation of LOS on roadways and at intersections. The following discussion identifies potential traffic impacts associated with the construction of the PHPP.

A majority of the project's construction workforce is expected to come from local labor in Lancaster and Palmdale but the workforce may also originate from other population centers like the Los Angeles basin and San Fernando Valley. It is also possible that the construction workforce may originate from Victorville, San Bernardino and Bakersfield. As noted in the **Traffic and Transportation** section of the PSA, staff originally believed that the most likely routes for construction workforce originating from the Palmdale and Lancaster areas would be SR-14, Avenue M, Avenue L, Sierra Highway and 10th Street East. However, staff supports a more recent traffic analysis suggesting that using Avenue M instead of Avenue L is a more reasonable, and perhaps better, option for construction traffic (Fehr & Peers 2010). Any construction workforce traffic coming from Los Angeles would use SR-14 to Avenue M. Construction related traffic originating from Bakersfield would use SR-58 to SR-14 and Avenue M. Construction related traffic originating from Victorville and San Bernardino would use SR-138 and Sierra Highway or SR-14.

AFC Section 5.13.3.2 states that construction of the PHPP is anticipated to occur over 27 months and have a work force of 767 workers during the peak construction month. During the peak construction month it is anticipated that under the worst case scenario there will be 1,534 one-way commuter trips per day, 767 in-bound and 767 out-bound. **Traffic and Transportation Table 4** shows the proposed construction traffic trip distribution and existing and 2011 projected roadway segment ADT.

Traffic and Transportation Table 4
Project Construction and 2011 Roadway Segment Characteristics

Roadway Segment	Roadway Classification / Lanes	Projected Construction Traffic	Existing ADT[1]	Capacity	2011 Estimated ATD	Capacity
SR-14 South of Ave M	Arterial/6	536	99,000	132,000	126,675	132,000
Ave M Sierra Hwy To 10th St W	Arterial/4	1534	21,800	36,000	26,500	36,000
Ave M 10th St to 20th St	Arterial/4	1534	14,010	36,000	17,950	36,000

1 ADT = Average daily traffic

Source: Adapted from PHPP 2008a, Table 5.13-6, pg. 5.13-9 and Table 5.13-8, pg. 5.13-15

SR-14

Table 4 shows background traffic volumes for SR-14 and projects 536 construction related traffic trips on SR-14 south of Avenue M. Peak construction is likely to occur during 2011 or later. **Table 4** also shows that construction related traffic would not cause traffic volumes to exceed the design capacity of SR-14.

Avenue M

As noted earlier, staff believes that Avenue M (accessed by SR-14 or Sierra Highway) would be the most direct route to the PHPP site. It is projected that Avenue M would incur 1,534 peak construction related trips. This represents about a 4% increase to the overall traffic volume capacity for this road (36,000 per day).

Sierra Highway

Some construction workforce traffic could use other routes such as Sierra Highway because the worker trip might originate in Palmdale or Lancaster. Sierra Highway currently operates at 83% of capacity (25,000 ADT) [see **Traffic and Transportation Table 2**].

Project Related Intersections

As shown in **Traffic and Transportation Table 5**, some intersections would operate at unacceptable LOS with or without peak construction project traffic. With the addition of the PHPP project's 2011 peak construction related traffic, the LOS of three additional intersection segments would deteriorate in the A.M. or P.M. peak hours.

According to the city of Lancaster General Plan, Plan for Physical Mobility, and the city of Palmdale General Plan Circulation Element, the minimum acceptable LOS during peak hour traffic is LOS D. The 767 projected construction related traffic round-trips would reduce three intersections to unacceptable LOS. Project-induced impacts that reduce intersections to below acceptable LOS are considered significant.

Traffic and Transportation Table 5
Intersection Level of Service 2011 No Project and 2011 Peak Hour Construction

Intersection	Direction	AM Peak Hour LOS		PM Peak Hour LOS	
		2011 No-Project	2011 Peak Workforce	2011 No-Project	2011 Peak Workforce
SR-14 SB/ E. Ave. M	East/ North	F	F	F	F
SR-14 SB/ E. Ave. M	West/ South	B	F	F	F
SR-14 NB/ E. Ave. M	West/ South	F	F	F	F
SR-14 NB/ E. Ave. M	East/ North	F	F	C	F
Sierra Highway/ E. Ave. M	East/ West	D	D	D	D/E

Source: PHPP 2008a, Table 5.13-5, pg 5.13-8 and Table 5.13-7, pg. 5.13-13

The applicant states that the maximum number of project-induced truck trips would occur during foundation construction and would not coincide with peak month construction workforce trips. Construction is anticipated to generate an average of 15 daily one-way truck trips. According to the *Highway Capacity Manual* guidelines, a typical 18-wheel truck equals three passenger cars or passenger car equivalent (PCE) of three cars to one truck. If the project generates 15 truck trips (average) per day during the peak construction workforce month, it would add approximately 45 one-way trips.

Staff is proposing Condition of Certification **TRANS-1** which would reduce the project's impacts on local roads to a less than significant level by: requiring construction workers to avoid using SR-14 on and off ramps to East Avenue M and the intersection of Sierra Highway and East Avenue M during peak traffic periods; limiting heavy equipment and building materials to off peak periods (9:30 am to 3:30pm); and developing traffic diversion plans to ensure access during temporary lane/road closures.

Hazards and Public Safety

Weight and Load Limitations

The use of oversize vehicles during construction can create a hazard to the public by limiting motorist views on roadways and by the obstruction of space. According to the AFC, project construction and operation would involve the transport of equipment and materials that exceed roadway load or size limits and will require special permits to be obtained through state and local regulatory agencies. The expected type of oversized equipment and materials for project construction includes generators, heat recovery steam generator modules, and main transformers. Transport of equipment and materials may require the use of truck and trailer with multiple axles via public roadways.

California Vehicle Code and California Streets and Highway Code requirements note that if State highways are used by oversized truck and trailer with multiple axles, the mover is required to obtain a permit from Caltrans, and use trailing warning vehicles or police control.

For the proposed project to be in compliance with LORS pertaining to overweight and oversize vehicles, staff proposes Condition of Certification **TRANS-3** which requires that all project-related overweight and oversize vehicles used on public roadways during

construction and operations comply with Caltrans and other agency regulations pertaining to overweight and oversize vehicles.

Materials Transport

According to the AFC, project construction would involve a combination of rail and truck transport. UPRR has railway sidings within the vicinity of the proposed project site. It is anticipated that materials, including hazardous materials, and equipment could be shipped by rail to the nearest available siding and then be trucked the remainder of the way to the proposed site. The applicant intends to use one of the railway sidings for delivery of oversized equipment and, if railways are used, the equipment would be transported from the railroad siding to the construction site via multi-axle trucks. A rail siding, serving Plant 42, is located immediately south of the proposed plant site.

The California Vehicle Code and California Streets and Highway Code require permits for hazardous materials shipment and handling including quantities, routes and operator training and qualifications. It is anticipated that project construction would generate approximately 15 one-way truck trips per day with a maximum of 50 truck trips per day. During project operations, it is anticipated that approximately 68 truck trips per month would be generated by the project, with an average between two and three truck trips per day. Solid waste disposal shipments would account for approximately 45 of the anticipated truck trips and the remainder being deliveries of materials and supplies. Approximately 15 of the remaining 23 truck trips would be deliveries of hazardous materials, 14 of which would be aqueous ammonia. For a discussion of the potential impacts related to hazardous materials please see the **HAZARDOUS MATERIALS MANAGEMENT** section in this Final Staff Assessment (FSA). Because the project would require the delivery of hazardous materials, staff recommends Condition of Certification **TRANS-7**, which requires that the project owner obtain the necessary permits from Caltrans and the cities of Lancaster and Palmdale for the delivery of hazardous materials on public roadways.

Public Right-of-way Encroachment

Construction of the power plant would require the use and installation of heavy equipment and associated systems and structures. Consequently, encroachment onto public roads may result in damage by vehicles and equipment to public roads within the project area. In addition, the use of oversize and overweight vehicles during project construction can create a hazard to the public by damaging roads. Staff's recommended Condition of Certification **TRANS-5**, would require that any road damaged by project construction be repaired to its original condition. This would ensure that any damage to local roadways would not be a safety hazard to motorists.

Potential Traffic and Transportation Hazards

Traffic Control Plan

The construction of the power plant and transmission facilities could involve road closures or detours, construction vehicle interface with normal traffic flows other than at intersections and other similar construction and traffic flow interaction. Impacts associated with hazards and public safety induced by construction vehicles would be minimized by Condition of Certification **TRANS-1**, which requires the preparation of a

construction traffic control plan that would include the use of flagging, flag men, signage and covering open trenches. In addition, the traffic control plan would divert construction-related traffic away from residential areas to the maximum extent feasible.

Avenue M Turning Movements

The proposed primary site access would be off East Avenue M. Many factors like, vehicle length, stopping distance, take-off speed and turning radius can affect the flow rate of traffic. A right or left turn from Avenue M to the proposed site access would create an impediment to rapidly moving vehicles on Avenue M, a 65 mph route as shown on City maps. This poses safety hazards pertaining to turning movements entering and exiting the project site. A left turn lane and acceleration and deceleration lanes at the main entrance to Plant 42 demonstrate the necessity to provide left turn lanes and acceleration and deceleration lanes at the proposed power plant site. Staff proposes Condition of Certification **TRANS-1**, which requires the project owner to improve Avenue M to include a turn lane into the project site, and/or acceleration/deceleration lanes to minimize the potential for traffic hazard on Avenue M, which would be consistent with established project accesses along Avenue M.

Bicycle and Public Transportation

As noted above, Avenue M is designated as a Class II master planned bicycle route. Class II bicycle routes are constructed with roadway improvements. The applicant does not propose to improve Avenue M and given the fact that during peak construction of the project average daily traffic would only increase by 4%, staff believes that road improvements related to bicycle routes are not necessary. Staff's proposed Condition of Certification **TRANS-**1 would ensure pedestrian and bicycle safety from construction vehicle travel routes and any construction-related temporary travel lane closures or disruptions.

There are two bus routes located in the vicinity of the proposed plant site. These routes are AVTA local routes 1 and 4 and stops are provided at Avenue M at 10th Street West for Route 1 and Avenue M at Sierra Highway for Route 4. Currently, there are no sidewalks from the bus stop locations to the project site but staff believes that construction workers will not be accessing the site via bus and walking to the project. Therefore, the lack of sidewalks is not an issue.

City of Palmdale Unified School District (PUSD) and Antelope Valley School Transportation Agency (AVSTA) operates school bus routes in the area. School bus routes include Avenue L, Avenue M, 10th Street East and Sierra Highway. Energy Commission staff contacted PUSD and AVSTA representatives about project construction and operation traffic and were advised that public bus service would not be significantly impacted (PUSD 2010, AVSTA 2010). Staff concurs with this advisement.

Linear Facilities

The construction/installation of linear facilities for the PHPP could have impacts on local roadways. According to the project description in the AFC, an 8.7-mile and 20-inch natural gas pipeline would be installed in an existing right-of-way (ROW). It would begin at a Southern California Gas facility on Avenue S and traverse north along 10th Street East, west along Lockheed Way, north along Sierra Highway, east along Avenue M to

10th Street East, and south along the project's east boundary to the power block. The city of Palmdale would install a 7.4-mile and 14-inch water pipeline in a joint trench with the natural gas pipeline. The water line would travel along the same route as the natural gas pipeline but would begin at the City's wastewater treatment plant and traverse east along Avenue P to 10th Street East. The PHPP would require the installation of a one-mile long six-inch diameter wastewater disposal line in 10th Street East ROW to connect to an existing 12-inch sewer line at Avenue L.

PHPP transmission lines would extend 35.6 miles and consist of two segments. The first segment would begin at the PHPP on-site switchyard and extend approximately 23.7 miles through new and existing ROW to a Southern California Edison (SCE) substation near Pearblossom Highway in Pearblossom, CA. The second segment would be approximately 11.9 miles and would extend from the Pearblossom Substation to the Vincent substation. Within the vicinity of the proposed project site, the transmission lines would be erected along existing roads, however, large portions of the transmission line would be erected where easements or rights-of-way must be obtained. The proposed transmission line routes are illustrated on AFC Figures 2-1, Sheets 1 through 14, which also illustrates that the transmission lines are proposed along logical extensions of existing roads and planned street patterns. The AFC states that only stub roads would be constructed to access any transmission line constructed in unimproved ROW.

Staff's proposed Condition of Certification **TRANS-1** would ensure that construction/ installation of the PHPP linears would not have a significant traffic and transportation impact on local roadways.

Operation Impacts and Mitigation

It is anticipated that PHPP operations would require a staff of 36 employees working 24 hours - seven days per week. The estimated project operations would generate 2-3 truck trips per day. The number of operations-related and maintenance-related traffic associated with the project is considered to be minimal and insignificant when added to major movements on regional and local serving roadways as well as at intersections studied within the project's vicinity. Therefore, staff finds that the PHPP project operations would have a less than significant impact on study area roadways or intersections LOS. Consequently, no operations-related mitigation measures are required.

Airport Operations

According to AirNav.com Air Force Plant 42 operations consist of 80% military, 8% local general aviation, 8% transient general aviation, 2% air taxi and 2% commercial (cargo carriers). However, staff was advised by Plant 42 staff that approximately 30% of airport operations involve civilian aircraft from other airports (USAF 2010).

As noted in the setting discussion of airports, Plant 42 is adjacent to the proposed project site. Runway 7/25 is located 3,000 feet south of the proposed project and Runway 4/22 is located 10,000 feet south of the proposed project. Arrival and departure air traffic using Runway 7/25 would not fly over the proposed project given the current traffic pattern as depicted on **Traffic and Transportation Figure 3**. A departure from Runway 4/22 could fly over the western part of the project but staff believes that pilots

could fly further west until reaching the end of the runway before turning north towards Edwards Air Force Base. This delay of turn would not bring the aircraft over any residential area. Most of the aircraft at Plant 42 use Runway 7/25 and are engaged in practice landings and take-offs commonly referred to as “touch-and-gos”.

The FAA requires that anyone proposing to construct or alter any navigable airspace within 20,000 lineal feet of a public use (or military) airport which exceeds a 100:1 vertical surface from any point on the runway of an airport, with at least one runway more than 3,200 feet long, must file a 7460-1 form (Notice of Construction/Alteration of Navigable Airspace) with the FAA (FAA 2007) for determination of a potential aviation hazard. Given the proximity of Plant 42 to the project site and its two long runways, any structure over 30 feet tall would penetrate Plant 42’s navigable airspace. Therefore, the applicant must file the 7460-1 form for each applicable structure. Using the 100:1 vertical ratio designated by the FAA, staff has concluded that there are several project structures that would exceed the 30 feet AGL threshold: These include the two heat recovery steam generator stacks (HRSGs) (145 feet tall), some of the transmission towers (94 feet or taller), the ten-cell cooling tower (50 feet tall), one clarified water storage tank (35 feet tall), and one crystallizer (55 feet tall) (PHPP 2008a, Table 5.15-3, pg. 5.15-10). In addition, a tall construction crane would most likely be used to construct the HRSGs and other tall structures. In the Victorville 2 project, the applicant proposed using a 205-foot tall construction crane.

All of these structures will require the PHPP applicant to submit 7460-1 forms to the FAA and the subsequent Determinations of No Hazard to Navigable Airspace must be obtained. To date, staff has only received the No Hazard Determinations for the two HRSGs. Staff is proposing Condition of certification **TRANS-2** which would require the project owner to acquire FAA Determinations of No Hazard for all project structures over 30 feet tall. However, it is staff’s opinion that the project structures that exceed the 30 foot threshold would not be a hazard to air navigation at the Plant 42 because most aircraft do not fly over the project site, and those aircraft in the traffic pattern are at least 1,500 feet AGL, and would be well above any project structure.

Thermal and Visible Plumes

The project would generate thermal plumes from two heat recovery steam generator (HRSG) stacks and the ten-cell cooling tower (Aspen 2007a; see **APPENDIX TT-1**). Staff has predicted that turbine and cooling tower plumes at or exceeding the 4.3 meters per second (m/s) threshold could extend to about 990 feet and 875 feet AGL, respectively. Staff relies on a finding of the Australian Civil Aviation Safety Authority that… “an exhaust plume with a vertical velocity in excess of 4.3 m/s may cause damage to an aircraft airframe or upset an aircraft when flying at low levels” (Australian Civil Aviation Safety Authority 2004). The FAA has recommended that aircraft do not fly over plume-generating industrial sites at less than 1,000 feet AGL (FAA 2006). In addition, a recent modification to the FAA’s Aeronautical Information Manual advises pilots to avoid flight in the vicinity of thermal plumes (FAA 2010). The HRSGs and cooling tower are located close to the runways and within the traffic pattern and arriving or departing aircraft would not fly over them. Therefore, the turbulence caused by these thermal plumes would not affect aircraft using Plant 42. Plant 42 representatives have advised staff that they do not foresee negative impacts from either the cooling tower or

HRSG exhausts (USAF 2010a).

As discussed in the **Visual Resources** section of this FSA, visible plumes from the gas turbine/HRSG exhaust stacks are predicted to occur less than 20% of seasonal daylight clear hours and would occur very infrequently when operating without duct firing. Duct firing is much more likely to occur during high summer demand periods rather than during the periods that are more favorable for gas turbine/HRSG exhaust plume formation (i.e. very cold). Cooling tower plumes will occur much more frequently and the dimensions at the 20 percentile frequency of the seasonal daylight clear hours are predicted to be 70 meters (231 feet) long, 189 meters (622 feet) tall, and 62 meters (203 feet) wide (See **Appendix VR-2**).

Visible plumes from the cooling towers could be significantly greater than 20% given the plant design and the incorporation of several conservative operating assumptions, and assuming year-round full load operation and 100% capacity factor (although 80% capacity is more likely). Using a worst case scenario of the PHPP operating at full load with solar/no duct firing, the 5% plume dimensions are predicted to be 232 meters (762 feet) long, 467 meters (1,532 feet) tall, and 117 meters (384 feet) wide. These are significant plume dimensions that would reach traffic pattern altitude and would be very noticeable to pilots using Plant 42. For comparison, the 50 percentile plume dimensions are expected to be 20 meters (66 feet) long, 40 meters (133 feet) tall, and 41 meters (133 feet) wide. Staff believes that pilots would be able to observe and avoid direct overflight or penetration of any predicted plume without deviating significantly from existing traffic patterns, and could maintain visual contact with the runways at Plant 42. This belief is based on the worst case plume height barely penetrating traffic pattern altitude (1,500 feet AGL), the traffic pattern is farther out than where the plumes would rise and is wide enough to allow pilots to avoid flying through or above the tallest plume, and therefore visual contact with the runways would be maintained (see **Traffic and Transportation Figure**). As noted earlier, Plant 42 representatives do not anticipate negative impacts from project plumes.

One additional factor involves the relationship between plume formation and behavior and the frequency of calm winds (less than 3 meters per second [m/s]) and cool temperatures (30 to 60°F). In general, plumes form, increase in size, and maintain their integrity as they rise from a HRSG stack or a cooling tower cell when temperatures are cool and the wind is calm. When winds are greater than 3 m/s and temperatures are greater than 60°F, plumes are less likely to form and/or are blown horizontally and dissipate quickly into the air. In addition, relative humidity is comparatively low in the Palmdale area for most of the year which further limits the formation of plumes. Therefore, cooling tower plumes with dimensions as large as or larger than those noted above occur predominately in the winter and would be expected to occur very infrequently outside of the analyzed seasonal (November through April) period. Staff believes that the PHPP visible plumes would not significantly affect local aircraft operations.

However, staff is proposing Condition of Certification **TRANS-4** which would require the project owner to work with the FAA and the Plant 42 Commander to implement a number of measures that would advise pilots to avoid direct overflight of the project. These could include: 1) requesting a FAA Notice to Airmen (NOTAM) be issued

advising pilots of the location of the PHPP; 2) amending navigational charts (i.e. Jeppguide Airport Directory, Western Region), the Los Angeles VFR Terminal Chart, and the Plant 42 Airport Facility Directory to include a symbol representing the PHPP; 3) provide Plant 42 control tower operators verbal and written notice before the PHPP commences operation; and 4) install obstruction lighting and marking on each project exhaust stack and both ends of the cooling tower, and additional lighting at each corner of the project.

Ground Fogging Plume Hazard

A Plume Traffic Impact Modeling Analysis, **Appendix TT-1**, was performed to evaluate ground fogging plumes on the transportation system within the vicinity of the project. Ground level fogging is generated by atmospheric conditions that can create a visible plume with the potential to affect roadways and airport ground operations. Predicted ground level fogging would occur no more than 5 hours per year beyond the proposed project's property line at 15th Street East and no more than one hour a year at East Avenue M. These plumes would not have a significant traffic impact on the affected roads. Given the proximity of Plant 42 to the project site, ground level plumes could be a factor. However, the modeling analysis does not predict that the runways/taxiways of the airport would experience plume fogging (Aspen 2010).

Glint and Glare Hazard Potential

The PHPP would include 251 acres of parabolic solar-thermal collectors and associated heat-transfer equipment. Each mirror unit is 63 feet long and would be arranged end-to-end in rows. With an estimated 75 feet by 25 feet appropriate mirror spacing, this footprint results in an estimated number of mirrors in excess of 14,800. The troughs are aligned on a north-south axis and track the sun as it moves from east to west.

According to the 2002 Air Installation Compatible Use Zone Study, Air Force Plant 42, no official count exists or is taken of the times aircraft use the runways for Plant 42. For year 2001, the Air Force estimated that total daily operations for Air Force Plant 42 on a busy day were 235.79. That information was derived from conversations with Plant 42 staff, pilots, and traffic control tower personnel. In 2001 approximately 70 types of military and civil airplanes conducted operations at Plant 42 but most had less than one operation a day. In addition, during that time about 17% of the total daily operations occurred during the evening (7 PM to 10 PM) and approximately 6% of the operations were accomplished during nighttime (10 PM to 7 AM). According to a November 24, 2010, e-mail from Timothy Hughes, Deputy Director, Detachment 1, Aeronautical Systems Center (AFMC), Production Flight Test Installation, Air Force Plant 42, the actual number of aircraft under the control of Detachment 1 was approximately 30,000 to 35,000 aircraft.

Pilots flying to and from Air Force Plant 42 use two runways, Runway 4/22 and Runway 7/25. Pilots using Runway 4/22 would be approximately 1.7 statute miles (approximately 9,000 feet) from the PHPP's parabolic mirrors. Consequently, pilots' exposure to glint and glare would be minimal. The greater danger for exposure to glint and glare would occur for pilots using Runway 7/25. At its closest point, the PHPP is located

approximately 2,000 feet from the runway.[9] With its substantial array of parabolic mirrors, the PHPP could pose a significant source of glint and glare to pilots operating aircraft to and from Air Force Plant 42. Consequently, staff has recommended mitigation to reduce the impact of glint and glare to less than significant. Those conditions of certification will also mitigate any effects from glint and glare for pilots using Runway 4/22.[10] See Traffic and Transportation Figure 3 for the location of Runway 7/25 and Runway 4/22.

Definition of Glint and Glare

Glint is defined as a momentary flash of light, and glare, a relatively continuous source of excessive brightness relative to ambient lighting. Many objects reflect sunlight into the sky-- windows on buildings and vehicles; lakes and ponds; and polished surfaces. Consequently, pilots frequently contend with these conditions, particularly on a sunny day. Reflections from nearly all surfaces are a combination of specular and diffuse reflections. Specular reflections occur off mirror-like surfaces when the angle of reflection is identical to the angle of incidence from the light source. Diffuse reflections occur off rough or uneven surfaces when the reflection angles are distributed in many directions. This distribution is a function of the light source incident angles.

The unique configuration of parabolic solar-thermal collectors combined with the necessity for the collectors to track the sun as it moves from east to west can, in certain conditions, result in glint and glare to pilots taking off from or landing on Air Force Plant 22's runways. Those runways include Runway 7/25, which runs east to west, and Runway 4/22, which runs southwest to northeast. The western region of Runway 7/25 is located approximately 2,000 feet from the first array of solar troughs.

Glint and Glare at Air Force Plant 42

In most circumstances, the generally east-west orientation of Runway 7/25 and Runway 4/22 at Air Force Plant 42 will mitigate the risk of glint and glare to pilots taking off and landing on the runways. However, without mitigation pilots could experience glint and glare in the form of a temporary afterimage in several circumstances. Glint and glare at Air Force Plant 42 could occur in the following specific and unique configurations.

Runway 7/25 Traffic Patterns

1. **Movement of mirrors from stow to tracking or tracking to stow positions.** Specular reflections off the mirror troughs could occur when the troughs are moving from stow to tracking positions and from tracking to stow positions. Generally these movements take place as the sun rises (early morning) or when it is setting (early evening.)

2. **Spillage from angle of mirrors.** Aircraft on the crosswind leg of the right traffic pattern could be at risk of experiencing a temporary afterimage from reflections spilling to the southeast early on summer mornings and to the southwest late on summer days. In addition, pilots could experience temporary after image from

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[10] The entire glint and glare analysis for the Palmdale Hybrid Power Project may be found as appendix TT 3 to this Traffic and Transportation section.

adverse end-loss reflection during take-off and landing at the western end of Runway 7/25 at low sun angles during winter mornings and evenings. Pilots could also experience a temporary afterimage if required to overfly the runway in close proximity to the mirror arrays.

3. **Improper mirror alignment.** When required to overfly the runway in close proximity to the mirror arrays, pilots could also experience a temporary after image if mirrors were misaligned.

4. **Reflection from stainless steel tubular shields.** Previous installations of mirror troughs using reflective stainless steel tubular shields have resulted in concentrated sources of glare that can be viewed over a mile away.

Runway 4/22 Traffic Patterns

1. **Movement of mirrors from stow to tracking or tracking to stow positions.** The risk of glint and glare caused by errant specular reflections would be greatest for pilots on the Runway 4/22 approach traffic patterns early on summer mornings when the mirrors are rotating out of the nighttime stow position. Staff has recommended conditions of certification designed to reduce impacts to less than significant.

2. **Spillage from angle of mirrors.** Spillage and end-loss reflections are not considered to be significant for any of Runway 4/22 traffic patterns.

3. **Improper mirror alignment.** Runway 4/22 flight tacks do not overfly the mirror arrays and in their greatest proximities to the arrays any reflections are not considered significant, unless they were coupled with mirror misalignment conditions. Staff has recommended conditions of certification to reduce impacts to less than significant.

4 **Reflection from stainless steel tubular joints.** Reflections from the tubular joints could produce significant glare for a sub population of the arrival, departure and closed flight tracks when in proximity (about 2 miles) of the west and east axis.

Staff has proposed Conditions of Certification **TRANS-8** and **-9** to reduce impacts to a less than significant level and to provide a complaint resolution process should a glint and/or glare incident occur. **TRANS-8** would require providing a plan which includes measures to be taken to reduce glint and glare to the maximum extent possible. These would include ensuring mirrors are brought out of storage before sunrise and are aligned to catch the first rays of the morning sun, and returned to stow position after sunset; ensure mirrors are continuously monitored for malfunctions and to ensure that mirrors remain properly aligned with the sun; minimize reflections from bellow shields; ensure PHPP operator establishes and maintains a communication link with Plant 42 control tower to ensure that mirrors are positioned so as not to interfere with critical flight operation; and, establish procedures to avoid glare while intentionally moving individual collectors off-axis to “dump” power during periods of high insolation.

TRANS-9 would require the project owner to develop and implement a process for documenting, investigating, evaluating, and resolving all project-related glare complaints. This would involve the project owner working with the Commander of Plant

42, or his or her designated representative, to set up a communication link to alert both parties about complaints involving PHPP related glint or glare, investigating each complaint and contacting the Commander within 24 hours to report on actions taken to resolve the complaint. Once the complaint has been resolved, the Commander or his or her representative shall submit a report to the CPM describing specific details of the complaint, the results of glare reduction efforts, and a signed statement that the glare problem is resolved.

Migratory Bird Hazard Potential

AirNav.com reports that USAF experiences migratory bird hazard potential from October to March. The AFC states that the project will require a retention facility but ponding, which might attract more birds, is not expected to occur. Refer to **WATER RESOURCES** and **BIOLOGICAL RESOURCES** sections of this FSA for more detailed discussion pertaining to the retention facilities and migratory birds.

Emergency Access

In the event of an emergency at the PHPP site during construction, emergency vehicles would likely use Avenue M to the project site. A main access drive and at least one additional emergency access would provide standard acceptable emergency access to the proposed project (see proposed Condition of Certification **TRANS-6**). For additional discussion of emergency services serving the facility, refer to the **HAZARDOUS MATERIALS MANAGEMENT,** and **WORKER SAFETY** and **FIRE PROTECTION** section in this FSA.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. *Cumulatively considerable* means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Title 14, California Code Regulation, section 15130).

Continued development in the Antelope Valley has contributed to congestion on area roadways that would be used by PHPP related traffic. Construction related traffic associated with the project would temporarily contribute to cumulative traffic impacts. Operations generated traffic is minimal with respect to existing and likely future conditions. In the event construction of the proposed project and the other listed projects were to occur simultaneously, cumulative impacts resulting in disruption of traffic flows and temporary lane closures could occur. Traffic associated with future residential and commercial developments within the area would further contribute to congestion on these affected roadways.

Staff has recently become aware of a proposal to construct a new 50-mile east/west freeway/expressway that would connect SR-14 with Interstate (I-15). It would be an eight-lane freeway from SR-14 to 50th Street and a six-lane freeway/expressway from 50th St. East to 240th St. East past the Southern California Logistics Airport to I-15. The environmental analysis phase is expected to be completed in 2013 with construction due to start in 2016 and would be completed in 2020. Given the lengthy time until the

start of construction and the possibility that the PHPP may be operational within two or three years, staff does not believe that the proposed freeway/expressway is a reasonably foreseeable project in terms of cumulative impacts review).

It is assumed that all future cumulative projects would include mitigation similar to that for PHPP (i.e. the development of a construction traffic control plan) and would require approval from the city of Palmdale, Lancaster or Caltrans, as well as other affected jurisdictions and agencies. The incremental effect of the PHPP would not be cumulatively considerable when combined with the effects of past, present and reasonably foreseeable projects.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Traffic and Transportation Table 6 provides a general description of applicable statutes, regulations, and standards adopted by the federal government, the State of California, and the cities Palmdale and Lancaster pertaining to traffic and transportation with which the project is required to comply. Conditions of certification have been proposed to ensure project consistency with the relevant LORS.

TRAFFIC AND TRANSPORTATION Table 6
Compliance with Applicable LORS

Applicable LORS	Description
Federal	
Code of Federal Regulations (CFR) Title 14, Chapter 1, Part 77	Includes standards for determining obstructions in navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alteration. Also, provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace. Consistent: Staff has reviewed the FAA Determination of No Hazard to Navigable Airspace for U.S. Air Force Plant 42 for the HRSG exhaust stacks but has not received the Determinations for some of the transmission towers, ten-cell cooling tower, clarified water storage tank, crystallizer, and construction crane that would penetrate navigable airspace. Staff's proposed Condition of Certification **TRANS-2** would require the project owner to secure Determinations of No Hazard for the project structures listed above which would make the project consistent with CFR Part 77.
Title 49, Subtitle B	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures), and provides safety measures for motor carriers and motor vehicles who operate on public highways. Consistent: Condition of Certification **TRANS-7**, would require that delivery of hazardous materials on public roadways during construction and operations comply with US DOT, Caltrans, Lancaster and Palmdale requirements pertaining to hazardous materials delivery and the training and certification of drivers and handlers.
State California Vehicle Code, Division 2, Chapter. 2.5, Div. 6, Chap. 7, Div. 13, Chap. 5, Div. 14.1, Chap. 1 & 2, Div.	Includes regulations pertaining to licensing, size, weight and load of vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials. Includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits. Consistent:. Condition of Certification **TRANS-3** would require that all project related overweight

14.8, Div. 15 California Streets and Highway Code, Division 1 & 2, Chapter 3 & Chapter 5.5	and oversize vehicles used on public roadways during construction and operations comply with US DOT, Caltrans and Palmdale limitations on vehicle sizes and weights, the use oversize vehicle routes, as established by permit, and provide appropriate trailing warning and police control. Staff's proposed Condition of Certification **TRANS-5**, would require that any road damaged by project construction be repaired to its original condition. This will ensure that any damage to local roadways will not be a safety hazard to motorists.
Local	
City of Palmdale General Plan Circulation Element	The purpose of the General Plan Circulation Element is to identify goals, policies, and implementation measures that will balance traffic patterns with land uses to minimize existing road congestions while expanding the circulation network to serve the City's future growth areas. Consistent: Proposed Condition of Certification **TRANS-1** requires the approval of a traffic control plan to minimize road congestion during project construction.
City of Lancaster General Plan Plan for Physical Mobility	This section of the General Plan presents the City's existing traffic and transportation condition and plans for the anticipated impact associated with growth. It also establishes goals, objectives and policies pertaining to streets and highways, parking facilities, alternative transportation modes, commodity movement and air transportation. Consistent: Proposed Condition of Certification **TRANS-1** requires the approval of a traffic control plan to minimize adverse impacts on SR-14 on and off ramps that access East Avenue M..

RESPONSE TO AGENCY AND PUBLIC COMMENTS

A memorandum from the Plant 42 Commander to the city of Palmdale dated July 16, 2010 raised the issue that under some circumstances glint and glare (reflections) could occur from PHPP structures. An internal body within the U.S. Air Force will investigate the potential for reflections through some type of modeling/simulation. The letter stated that…"at this time all other known concerns have in fact been resolved…" (USAF 2010a). A second memorandum from the Commander to staff dated August 30. 2010 raised additional concerns regarding glint and glare that were analyzed in the Blythe Solar Power Project. The memorandum recommended several permit conditions be implemented to reduce the potential for glint and glare to impact flight operations at Plant 42 (USAF 2010b). Staff's proposed Conditions of Certification **TRANS-8** and **9** include the recommended conditions.

CONCLUSIONS

The Palmdale Hybrid Power Project would be consistent with the Circulation Elements in the cities of Palmdale and Lancaster General Plans and all other applicable laws, ordinances, regulations, and standards (LORS) related to traffic and transportation. Staff has reviewed copies of two Determinations of No Hazard to Air Navigation forms from the FAA regarding PHPP HRSG exhaust stacks. However, staff has not received no-hazard determinations regarding some of the transmission towers, ten-cell cooling tower, clarified water storage tank, crystallizer, and construction crane that would penetrate the navigable airspace of U.S. Air Force Plant 42. However, since the FAA has determined that two of the tallest structures (145 feet tall HRSGS) would not be a hazard to

navigable airspace, it is very likely that similar determinations would be issued for the other project structures noted above. It is staff's opinion that these structures would not be a hazard to air navigation given the elevation of the Plant 42 traffic pattern (1,500 feet above ground level (AGG)), and with staff's proposed Condition of Certification **TRANS-2** the project would comply with Code of Federal Regulations Part 77.

During the construction and operation phases of the PHPP, local roadway and highway activity resulting from the daily movement of workers and materials would not increase beyond significance thresholds established by the cities of Palmdale and Lancaster. Construction and some operational impacts on the local and regional road/highway network related to the project would be reduced to less than significant with the implementation of staff's proposed Conditions of Certification **TRANS-1** through **TRANS-9**.

Staff has considered the minority populations (as identified in **Socioeconomics Figure 1**) and low income populations in its impact analysis. There are no significant direct or cumulative traffic and transportation impacts, and therefore, no environmental justice issues.

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall prepare and implement a construction traffic control plan. The traffic control plan must include but not be limited to the following issues:

- Prepare and distribute a map of the route for construction workers to use to access the proposed project site (SR-14 to Avenue M to the PHPP site;
- Make improvements to East Avenue M (e.g. turn and acceleration/deceleration lanes) consistent with existing project access features to allow for safe arrival/departure to/from the project site;
- Limit heavy equipment and building materials deliveries to between 9:30am and 3:30pm, per Palmdale General Plan Circulation Element, to minimize impacts and route truck traffic around residential development;
- Provide signing, lighting, and traffic control device placement during construction impacting regional and local roadways;
- Ensure construction traffic avoids using the SR-14 on and off-ramps to East Avenue M and the intersection of Sierra Highway and East Avenue M during peak morning and afternoon traffic periods;
- Traffic diversion plans (in coordination with the cities of Palmdale and Lancaster) to ensure access during temporary lane/road closures;
- Ensure of access for emergency vehicles to the project site;
- Ensurance of pedestrian and bicycle safety from construction vehicle travel routes and any construction-related temporary travel lane closures or disruptions;

- Temporary closure of travel lanes or disruptions to street segments and intersections during reconductoring activities or any other utility tie- ins;
- Establish a parking plan for workers, construction vehicles, and trucks during transmission line and pipeline construction;
- Installation of the natural gas pipeline and water line to occur during non-peak hours; and
- Use flagging, flag men, signage and cover open trenches when needed.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit a traffic control plan that outlines each component above to Caltrans and the cities of Palmdale and Lancaster Planning Departments for review and comment and to the CPM for review and approval. The project owner shall provide the CPM with any comments from Caltrans and the cities of Palmdale and Lancaster.

TRANS-2 The project owner shall obtain Determinations of No Hazard to Navigable Airspace from the FAA for U.S. Air Force Plant 42 regarding the project's transmission towers, cooling tower, clarified water tank, crystallizer, and construction crane that would penetrate the Plant's airspace.

Verification: At least 90 days prior to the construction,, the project owner shall provide the CPM copies of the FAA Determinations of No Hazard to Navigable Airspace regarding the project structures identified above and the project owner must comply with specific recommendations contained in the FAA determinations.

TRANS-3 The project owner shall comply with Caltrans and other relevant jurisdictions' limitations on vehicle sizes and weights used during construction and operation. In addition, the project owner or its contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for roadway use.

Verification: The project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS-4 Pilot Notification and Awareness

The project owner shall initiate the following actions to ensure pilots are aware of the project location and potential hazards to aviation:

a) Submit a letter to the FAA requesting a Notice to Airmen (NOTAM) be issued advising pilots of the location of the PHPP and recommending avoidance of overflight of the project site below 1,500 feet AGL. The letter shall also request that the NOTAM be maintained in active status until all navigational charts and Airport Facility Directories (AFDs) have been updated.

b) Submit a letter to the FAA requesting a power plant depiction symbol be placed at the PHPP site location on the Los Angeles Sectional Chart with a notice to "avoid overflight below 1,500 feet AGL".

c) Submit a request to and coordinate with the USAF Plant Commander to add a new remark to the Automated Surface Observing System (ASOS) identifying the location of the PHPP and advising pilots to avoid direct overflight below 1,500

feet AGL as they approach or depart the airport.

d) Request that TRACON (SOCAL) and/or the Los Angeles Air Traffic Control Center submit aerodrome remarks describing the location of the PHPP plant and advising against direct overflight below 1,500 feet AGL to:

1) FAA AeroNav Services, formerly the FAA National Aeronautical Charting Office (Airport/Facility Directory)

2) Jeppesen Sanderson Inc. (JeppGuide Airport Directory, Western Region)

3) Airguide Publications (Flight Guide, Western States)

Verification: Within 30 days following the start of construction, the project owner shall submit draft language for the letters of request to the FAA (including SOCAL TRACON) and Plant 42 to the CPM for review and approval.

At least 60 days prior to the start of operations, the project owner shall submit the required letters of request to the FAA and request that TRACON (SOCAL) submit aerodrome remarks to the listed agencies. The project owner shall submit copies of these requests to the CPM. A copy of any resulting correspondence shall be submitted to the CPM within 10 days of receipt.

If the project owner does not receive a response from any of the above agencies within 45 days of the request (or by 15 days prior to the start of operations) the project owner shall follow up with a letter to the respective agency/ies to confirm implementation of the request. A copy of any resulting correspondence shall be submitted to the CPM within 10 days of receipt.

The project owner shall contact the CPM within 72 hours if notified that any or all of the requested notices cannot be implemented.[11] Should this occur, the project owner shall appeal such a determination, consistent with any established appeal process and in consultation with the CPM. A final decision from the jurisdictional agency denying the request, as a result of the appeal process, shall release the project owner from any additional action related to that request and shall be deemed compliance with that portion of this condition of certification.

TRANS-5 The project owner shall repair any damage to roadways affected by construction activity along with the primary roadways identified in the traffic control plan for construction related traffic to the road's pre-project construction condition.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall photograph, videotape, or digitally record images of the roadways that will be affected by any underground utility connection construction and heavy construction traffic. The project owner shall provide the CPM, CBO and the city of Palmdale and Lancaster with a copy of the images for the roadway segments under its jurisdiction.

[11] The Energy Commission does not have the authority to compel issuance of a NOTAM or require the FAA or Byron Airport to publish the location of or remarks regarding the project in any aviation chart or guide, or add that information to the Byron Airport ASOS.

Also prior to start of construction, the project owner shall notify the cities about the schedule for project construction. The purpose of this notification is to postpone any planned roadway resurfacing and/or improvement projects until after the project construction has taken place and to coordinate construction-related activities associated with other projects.

Within 30 days prior to the commencement of project operations, the project owner shall meet with the CBO and the cities of Palmdale and Lancaster to determine the actions necessary and schedule the repair of identified sections of public roadways and restore the ROW to original or as near-original condition as possible. Following completion of any road improvements, the project owner shall provide to the CPM and CBO comment letters from the cities of Palmdale and Lancaster stating whether the work completed within public rights-of-way meets city standards. If the CPM and CBO determine that additional work is needed to meet city standards, the CPM will direct the project owner to complete the additional work.

TRANS-6 The project owner shall provide emergency access that complies with the city of Palmdale General Plan Circulation Element and requirements of the Los Angeles County Fire Department.

Verification: At least 90 days prior to the start of construction, the project owner shall provide plans to the Los Angeles County Fire Department and Palmdale Public Works Department for review and comment, and the CPM and CBO for review and approval, which demonstrate that emergency access will be provided in compliance with city of Palmdale and Los Angeles County Fire Department standards. The project owner shall provide the CPM with any comment letters received from the city of Palmdale and/or Los Angeles County Fire Department. Adequate emergency access shall be provided prior to the start of project operations.

TRANS-7 The project owner shall ensure that all necessary permits and/or licenses are secured from the US DOT, California Highway Patrol, Caltrans and the cities of Palmdale and Lancaster for the transport of hazardous materials.

Verification: The project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS-8 Prior to the start of construction, the project owner shall provide a plan to the CPM and the Air Force Plant 42 Commander identifying all reasonable measures the project owner will take to minimize the creation of glint and glare on Air Force Plant 42 airfield traffic including, but not limited to, the following:

1. Ensure the mirrors are (1) brought out of stowage before sunrise and are aligned to catch the first rays of the morning sun; and (2) returned to stow position after sunset.
   Ensure mirrors are continuously monitored for malfunctions and remain properly aligned with the sun. Acquire appropriate equipment and establish procedures to cover inoperative or malfunctioning mirrors immediately after malfunctions are discovered to prevent the escape of errant reflections.

2. Minimize reflections from bellows shields by using a non-reflective or diffuse material or coating (for example, paint) for the shields.

3. Ensure PHPP operator establishes and maintains a communication link with Air Force Plant 42 control tower to ensure that when necessary mirrors are positioned so as not to interfere with critical flight operations.

4. Establish procedures to avoid glare when intentionally moving individual collectors off-axis to "dump" power incident on the heat collection elements during periods of high insolation.

If the plant operator needs to dump power and rotate several modules off-axis, the operator shall start with the modules at the north-most and west-most parts of the collector field, which is furthest from the Air Force Plant 42 to the southeast. For each module that is rotated off-axis, the operator shall consider the nearest flight pattern; if it is to the east, then the module shall be rotated to the west, and vice-versa. This rotating shall be done in a manner that minimizes the impact of glare on aircraft (for example, rotating modules furthest from the airport in a direction that is away from flight patterns).

In addition, this plan shall include specific provisions for tracking and compiling data involving any and all mirror malfunctions. This data shall include the (1) date, time and location of offending mirror or mirrors; (2) specific adjustments made to correct each mirror or mirrors; (3) date and time specific adjustments were evaluated for effectiveness; and (4) effectiveness of each adjustment. That information shall be included in the monthly compliance reports during construction and in the semi-annual compliance reports during operation. This information will be used to ensure that the offending mirrors are quickly adjusted, thereby having a minimum impact on flight operations. In addition, this information will provide data for the plant operator to use in monitoring mirror operations and preventing malfunctions.

Verification: Within 30 days prior to the start of construction, the project owner shall submit the required plan to the Air Force Plant 42 Commander for comment and to the CPM for review and approval. The project owner shall also notify the CPM when the required modifications have been made and are available for inspection.

In addition, the project owner shall include in the monthly compliance reports all data concerning malfunctions of any mirrors during construction and initial start-up operation of the plant and in the semi-annual compliance reports during regular operation.

TRANS-9 Throughout the construction and operation of the project, the project owner shall work with the Air Force Plant 42 Commander or his or her designated representative to develop and implement a process for documenting, investigating, evaluating, and resolving all project-related glare complaints.
The project owner or authorized agent shall:

1. Work with the Commander, Air Force Plant 42 or his or her designated representative to develop a procedure for quickly resolving complaints. The process shall include a means for immediately alerting through telephone or other means the project owner of a glint and glare complaint as well as a

Complaint Resolution Form (below), or functionally equivalent procedure acceptable to the CPM, Commander, Air Force Plant 42, and the project owner to document and respond to each complaint.

2. Investigate each complaint and contact the Commander, Air Force Plant 42, or his or her designated representative within 24 hours to report on actions to be taken to resolve complaint.

3. If glint or glare is project-related, project owner shall take all feasible measures to reduce glint and glare at its source within 24 hours.

4. As soon as the complaint has been resolved to the satisfaction of the Commander, Air Force Plant 42, or his or her designated representative, submit to the CPM a report in which the complaint as well as the actions taken to resolve the complaint are documented. The report shall include (1) specific details of the complaint as well as (2) information about the final results of glare reduction efforts; and (3) a signed statement by Commander, Air Force Plant 42, or his or her designated representative, in which the complainant states that the glare problem is resolved to his or her satisfaction.

Verification: Thirty days prior to the start of mirror installation, the project owner shall provide copies of the glare resolution form to the Commander, Air Force Plant 42 or his or her designated representative. This form shall include the name and telephone number of the project owner's designated representative authorized to take action to resolve complaints of glint and glare. Within five business days of receiving a glare complaint, the project owner shall file the Glare Complaint Resolution Form in which he or she has documented the resolution of the complaint with the CPM and the Commander, Air Force Plant 42 or his or her designated representative. If the mitigation required to resolve a complaint is not completed within three business days from the date the complaint is received, the project owner shall submit an updated glare resolution form to the CPM and the Air Force Plant 42 Commander or his or her designated representative when the mitigation is implemented along with the items indicated in item number 4, above.

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Appendix TT-1

GLINT AND GLARE COMPLAINT RESOLUTION FORM

Palmdale Hybrid Power Project
(08-AFC-9)

COMPLAINT LOG NUMBER _____

Complainant's name, telephone number, and location of incident:

Phone number: _____

Date complaint received: _____

Time complaint received: _____

Nature of complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: _____

Description of corrective measures taken:

Approximate cost of corrective measures: $ _____

Date corrective measures completed: _____

Complainant's signature: _____ Date: _____

Date first letter sent to complainant: _____ (copy attached)

Date final letter sent to complainant: _____ (copy attached)

This information is certified to be correct:

Signature of Palmdale Hybrid Power Plant manager:

_____

Signature of Commander, Air Force Plant 42, or authorized representative:

_____

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

Appendix TT-2
Plume Traffic Impact Modeling Analysis
William Walters, P.E.

INTRODUCTION

The following provides the assessment of the Palmdale Hybrid Power Project (PHPP) gas turbine/HRSG and cooling tower exhaust stack plumes' potential to impact aircraft and ground-based traffic. Impacts to light aircraft could result due to high vertical velocities that would create turbulence, and impacts to ground-based traffic could occur during cooling tower ground fogging events. Staff completed calculations and modeling to determine the worst-case vertical plume velocities at different heights above the stacks and the potential for ground fogging events at nearby roadway and other ground traffic locations based on the applicant's proposed facility design.

PROJECT DESCRIPTION

The proposed project includes two F-class gas turbines operating in combined cycle mode and a ten cell cooling tower that rejects heat from the steam condenser. Thermal load to the cooling tower comes from both the gas turbine/HRSG, which has duct burners to augment steam production, and from the project's thermal solar collectors.

PLUME TRAFFIC IMPACT MODELING METHODS

VERTICAL PLUME VELOCITY MODELING

Staff has selected a calculation approach from a technical paper (Best 2003) to estimate the worst-case plume vertical velocities for the PHPP exhausts. The calculation approach used by staff, which is also known as the "Spillane approach", is limited to calm wind conditions, which are the worst-case wind conditions. The Spillane approach uses the following equations to determine vertical velocity for single stacks during dead calm wind (i.e. wind speed = 0) conditions:

(1) $(V*a)^3 = (V*a)_o^3 + 0.12*F_o*[(z-z_v)^2-(6.25D-z_v)^2]$

(2) $(V*a)_o = V_{exit}*D/2*(T_a/T_s)^{0.5}$

(3) $F_o = g*V_{exit}*D^2*(1-T_a/T_s)/4$

(4) $Z_v = 6.25D*[1-(T_a/T_s)^{0.5}]$

Where: V = vertical velocity (m/s), plume-average velocity
a = plume top-hat radius (m, increases at a linear rate of $a = 0.16*(z- z_v)$
F_o= initial stack buoyancy flux m^4/s^3
z = height above ground (m)
z_v= virtual source height (m)
V_{exit}= initial stack velocity (m/s)

D = stack diameter (m)
T_a= ambient temperature (K)
T_s= stack temperature (K)
g = acceleration of gravity (9.8 m/s^2)

Equation (1) is solved for V at any given height above ground that is above the momentum rise stage for single stacks (where z > 6.25D) and at the end of the plume merged stage for multiple plumes. This solution provides the plume-average velocity for the area of the plume at a given height above ground; the peak plume velocity would be higher than the plume-average velocity predicted by this equation. As can be seen the stack buoyancy flux is a prominent part of Equation (1). The calm condition calculation basis clearly represents the worst-case conditions, and the vertical velocity will decrease substantially as wind speed increases.

For multiple stack plumes, where the stacks are equivalent, the multiple stack plume velocity during calm winds was calculated by staff in a simplified fashion, presented in the Best Paper as follows:

(5) $V_m = V_{sp} * N^{0.25}$

Where: V_m = multiple stack combined plume vertical velocity (m/s)
V_{sp} = single plume vertical velocity (m/s), calculated using Equation (1)
N = number of stacks

Staff notes that this simplified multiple stack plume velocity calculation method predicts somewhat lower velocity values than the full Spillane approach methodology as given in data results presented in the Best paper (Best 2003).

The applicant noted in the AFC (p. 5.13-21, 22) that they completed a modeling analysis for plume turbulence; however, the applicant's analysis only used an average wind speed of 6 miles per hour and does not evaluate the potential worst-case calm wind thermal plume conditions for both the gas turbine/HRSG and cooling tower (COP2008a).

GROUND FOGGING MODELING

The ground fogging plume modeling for the cooling tower was completed using the Seasonal/Annual Cooling Tower Impact (SACTI) model. The cooling tower operating parameters used in the model are provided in Appendix VR-2 to the Visual Resources Section and used meteorological data supplied by the applicant. This model determines the number of hours that an opaque plume will be at ground level at given distances along the 16 cardinal directions from the cooling tower. The proposed cooling tower layout has the long axis of the tower set along the predominant wind direction for the site, west southwest to east northeast, which will reduce the ground fogging potential.

PLUME TRAFFIC IMPACT MODELING ANALYSIS

VERTICAL PLUME VELOCITY MODELING RESULTS

The calm wind condition vertical plume velocities were calculated for the PHPP gas turbine/HRSGs and the cooling tower. The ambient and exhaust conditions for the gas turbine/HRSGs and the cooling tower, operating at full load, are provided below in **Plume Traffic Impact Table 1**.

Plume Traffic Impact Table 1
Gas Turbine/HRSG and Cooling Tower Parameters

Case	**Gas Turbine/HRSG**		**Cooling Tower**	
	23°F	**64°F**	**40°F 20% RH**	**64°F 40%RH**
Stack Height ft (m)	145 (44.2)		59 (17.98)	
Stack Diameter ft (m)	18 (5.49)		28.0 (8.53) per cell	
Operating Case	Base Nonfired	Base Nonfired	Solar Nonfired	Solar Nonfired
Stack Velocity ft/s (m/s)	68.4 (20.8)	64.7 (19.7)	31.8 (9.70)	31.9 (9.73)
Exhaust Temperature F (K)	191.3 (362)	190.6 (361)	76.8 (296.4)	86.6 (303.5)

Source: AECOM2009h and AECOM2010x

The ten cell cooling tower is a two cell by five cell design. Under cold conditions fewer than 10 cells will operate (AECOM2008h). The conditions modeled are worst case conditions where the plumes are not predicted to be visible, as visible condensed plumes can be seen and avoided by pilots, and also the velocity calculation procedure that is used by staff is not meant for condensed water vapor plumes that would create drag reducing the vertical plume velocity.

Using the Spillane calculation approach staff determined the calm wind plume velocity at different heights above ground level. Staff's calculated plume velocity values are provided in **Plume Traffic Impact Table 2.** The gas turbine/HRSG plume velocities are calculated for the two gas turbine/HRSG exhausts, which are approximately 135 feet apart, while the cooling tower plume velocities are calculated for a ten-stack combined exhaust for the 30°F and 64°F cases, respectively. For the cooling tower the 40°F/20% relative humidity case was selected as a worst-case clear plume case based on the fogging frequency curve provided by the applicant (AECOM 2010x). The values provided below assume that the multiple stack plumes have merged; however, the plumes may not have fully merged at the lowest heights in this table.

Considering that duct firing is more likely to occur seasonally during high summer demand periods during hot weather periods, which are less conducive to thermal plumes, staff has determined that non duct-fired operations are the most reasonable worst-case condition, but have included solar field operation for the determination of worst-case cooling tower operating conditions and resulting thermal plume impacts.

Plume Traffic Impact Table 2
Gas Turbine/HRSG and Cooling Tower Predicted Plume Velocities

Height (ft)	Gas Turbine/HRSGs Plume Velocity (m/s)		Cooling Tower Plume Velocity (m/s)	
	23°F	**64°F**	**40°F 20%RH**	**64°F 40%RH**
300	9.58	8.98	7.18	6.85
400	7.05	6.47	6.08	5.54
500	6.02	5.46	5.46	4.85
600	5.43	4.89	5.04	4.41
700	5.02	4.51	4.73	4.10
800	4.72	4.23	4.49	3.87
900	4.48	4.01	4.29	3.68
1,000	4.28	3.83	4.12	3.53
1,100	4.12	3.68	3.98	3.40
1,200	3.98	3.56	3.86	3.29
1,300	3.85	3.44	3.75	3.19
1,400	3.74	3.35	3.65	3.10
1,500	3.65	3.26	3.56	3.03

Source: Staff calculations.

As explained in the Transportation and Traffic section a vertical velocity of 4.3 m/s has been determined as the critical velocity of concern to light aircraft. For the gas turbine/HRSG cases the heights at which the plume velocity drops below 4.3 m/s are calculated to be approximately 990 feet and 770 feet, respectively for the 23°F and 64°F operating cases. This indicates that the plume velocity of the gas turbine/HRSG exhausts decreases as a function of ambient temperature. Additionally, the plume velocities for the gas turbine/HRSGs would be lower for the duct fired and duct fired/solar operating cases due to the lower exhaust temperatures and velocities that occur under those operating cases. For the cooling tower the heights at which the plume velocity drops below 4.3 m/s are calculated to be approximately 875 feet and 630 feet, respectively for the 40°F and 64°F operating cases, which shows a very strong function of velocity versus ambient temperature. However, the cooling tower vertical plume velocities at low temperatures are likely to be lower than predicted using this worst case velocity calculation as low relative humidity conditions do not normally occur along with very low temperatures in the project area, and higher relative humidity would cause the plumes to be visible and the velocities would drop due to increased density and drag, and visible plumes are generally less of a concern in terms of turbulence impacts as they can be seen and avoided.

COOLING TOWER GROUND FOGGING MODELING RESULTS

Plume Traffic Impact Table 3 provides the predicted number of hours of plume ground fogging with direction from the tower over the three year meteorological data period.

Plume Traffic Impact Table 3
Hours of Worst Case Annual Plume Fogging
Year Round Full Load Operation
Palmdale 2002-2004 Meteorological Data

	Wind From			
	SSW	SW	WNW	All
	Plume Headed			
Distance from tower (m)	NNE	NE	ESE	Sum
	Solar On without Duct Firing at Ambient Temperature, 64 °F			
100	0.0	0.0	0.0	0.0
200	0.7	1.2	0.2	2.1
300	1.5	2.0	0.5	4.0
400	1.5	2.0	0.4	3.9
500	1.1	2.0	0.0	3.1
600	1.0	2.0	0.0	3.0
700	1.0	2.0	0.0	3.0
800	1.0	2.0	0.0	3.0
900	1.0	2.0	0.0	3.0
1,000	0.2	0.5	0.0	0.7

Source: Staff modeling.

The most prevalent ground fogging plume events would be to the northeast and north-northeast. Plumes headed to northeast and north northeast directions would be observed as far as 1,000 meters away from the center of the cooling tower. The north northeast plumes would cross 15th Street East and the East Avenue M at approximately 165 meters and 736 meters from the cooling tower, respectively. The northeast plumes would possibly cross East Avenue M at approximately 962 meters northeast from the cooling tower, but would not appear to impact 15th Street East, which at approximately 89 meters from the cooling tower may be too close for the northeastern ground fogging events. Overall, since 15th Street East is closer to the cooling tower it is forecast to experience more plume fogging events than East Avenue M, but both roadways are forecast to have limited ground fogging potential.

In addition to roadways, the U.S. Air Force Plant 42 (Plant 42) is located directly adjacent to the proposed project site. A portion of the airport property is located on the east side of the project site, and the far west boundary of the airport is only 320 meters east of the cooling tower. Since plume fogging is expected as far as 400 meters in east southeast direction, a portion of this airport area would potentially be affected by occasional plume fogging. However, the runways/taxiways of the airport are located further south and southeast. Therefore, the modeling analysis does not predict that the runways/taxiways would experience plume fogging.

WIND SPEED AND TEMPERATURE STATISTICS

Plume Velocity Table 4 provides the hourly average wind speed and temperature statistics for the meteorological data for Palmdale (1994 to 1996) provided by the applicant (AECOM 2009h). Calm or nearly calm wind speeds can also occur for shorter periods of time within each of the monitored average low wind speed hourly conditions.

Plume Velocity Table 4
Wind Speed and Temperature Statistics for Palmdale

Wind Speed		Temperature	
Calm	10.3%	≤ 30°F	2.5%
≤ 3 m/s	19.0%	≤ 60°F	47.2%

Source: Staff data reduction of applicant provided meteorological data (AECOM 2009h).

Calm conditions/low wind speeds averaging an hour or longer are not the predominant wind condition in the site area, and the anemometer for this Palmdale data set has a relatively poor sensitivity for low wind speeds, which will cause an overestimation of the calm wind condition frequency, but calm winds do occur, and they do occur during lower temperature conditions that are more favorable to higher velocity conditions for the thermally buoyant gas turbine/HRSG and cooling tower plumes.

CONCLUSIONS

The calculated worst-case calm wind condition vertical plume velocities from the PHPP gas turbine/HRSGs and cooling tower are predicted to exceed 4.3 m/s at heights as much as approximately 990 and 875 feet above ground level, respectively. The worst-case dead calm wind and cool to cold ambient conditions used in the velocity calculations will occur occasionally during the plant's life.

The vertical velocity from the equipment exhaust at a given height above the stack decreases as wind speed increases. However, the vertical velocities will remain relatively high, and may exceed 4.3 m/s above 500 feet about ground level, during very low wind speed conditions (less than 1 m/s). These low wind speed conditions do occur at the site location.

Plume ground fogging events are not predicted to occur across any of the Plant 42 runways or taxiways; however, two nearby roadways are predicted to experience very infrequent ground fogging events. The majority of these ground fogging events are predicted to occur on 15th Street; while a very low frequency of ground fogging is predicted to occur across the more heavily traveled Avenue M.

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Appendix TT 3
Glint and Glare Safety Impact Assessment
Palmdale Hybrid Power Project
Gregg Irvin, Ph.D.

The Palmdale Hybrid Power Project (PHPP), located next to Runway 7/25, Air Force Plant 42, is designed to consist of 251 acres of parabolic solar-thermal collectors and associated heat-transfer equipment. The troughs are aligned on a north-south axis and track the sun as it moves from east to west. With its substantial array of parabolic mirrors, the PHPP could, without mitigation, pose a hazard in the form of of glint and glare to pilots operating aircraft to and from Air Force Plant 42. Pilots using Air Force Plant 42's Runway 4/22, the main runway, would be approximately 1.7 statute miles (approximately 9,000 feet) from the PHPP's parabolic mirrors. Consequently, pilots' exposure to glint and glare would be minimal.

The greater danger for exposure to glint and glare would occur for pilots using Air Force Plant 42's Runway 7/25. At some point, pilots using Runway 7/25 could be as close as 2,000 feet to the nearest parabolic solar-thermal collectors. Because of the close distance, pilots' exposure to glint and glare could result in a temporary afterimage. That afterimage could affect the pilots' ability to control the aircraft. Consequently, staff has recommended mitigation to reduce to less than significant the impacts of glint and glare for pilots using Runway 7/25. Those conditions of certification will also mitigate any effects from glint and glare for pilots using Runway 4/22.

Definition of Glint and Glare

Glint, a momentary flash of light, and glare, a relatively continuous source of excessive brightness relative to ambient lighting, are conditions with which pilots must contend on any sunny day. Any number of objects can reflect sunlight into the sky, including windows on buildings and vehicles, lakes and ponds, polished surfaces, and high reflectance surfaces as well as low reflectance objects with specular surfaces. Reflections off an aircraft itself can cause glint and glare for pilots.

Glint and glare do not necessarily pose equally serious hazards in all modes of flight. In cruise mode at relatively high altitude, pilots are more easily able to avert their eyes from the source of the glare and have time for their eyes to readjust than if they are executing low altitude maneuvers and maintaining separation from other aircraft as they prepare to land. The concern posed by the proposed PHPP is the adverse effects that glint and glare might present to pilots flying at low altitudes and in close proximity to the mirror array in and out of Air Force Plant 42.

Glint and glare are produced by either specular or diffuse reflection. Specular reflections occur off mirror-like surfaces, where the angle of reflection is identical to the angle of incidence from the light source. Diffuse reflections occur off rough or uneven surfaces, where the reflection angles are distributed in many directions as a function of the light source incident angle(s).[1] This distribution is termed the Bidirectional Reflectance Distribution Function or BRDF. The concern posed by the proposed PHPP is specular reflection off the parabolic mirror troughs. The glare potential from diffuse reflections is substantially lower and is not a concern at the proposed PHPP. Glint and glare from the specular parabolic mirrors at PHPP could occur from:

- Improper mirror alignment. Specular reflections resulting in glint and glare can occur at any time of day or time of year if the mirrors become misaligned with respect to the sun.
- Mirror deployment and stowage operations. Specular reflection off the mirror troughs could occur when the troughs are moving from stow to tracking positions and from tracking to stow positions. This condition can be considered as a transient condition in which there is an improper mirror alignment.
- Mirror low-angle geometries with respect to the sun. Glint and glare could also occur during the winter when the sun is low on the southern horizon and aligned with the trough, causing reflected light to spill from the north end of the troughs (referred to as end loss).[2] Also, in the summer, when the sun rises and sets towards the north, end loss spillage could also occur from the south end of the troughs in the early morning and early evening hours.
- Reflections from stainless-steel tubular joints. At certain times glare may be produced by reflections from the stainless-steel tubular joints between the mirrors which connect the individual mirror receiver tubes. When illuminated the receiver tubes receive focal plane illumination from the mirrors. This glare has been documented to be significant from distances of at least 2 miles away.

Metrics for Determining Significant Impacts of Glint and Glare

In visual science the spatial, temporal and intensity profile of a stimulus is directly related to its glint and glare potential. As a visual stimulus increases in its spatial extent, size, or increases in its intensity, luminance, the potential for glare and glare associated adverse performance effects increases. This effect has also been documented recently by scientists and engineers at the Solar Technologies Department at Sandia National Laboratories. They have proposed a safety metric for assessing the effects of glint and glare, based on a review of medical research and other research undertaken by the U.S. Air Force.[1] They noted that adverse effects of glint and glare are functions of the level of retinal irradiance and the subtended angle of the light source meeting the retina.[3] That is, as the intensity of light reaching the retina increases, and the subtended angle of the light source increases (becomes larger in the visual field of the observer), adverse effects on visual performance increase.

Additionally, the temporal duration of a visual stimulus can affect perceived brightness in a non-linear fashion. Glint can result from short duration stimuli (50-100 msec) where the perceived brightness can be substantially greater than for a longer duration stimulus. This effect is known as the Broca-Sulzer effect and describes the apparent transient increase in brightness of a flash of short duration.[4] Such brief exposures leading to an enhanced glare potential are common in an airborne environment due to relative velocity effects with respect to a stationary ground-based glare source.

The Sandia team has proposed two performance standards for describing the adverse impacts of glint and glare:

- Potential for permanent eye damage; and
- Potential for glint (transient) and glare (relatively sustained) and the

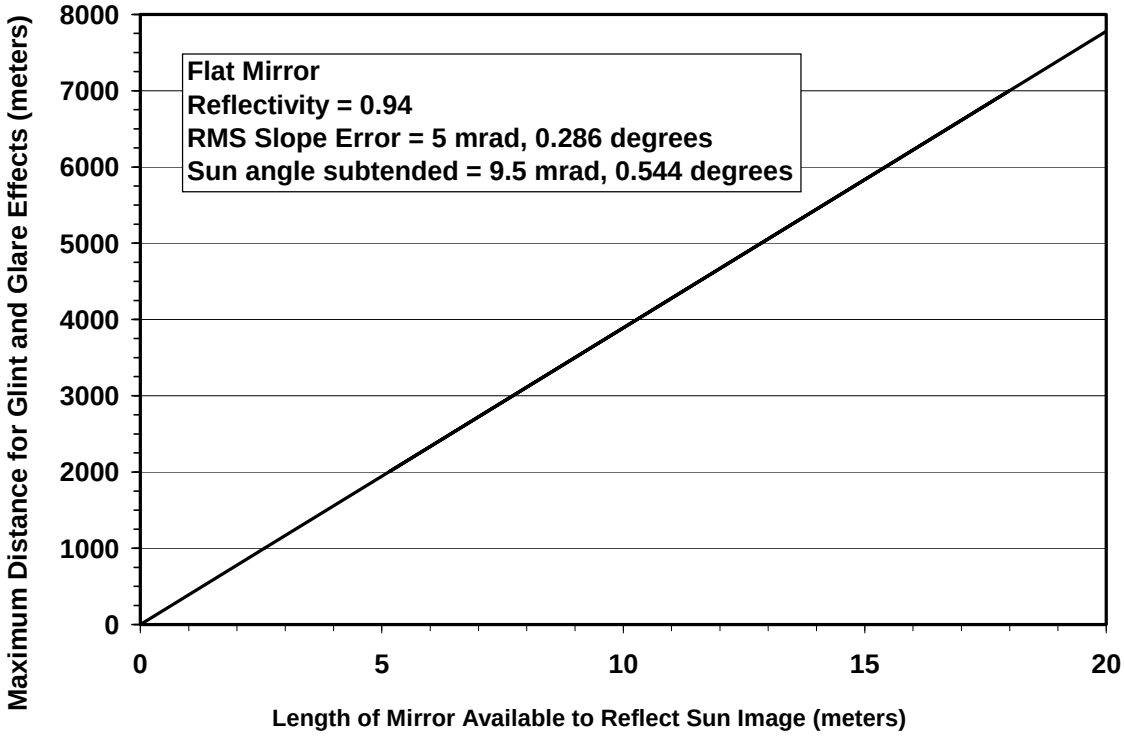
associated post exposure afterimage.
Both thresholds have been developed empirically and can be measured through equations accounting for the intensity of the light source and the subtended angle of the reflected image.

Permanent eye damage is caused by extremely high intensities of light that burn the retina. At substantially lower levels, the intensity of light can be great enough to cause both glint and glare effects. Both glint and glare produce transient afterimages, which is caused by transient bleaching the retinal pigments. Both glint and glare are characterized by a temporary afterimage in the visual field. Both the debilitating effects of glint and glare during exposure and the subsequent afterimage post exposure can last for varying durations. A common example is the glare effect of a camera flash in a dim room and the effect after the camera flash of the presence of an afterimage.[4]
It is important to note that an afterimage behaves as a real visual stimulus, i.e., an afterimage has an equivalent background luminance or "dark light equivalency.[6, 7, 8]
Thus, an afterimage (like after viewing a camera flash) can compromise visual performance (reduced acuity, contrast sensitivity, etc.) in exactly the same manner as a persistent glare source (see Crawford Transform [9]).

Exhibit1 was developed for this study to provide criteria for assessing the potential impacts of glint and glare from the proposed PHPP facility on pilots operating at Air Force Plant 42.The exhibit presents maximum distances between the parabolic mirror and an observer at which glint and glare effects can occur as a function of mirror length available to reflect the sun. (Permanent eye damage is not a concern at the distances from the parabolic troughs at which aircraft will be operating.) The calculated distances assume specular reflection from a parabolic mirror with a reflectivity of 0.94, an aperture of 6 meters, a subtended sun angle of 9.4 milliradians (mrad), and slope errors of 5 and 6 mrad.[10]

The focal length for the collector is assumed to be infinite, which would be true of a flat mirror. This validly represents the nature of the reflection off the long (linear) axis of the trough collector. The reflected sun image along this long axis, rather than the short parabolic axis, is the critical feature in assessing the potential for glint and glare. The reflected image of the sun along the long axis would maintain a constant subtended angle in the observer's visual field as the observer moves further from the mirror. This would partially counteract the decrease in irradiance as distance from the mirror increases.

The net irradiance projected onto the retina would remain relatively constant with increasing distance because the decrease in irradiance with distance would be offset by the constant size of the reflected image in the visual field (i.e., the inverse square law or Piper's Law of Partial Spatial Summation [11]). This effect would cease when the observer is so far from the mirror that the entire image of the sun no longer appears in the mirror. Exhibit 1 indicates that the maximum distance travelled by a reflection intense enough to cause a temporary afterimage depends on the length of the mirror available to reflect the sun. The longer the mirror, the farther the intense flash of light travels. A mirror 5 meters in length would reflect sunlight intense enough to cause a temporary afterimage approximately 2,000 meters. A mirror 20 meters in length would reflect blinding sunlight a distance of 7,800 meters (approximately 4.8 miles).



Notes:

mrad (milliradians)
One-thousandth of a radian. The radian is a description of an angle subtended by a circular arc. It is computed as the ratio of the length of the arc to the radius of the arc. Note: 1 degree = 1.75 mrad, 1 radian = 57.3 degrees.

RMS (root mean square)
The standard deviation of multiple measurements in milliradians of the slope error of the mirror surface.

Slope Error
The relative angular deviation in milliradians of the mirror surface from a perfect parabolic shape.

Subtended Angle
An angle subtended by (or lying within) a circular arc. In this analysis, the subtended angle describes the relative size of a reflected image, with the circular arc representing the field of view of a person with normal vision.

Sun Angle Subtended
The relative spatial extent; size of the sun in the visual field.

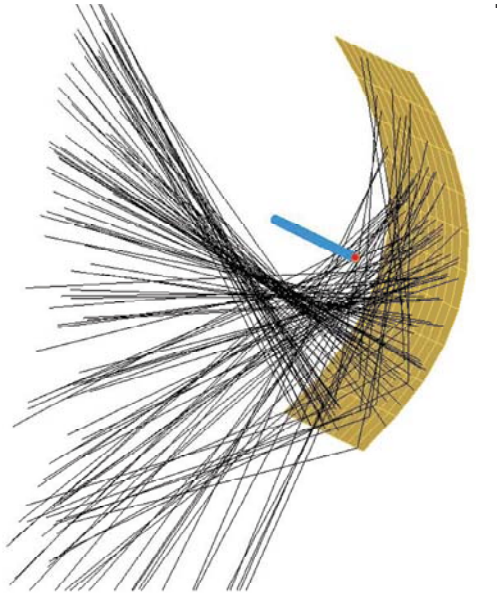
1/ The calculation of maximum distances for afterimage assumes that the collector is flat and focal length is infinite, which is true along the long-axis of the linear collector. The calculation is derived from Ho et al., Methodology to assess potential glint and glare hazards from concentrating solar power plants: analytical models and experimental validation. In Proceedings of the 4th International Conference on Energy Sustainability, ES2010, Phoenix, AZ, May 17-22, 2010, p. 2.

2/ Typical RMS slope errors of current parabolic trough collectors are approximately 5 to 6 mrad (personal communication, Tim Moss, Sandia National Laboratories, 6/16/2010).

Source: Adapted from Clifford K. Ho, June 2010.

Exhibit 1

Maximum Distances at Which Flash Blindness May



Misalignment specular reflections of solar image

Occur from Specular Reflections at PPHP

Potential for end loss when the sun is low on the horizon to the northeast, south, or northwest of the mirror array.
Potential for reflection along length of mirror array when misaligned with sun or Potential for reflection along length of mirror array when misaligned with sun or when moving to or from stow position.

Source: Adapted from Clifford K. Ho, June 2010.

Exhibit 2

Examples of Specular Reflection from Parabolic Trough Solar Collectors

At Air Force Plant 42, the sun is approximately 30.8 degrees above the horizon on noon of the winter solstice.[12] When the sun is 30.8 degrees above the horizon, and assuming that the heat collection element is 1.5 meters from the vertex of the parabolic mirror, approximately 3 meters at the northern edge of the mirrors would spill specular reflections of the sun off the north edge of the mirror array. Referring to Figure 1, a mirror 3 meters in length would reflect sunlight intense enough to cause a temporary afterimage at a distance of approximately 1,200 meters (3,937 feet.

The bottom panel on Exhibit 2 indicates how sunlight would be reflected if the mirror array was misaligned or moving to or from the stow position. In those situations, the entire length of the mirror would be available to create specular reflections. According to information provided by the applicant, each mirror unit is 63 feet (approximately 19 meters) long. These units are arranged end-to-end in rows and cover an area of 251

acres, or 0.392 square miles.

With an estimated 75 ft by 25 ft appropriate mirror spacing, this footprint results in an estimated number of mirrors in excess of 14,800. If one of the mirror units was misaligned with the sun, it could reflect a glare image a distance of about 25,000 feet (approximately 4.7 statute miles). If an entire row of mirrors were misaligned, it could reflect a glare image considerably farther, potentially dozens of miles.[12] Both end-loss reflections and potential mirror misalignment reflections are specular in nature, reflecting at the same angle as the angle of incidence. As such, any potential glare field is directed at an upward angle above the ground plane. End loss and mirror misalignment reflections are not considered as relevant or significant for pedestrians or ground based transportation systems.

Impact of Glint and Glare on Aircraft in Flight

Glint and glare and their subsequent temporary afterimages could be a serious problem in the environs of an airport. Pilots need to be able to see clearly in all directions to maintain safe separation from obstacles and other aircraft. In the immediate airport environs, aircraft are at relatively low altitudes and can be operating at low airspeeds, especially if they are on approach to land. Glint and glare images, even for periods as brief as a few seconds, can impede a pilot's ability to see other traffic, to read cockpit instruments, and to react quickly and appropriately in the presence of conflicting traffic. The potential for pilots to be in the line of sight of specular reflections from the parabolic troughs is limited to only some flight tracks and aircraft operating configurations. Information about the position of aircraft relative to the mirrors in the parabolic troughs as well as for the potential for glint and glare effects follows.

Instrument Approaches and Air Force Plant 42 Flight Tracks

Figures 10-12 included in the 2002 *Air Force Plant 42, Palmdale, California, Air Installation Compatible Use Study* indicate more specifically the population (and diversity) of flight tracks at Air Force Plant 42 that are associated with arrival flight tracks (Figure 10), departure flight tracks (Figure 11), and closed flight tracks (Figure 12). Aircraft at Air Force Plant 42 use the following basic flight patterns: Straight-out departures and straight-in approaches:

- Visual Flight Rules (VFR) or overhead landing pattern to the southeast of Runway 04/22 and north of Runway 0725
- Instrument Flight Rules (IFR) or radar closed patterns to the north of the airfield
- VTR rectangular closed patterns pattern to the southeast of Runway 04/22 and north of Runway 0725
- Re-entry VFR patterns

Figures 10-12 indicate that the proximity and over flights of the PHPP for the Figure 10 arrival flight tracks and the Figure 12 closed flight tracks. The figures also indicate that all take-off and landing profiles from runway 7/25, at the western runway region are in relative close proximity to the mirror arrays at a distance of approximately 2,000 feet. The instrument approach routes are primarily north and east of the proposed PHPP and are at relatively high angles of incidence to the north-south oriented parabolic troughs.

Sunlight reflected to the southeast and southwest toward aircraft on approach to Air Force Plant 42 is most likely to occur in the summer very early and very late in the day, when the sun is rising in the east-northeast and setting in the west-northwest. Aircraft on the instrument approach routes would be at high angles of incidence to the mirrors (roughly 70 to 90 degrees) and would be at little risk of experiencing a temporary afterimage resulting from a glint exposure from end-loss reflections. End loss reflections of sufficient intensity to cause an afterimage would be unlikely to travel the distance to the nearest aircraft on the instrument approach routes (approximately 15,500 feet or 3.0 statute miles).

The risk of glint or glare and the resulting transient afterimage caused by errant specular reflections would be greatest for pilots on the Runway 25 approaches early on summer mornings and evenings when the mirrors are rotating out of and in to the stow position. Flashes of light of sufficient intensity to cause a glint/glare image could be reflected to the southeast for distances of several miles, based on the information provided in Exhibit 1. While each mirror array would reflect light toward the Runway 25 approach tracks for only a brief time, pilots may experience a sequence of temporary exposures resulting in afterimages as the whole set of mirror assemblies rotate out of storage.

The geometries of aircraft following missed approaches would sometimes be subject to equivalent exposure effects.

Analysis of Runway Traffic Patterns

Runway 7/25 Traffic Pattern

Aircraft in the Runway 7/25 traffic patterns, depicted in Figures 10 and 11, encompass and overfly the PHPP site at distances from the mirrors ranging from 4 miles to as close as 2,000 feet from the nearest parabolic trough. Both the closed flight tracks in Figure 12 and the arrival flight tracks encircle the PHPP in all directions and in relatively close proximity. Further, both arrival and departure flight tracks are in close proximity, 2000 feet from the mirror array, during take-offs and landings on the western end of the runway.

Aircraft entering, operating in, and exiting the Runway 7/25 traffic patterns would not likely be exposed to significant reflection from the parabolic troughs, since they would not be flying directly toward areas where end loss reflections would most commonly be directed (to the north during the winter and to the south during the summer, early and late in the day).

It is possible that aircraft turning from the crosswind to the downwind leg of the patterns could receive direct end loss reflections early on summer mornings when the sun is in the northeast. This exposure would be fleeting as the aircraft executes its turn. At their closest, aircraft would be within approximately 0.4 miles (approximately 2100 feet) from the nearest parabolic trough. This would be within range for end loss reflections to be a problem especially if multiple mirrors were directing end loss reflections at the pilot. Additionally, it would be close enough to risk glare and afterimage effects caused by reflections from the parabolic troughs as they rotate out of the nighttime stow position. Both the closed flight tracks and the arrival flight tracks have legs which overfly the

mirror array. It is possible that pilots could see reflections spilling to the northeast and northwest on winter afternoons and mornings when the sun is low on the southern horizon in these situations. During a mirror array over flight the aircraft would be close enough to the mirror arrays (approximately 1,100 to 1,600 feet, or 340 to 490 meters, above the mirrors) for glare and temporary afterimages to be a possibility (based on the graph in Exhibit 1). However, with accurate mirror tracking these reflections are not considered significant unless they were coupled with mirror misalignment conditions. Pilots flying over the parabolic mirrors would only experience significant glare effects if the mirrors were misaligned with the sun.

Additionally, the western end of runway 7/25 is in relatively close proximity to the solar arrays at a distance of approximately 2000 feet. At this location and distance, during either departure or arrival, the potential for end loss reflections exist at sufficient intensity to cause temporary glare and afterimages during the take-off and landing phases of flight. These conditions, however, would be limited to reflections early on summer mornings or late on summer evenings to be intense enough to cause temporary afterimages. Further, the transient glare image (coming from the north) would be at right angles to the pilots' forward line of sight (east or west on runway 7/25).
At low altitudes reflections from the stainless steel tubular joints between the mirrors (which join the individual mirror tubes) can arise from the intense light focused on them by the mirrors. The glare image from these reflections are dispersed to the west and east axis at relatively low angles. Reflective glare from the tubes will fall off significantly from the west and east directions. Reflections from the tubular joints could produce significant glare for a sub population of all three flight tracks (arrival, departure and closed) when in proximity (about 2 miles) of the west and east axis.

Runway 4/22 Traffic Pattern

On early summer mornings and evenings, when end loss reflections toward the southwest and southeast might occur, pilots entering the runway 4/22 traffic patterns may be able to see end loss reflections. Because only a small portion of the mirror arrays will be the source of end loss reflections, the glint and/or glare is unlikely to travel far enough to be a problem for pilots. Aircraft would be no nearer than about 1.7 statute miles (approximately 9,000 feet) from the mirrors. Aircraft on other legs of the traffic pattern would not be in a position to receive direct end loss reflections from the parabolic troughs. End loss reflections are not considered significant for any of the runway 4/22 traffic patterns.

The runway 4/22 flight tacks do not overfly the mirror array and are at their greatest proximity at 1.3 statute miles, approximately 7,000 feet. As with the runway 7/25 flight tracks, with accurate mirror tracking these reflections are not considered significant, unless they were coupled with mirror misalignment conditions. The risk of glint and glare caused by errant specular reflections would be greatest for pilots on the Runway 4/22 approach traffic patterns early on summer mornings when the mirrors are rotating out of the nighttime stow position. Flashes of light of sufficient intensity to cause glint and afterimages could be reflected to the southeast for distances of several miles, based on the information provided in Exhibit 1. Each mirror array would reflect light toward the Runway 4/22 approach tracks for only a brief time. Pilots may experience a sequence of temporary afterimages as the entire set of mirror assemblies rotate out of storage.

As previously explained, reflections from the stainless steel tubular joints are dispersed to the west and east at low angles. Runway 4/22 flight tracks achieve their greatest proximity to the mirrors on this axis at a distance of 1.3 statute miles or approximately 7,000 feet. Reflections from the tubular joints could result in significant afterimages resulting from glare for a subpopulation of the arrival, departure, and closed flight tracks when in proximity (about 2 miles) of the west and east axis.

Aviation Safety Impacts of Glint and Glare

The mirror arrays at the proposed PHPP are oriented with respect to the runways and traffic patterns at Air Force Plant 42 so as to avoid the risk of glint and glare to pilots under most circumstances. The risk of experiencing glint and glare as well as a temporary afterimage, however, could occur in some operating configurations for both Runway 7/25 and Runway 4/22. At its closest point, Runway 7/25 is located about 2,000 feet from the PHPP. At its closest point, Runway 4/22 is located about two miles from the PHPP. That two-mile distance of Runway 4/22 from the PHPP significantly reduces the effects of glint and glare on pilots using that runway.

Runway 7/25 Traffic Patterns

- Mirror low angle geometries with respect to the sun. Departure and arrival aircraft at the western end of the runway as well as aircraft on certain approach patterns are considered to be at risk of experiencing glint and temporary afterimages from reflections. Pilots could experience adverse end-loss reflection during take-off and landing at the western end of runway 7/25 at low sun angles during winter mornings and evenings.
- Improper mirror alignment. On closed flight and arrival flight tracks which overfly or are in close proximity to the mirror array pilots could experience glint and glare under mirror misalignment conditions. Both the closed flight tracks and the arrival flight tracks have legs which overfly the mirror array and with accurate mirror tracking these reflections are not considered significant. However, under conditions of mirror misalignment, the glare effects during over flights could be significant.
- Mirror deployment and stowage operations. Certain approach patterns would be close enough and at the appropriate geometries to risk transient glare and afterimage effects caused by reflections from the parabolic troughs as they rotate out of the nighttime stow position.
- Reflections from stainless-steel tubular joints. At certain times glare may be produced by reflections from the stainless-steel tubular joints between the mirrors which connect the individual mirror receiver tubes. Reflections from the tubular joints could produce significant glare for a sub population of all three flight tracks (arrival, departure and closed) when in proximity (about 2 miles) of the west and east axis.

Runway 4/22 Traffic Patterns

- Mirror low angle geometries with respect to the sun. End loss reflections are not considered significant for any of the runway 4/22 traffic patterns.
- Improper mirror alignment. The runway 4/22 flight tacks do not overfly the mirror arrays and in their greatest proximities to the arrays any reflections are not considered significant, unless they were coupled with mirror misalignment

conditions.

- Mirror deployment and stowage operations. The risk of glint and glare caused by errant specular reflections would be greatest for pilots on the Runway 4/22 approach traffic patterns early on summer mornings when the mirrors are rotating out of the nighttime stow position.
- Reflections from stainless-steel tubular joints. Reflections from the tubular joints could produce significant glare for a sub population of the arrival, departure and closed flight tracks when in proximity (about 2 miles) of the west and east axis.

To ensure impacts of glint and glare to pilots using either Runway 4/22 or Runway 75 or both are reduced to less than significant, staff has proposed conditions of certification. Those conditions may be found at the end of the Traffic and Transportation section of this document.

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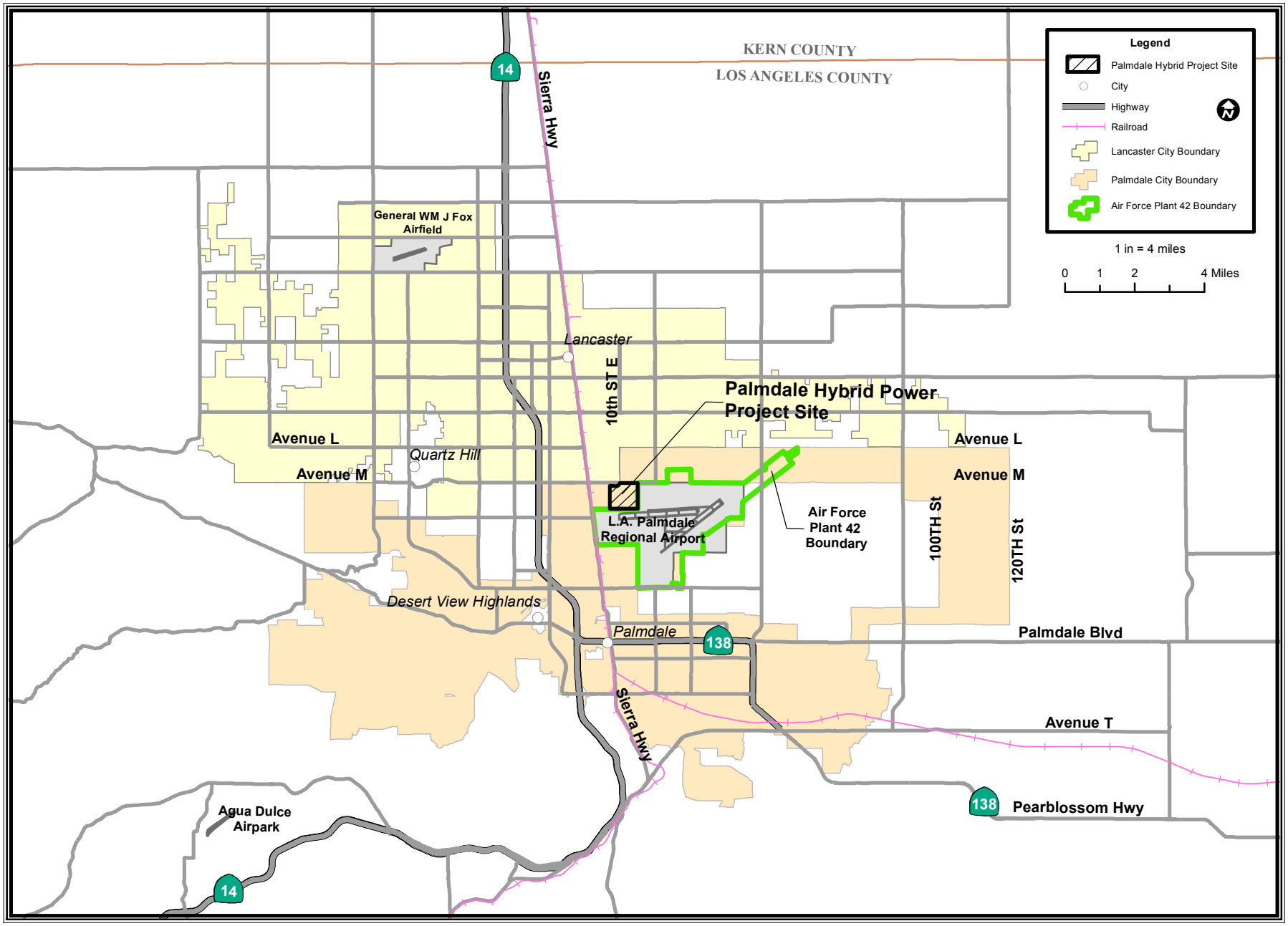
TRAFFIC AND TRANSPORTATION - FIGURE 1

Palmdale Hybrid Power Project - Regional Transportation Network



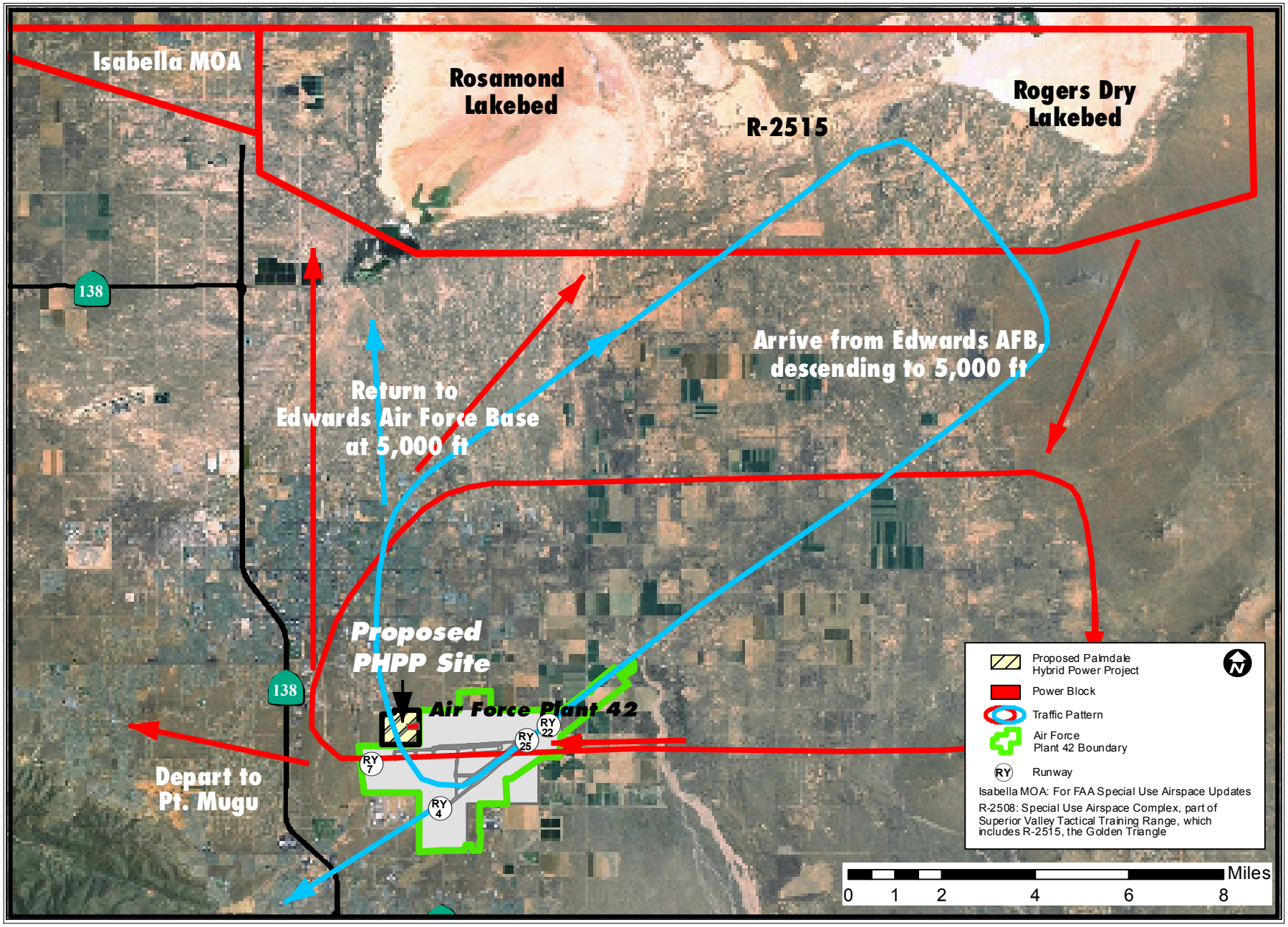
TRAFFIC AND TRANSPORTATION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Tele Atlas & City of Palmdale, City of Lancaster

TRAFFIC AND TRANSPORTATION - FIGURE 3

Palmdale Hybrid Power Project - Plant 42 Air Traffic Patterns



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CEC Staff

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The applicant, the City of Palmdale, proposes to transmit the power from the proposed Palmdale Hybrid Power Project (PHPP) to the Southern California Edison's (SCE's) transmission grid through SCE's existing Vincent Substation approximately 11 miles to the south-southwest. The proposed line would be constructed in two phases and would involve the use of a line of 35.6 miles as necessary to avoid specific area aviation-related facilities and businesses. The proposed PHPP would be owned and operated by the City of Palmdale with the related Phase I transmission facilities constructed, owned and operated by the applicant while the Phase II line would be constructed and owned by SCE. Since the two lines would be located within the SCE service area, they both would be operated, and maintained according to SCE's guidelines for line safety and field management which conform to applicable laws, ordinances, regulations and standards (LORS). With the five proposed conditions of certification, any safety and nuisance impacts from the proposed project line would be less than significant.

INTRODUCTION

The purpose of this staff assessment is to assess the proposed Palmdale Hybrid Power Project's transmission line's design and operational plan to determine whether its related field and non-field impacts would constitute a significant environmental hazard in the areas around the proposed route. All related health and safety laws, ordinances, regulations, and standards (LORS) are currently aimed at minimizing such hazards. 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.

The following federal, state, and local laws and policies apply to the control of the field and nonfield impacts of electric power lines. Staff's analysis examines the project's compliance with these requirements.

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 7640) with the FAA in cases of potential for an obstruction hazard.
FAA Advisory Circular 70/460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.
Interference with Radio Frequency Communication	
Federal	
Title 47, CFR, section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication.
State	
California Public Utilities Commission (CPUC) General Order 52 (GO-52)	Governs the construction and operation of power and communications lines to prevent or mitigate interference.
Audible Noise	
Local	
City of Palmdale General Plan: Noise Element	Establishes goals and policies to ensure that the city's residents are protected from excessive noise.
City of Lancaster General Plan: Noise Element	Establishes goals and policies to ensure that residents are protected from excessive noise.
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
Title 8, California Code of Regulations (CCR) section 2700 et seq. "High Voltage Safety Orders"	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.

Applicable LORS	Description
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations"	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
GO-131-D, CPUC "Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California"	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring electric and magnetic fields from an operating electric line.
Fire Hazards	
State	
14 CCR sections 1250-1258, "Fire Prevention Standards for Electric Utilities"	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

SETTING

As discussed by the applicant, the City of Palmdale, COP, (2008a, pp 1-1, 2-1, 5.2-18, 5.2-19, and 5.7-17 through 5.7-21) the proposed project site is in the northernmost portion of the City of Palmdale approximately 60 miles north of downtown Los Angeles. The 377-acre site is part of an approximately 600-acre City-owned property bounded by Sierra Highway to the west, East Avenue M to the north, and Air Force Plant 42 (Plant 42) to the south and east. The presence of the Plant 42 and other aviation-related area facilities is one of the reasons for the circuitous route proposed for the 230-killovlt (kV) transmission line as it connects the facility to the SCE Vincent Substation approximately 11 miles to the south southwest.

The proposed project line would be constructed in two phases. The phase I segment would be a an overhead 230-kV line of approximately 23.7 miles to be erected by the applicant in new and existing rights-of-way between the project site and SCE's Pearblossom Substation to the southeast. Phase II would be a system reliability upgrade by SCE that would increase the system's transmission and expand the existing Vincent Substation to the southeast. This

would involve construction of a new 11.9-mile double-circuit 230-kV line within the right-of-way of existing lines connecting the Pearblossom and Vincent Substations. This substation and transmission line upgrade is part of SCE's Tehachapi Renewable Project and the Antelope Transmission Project. Most of the Phase I Segment (Segment 1) would be within the City of Palmdale with the remainder of Segment 1, and the Phase II Segment (Segment 2) located within unincorporated Los Angeles County (COP 2008a pp.2-1 through 2-33).

The proposed project site is in an undeveloped desert land with the surrounding area zoned for commercial and industrial uses. The nearest residential area is located approximately one mile to the north but there are a few scattered residences in the surrounding area the nearest of which is approximately 1,500 feet to the northwest. The route of the proposed 36.5-mile project line would run through or near undisturbed desert land, agricultural land, and industrial and residential areas (COP 2008a, p. 2-33), raising the potential for the long-term residential field exposures that have been of health concern in recent years.

PROJECT DESCRIPTION

The proposed project line would consist of the following individual segments:

- Segment one which would be a new 230-kV overhead transmission line extending approximately 23.7 miles from the on-site project switchyard to SCE's Pearblossom Substation;
- Segment 2 extending approximately 11.9 miles westward from the Pearblossom Substation to the Vincent Substation;
- The project's on-site 230-kV switchyard from which the conductors would originate; and
- Project-related upgrades within the Pearblossom and Vincent Substations.

As more fully discussed by the applicant in its application for certification, AFC (COP 2008a, pp. 2-32 and 2-33, and 5.7-17 through 5.7-23), and in response to staff's data requests (AECOM 2009 b), Segment 1 would be located within new and existing rights-of-way as it extends from the on-site substation through the northeast corner of the site, along 10th St E and E Ave L. The line would then continue over industrial and agricultural areas, along existing road rights-of-way, over open spaces, and through areas zoned for non-urban residency, until entry into the Pearblossom Substation via the existing SCE line right-of-way. The conductors would be supported on steel poles spaced approximately 750 feet apart, and would be between 100 feet and 135 feet in height. The Segment 2 conductors would also be supported on new steel poles as the line runs within the existing SCE right-of-way with existing lines. These new support poles would be designed for two-circuit capacity; but only one side of the pole would be used and the other side reserved for future grid expansion.

Segment 2 would also be constructed for double-circuit transmission with conductors on both sides of the support poles. One set of conductors would be the new 230-kV interconnection between Pearblossom and Vincent Substations, the other would be the replacement for the 230-kV line currently providing power to the California Department of Water Resources'

(DWR's) pumping station via the Vincent Substation. The proposed construction scheme would allow for continued energy to the DWR station during construction activities. As a proposed SCE line, this PHPP line would be designed, built, operated, and maintained according to SCE guidelines that comply with existing health and safety LORS (COP 2008a pp. 2-32, and 5.14-1 through 5.14-4). The applicant provided the details of the proposed support structures as related to line safety, maintainability, and field reduction efficiency (COP 2008a, Figures 5.14-6 and 5.14-7).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

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.

DIRECT IMPACTS AND MITIGATION

Proposed Project

Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace. The requirements listed on **TLSN Table 1** establish the standards for assessing the potential for obstruction hazards within the navigable space and establish the criteria for determining when to notify the FAA about such hazards. As noted by the applicant (COP 2008a, p. 5.7-3, 5.13-6, and 5.13-7), these regulations require FAA notification in cases of structures over 200 feet from the ground and within the navigable space around the structure in question. Notification is also required if the structure is to be below 200 feet in height but would be located within the restricted airspace in the approaches to public or military airports. For airports with runways longer than 3,200 feet, the restricted space is defined by the FAA as an area extending 20,000 feet from the runway. For airports with runways of 3,200 feet or less, the restricted airspace would be an area that extends 10,000 feet from this runway. For heliports, the restricted space is an area that extends 5,000 feet.

The closest aviation-related facility is the adjacent Plant 42 with its civilian and military air operations from the Plant 42/Palmdale Regional Airport facility. As noted by the applicant, the northern portion of the project line (that runs along E Ave L, the northern portion of the gas supply line, and the sanitary wastewater and reclaimed water supply pipeline) would lie within a restricted zone for flights from the adjacent Plant 42/Palmdale Regional Airport. However, the maximum height of 135 feet for the proposed line support structures (COP 2008a pp. 5.7-

23 and Figures 5.14-6 and 5.14-7) would be much less than the 200 feet that triggers the concern over aviation hazard according to FAA requirements.

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as *corona discharge*, but is referred to as *spark gap electric discharge* when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any such interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas.

The proposed project lines would be built and maintained in keeping with standard SCE practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for lines of 345 kV and above, and not for 230-kV lines such as the proposed lines. The line's proposed low-corona designs are used for all SCE lines of similar voltage rating to reduce surface-field strengths and the related potential for corona effects. Given the line's low-corona design, staff does not expect any corona-related radio-frequency interference or related complaints but recommends a specific Condition of Certification, (**TLSN-2**) in the unlikely case of such 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 can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345 kV or higher. It is, therefore, not generally expected at significant levels from lines of less than 345 kV as proposed for PHPP. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally

indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. Since the low-corona designs are also aimed at minimizing field strengths, staff does not expect the proposed line operation to add significantly to current background noise levels in the project area. For an assessment of the noise from the proposed line and related facilities, please refer to staff's analysis in the **Noise 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 lines (COP 2008a, p. 5.14-2). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this mitigation approach. Condition of Certification **TLSN-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 (COP 2008a, pp. 5.14-2 and 5.14-8) 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 (COP 2008a, p. 5.14-7). Staff recommends Condition of Certification **TLSN-5** to ensure such grounding for PHPP.

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

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 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.

Given the proposed project line's low-field design, (as Segment 1 and Segment 2), any long-term residential field exposures would be at levels associated with SCE lines of similar voltage and current-carrying capacity. It is this similarity with existing lines that constitutes compliance with present CPUC's policy on line field management.

Maximum field intensities for Segment 1 (alone within its own right-of-way) reflect the effectiveness of the applied field reduction measures and potential level of contribution to area exposures. The applicant (COP 2008a, pp. 5.14-5 through 5.14-7, and Figures 5.14-1 through 5.14-7) calculated these maximum field intensities as 30 mG for the magnetic field and 0.65 kV/m for the electric field. These field intensities are similar to those for fields from SCE lines of similar voltage and current-carrying capacity. For Segment 2 (which would share an existing right-of-way with several SCE lines), the maximum intensity of 1.66 kV/m before the line is introduced compares with the 1.86 kV/m estimated for the period the line is

operating. The maximum magnetic field intensity was calculated as 144 mG before the line and the same 144 mG when the new line is operating. The lack of change in magnetic field strength in spite of the added PHPP power reflects the interactive effects of fields from all contributing lines. Since these field intensities would depend on the effectiveness of the applied field-reducing measures, they should mostly remain the same within any specific route connecting PHPP and the Pearblossom Substation in a way that avoids the existing aviation-related facilities. While these maximum field intensities are similar to those of similar SCE lines (as required under current CPUC regulations), they are much less than the 200 mG currently specified by the few states with regulatory limits. The requirements in Condition of Certification **TLSN-2** for field strength measurements are intended to assess the applicant's assumed reduction efficiency.

Closure and Decommissioning Impacts and Mitigation

If the proposed PHPP 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 project 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 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.

No Project/No Action Alternative.

As noted by the applicant (COP 2008a, pp. 4-1 through 4-15) failure to build the proposed PHPP and its related transmission lines would eliminate the potential field and nonfield impacts of specific concern in this analysis. Since the design and operation would be according to existing SCE guidelines, these avoided impacts would be at levels expected for similar area SCE lines.

CUMULATIVE IMPACTS AND MITIGATION

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. The field strength estimates for Segment 1 (within the right-of-way it would occupy by itself) reflects the potential level of its contribution to total field exposures along the Phase One line segment. The Phase Two segment line would similarly add to the cumulative exposure within the occupied corridor. Since the proposed line segments 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 these cumulative area exposures should be at levels expected for SCE lines of similar voltage and current-carrying capacity. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF

management. The actual field strengths and contribution levels for the proposed line design would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-2**.

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.

NOTEWORTHY PUBLIC BENEFITS

Since the proposed PHPP line segments would pose specific, although insignificant risks of the field and nonfield effects of concern in this analysis, their building and operation would not yield any public benefits regarding the effort to minimize any human risks from these impacts.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no public or agency comments on the preliminary staff assessment of the transmission line nuisance and safety aspects of the proposed PHPP.

CONCLUSIONS

Since staff does not expect the proposed 230-kV transmission line to pose an aviation hazard according to current FAA criteria, we do not consider it necessary to recommend location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures that would be implemented in keeping with current SCE guidelines (reflecting standard industry practices). These field-reducing measures would maintain the generated fields within levels not associated with radio-frequency interference or audible noise.

The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of CPUC's General Order 95. Compliance with Title 14, California Code of Regulations, section 1250, would minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices,

would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed PHPP 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. Any long-term, mostly residential magnetic exposure of health concern in recent years would be at levels possible with SCE lines of similar voltage and current-carrying capacity and thus in keeping with current CPUC requirements. 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, staff considers the proposed design, maintenance, and construction plan as complying with the applicable laws. With implementation of the conditions of certification proposed below, any such impacts would be less than significant for any of the area routes that might be chosen to avoid affecting area airport operations.

PROPOSED CONDITIONS OF CERTIFICATION

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 EMF reduction guidelines.

Verification: At least 30 days before starting 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 chosen line option or associated switchyard.

Verification: At least thirty days before starting operation of either line option, the project owner shall submit to the CPM a letter signed by a California registered electrical engineer affirming the project owner's intention to comply with this requirement.

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.

Verification: During the first 5 years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the right-of-way and provide such summaries in the Annual Compliance Report.

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.

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

REFERENCES

AECOM 2009b-AECOM/S Head (tn): 50094). Applicant's Responses to CEC Data Requests Set 1. Dated 02/13/09. Submitted to the CEC/Docket on 02/13/09

COP2008a - (City of Palmdale/. Williams (tn: 47383). Application for certification for the Palmdale Hybrid Power Project, Volumes I and II. Submitted to the California Energy Commission on August 4, 2008.

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.

VISUAL RESOURCES

Testimony of James Adams

SUMMARY OF CONCLUSIONS

Staff analyzed visual resources related information for the Palmdale Hybrid Power Project (PHPP or project), and has concluded that with the effective implementation of the mitigation measures identified by the applicant and contained in staff's proposed conditions of certification, this project would not cause any significant direct or cumulative visual resource impacts, and would comply with applicable laws, ordinances, regulations, and standards (LORS) pertaining to visual resources.

INTRODUCTION

Visual resources are the viewable natural and manmade features of the environment. This analysis focuses on whether construction and operation of the PHPP would cause significant visual impacts under the California Environmental Quality Act (CEQA) and whether the project would comply with applicable LORS.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

VISUAL RESOURCES Table 1 provides a general description of identified adopted federal, state, and local LORS pertaining to maintenance and protection of visual resources relevant to the proposed project.

VISUAL RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	None
State	None
Local	
County of Los Angeles – General Plan Chapter VI – Scenic Resources	The County recognizes that the coastline, mountain vistas, and other scenic features of the region are a significant resource for County residents and businesses.
City of Palmdale – General Plan Environmental Resources Policy ER1.2.2 & Implementation Program G	Several roadways within the City, including Pearlblossom Highway, are designated scenic highways which require special design standards for projects adjacent to these highways in order to protect their scenic qualities. These standards could include the prohibition of overhead utility rights-of-way along scenic highways.
City of Palmdale Municipal Code Section 14.04	It has been determined by the City Council that appropriate action must be taken in order to protect and preserve vegetation, and particularly Joshua trees, so as to retain the unique natural desert aesthetics in some areas of the City, and to promote the general welfare of the community.

SETTING

The PHPP would be built just north of the Air Force Plant 42 in the city of Palmdale, in northern Los Angeles County. The site lies approximately two miles east of State Route (SR) 14, approximately 0.5 mile east of Sierra Highway and the Sierra Bike Trail, and adjacent to the south side of East Avenue M. The proposed project would be constructed on an approximately 377-acre site in a northern portion of the city of Palmdale. The project site currently consists primarily of undisturbed land and does contain a significant number of Joshua Trees which the city of Palmdale considers to be an important natural resource (see **Visual RESOURCES Figure 1** – Existing Conditions, and City of Palmdale 2008a, Figure 2-2).

A notable landscape feature in the regional project setting is the San Gabriel Mountains which are approximately eight miles to the south. The nearest residence with views of the project's power block, which would contain the facility's largest structures and equipment, is located on Palermo Road approximately two miles to the southwest. Motorists and cyclists on Sierra Highway and motorists on East Avenue M would have the closest view of the project (COP 2008a, pg. 5.15-7).

POWER PLANT

Primary equipment for the 570 MW generating facility would include two natural gas-fired combustion turbine-generators, two heat recovery steam generators (HRSGs), one steam turbine-generator (STG) located on 25-acres in the power block, and 250 acres of parabolic solar-thermal collectors in the solar field with associated heat transfer

equipment. The most publicly visible components for the PHPP would include: two 145-foot tall HRSG stacks, one 59-foot tall cooling tower (ten cell), two 70-foot tall inlet air filters, and a 70-foot tall STG enclosure. The PHPP is designed to use solar technology to generate a portion of the project's output (10% of peak power or 57 MW) [COP 2008a, pg. 2-1]. During the construction period, the power plant site and an adjacent 50-acre parcel to the west would be used for parking and construction laydown.

Transmission Line

The 35.6 mile transmission line route is divided into two (2) segments and ends approximately 11 miles south of the plant site at Southern California Edison's (SCE) Victor Substation in an unincorporated portion of Los Angeles County (see **VISUAL RESOURCES Figure 2**). Transmission pole heights will range from 100 to 135 feet (Ibid, pg. 2-33). Segment 1 consists of approximately 24 miles of a new 230 kV transmission line and poles that would go north, east, and south of the project and would be constructed within new and existing designated right-of-way (ROW). The line would connect with SCE's Pearlblossom Substation. Segment 2 is a system reliability upgrade that would extend west from the Pearlblossom Substation to SCE's Victor Substation, a distance of approximately 12 miles. This portion of the project also includes a new 230kV line and poles that would parallel the existing transmission lines in an existing ROW. Segment 2 lies entirely within the county of Los Angeles jurisdiction. Property along this segment is largely undeveloped and is bisected by Pearlblossom Highway.

Natural Gas

Natural gas would be delivered to the project via a new 8.7 mile pipeline which would be designed and constructed by the Southern California Gas Company in an existing ROW within the city of Palmdale (COP 2008a, pg. 2-1).

Water/Wastewater

Process water needs would be met by the use of reclaimed water supplied by the city of Palmdale Water Reclamation Plant (PWRP) via a new 7.4 mile pipeline that will head south from the project site. Emergency backup process water would also be supplied by the PWRP via a planned new waterline connecting the cities of Palmdale and Lancaster. Potable water drinking, sanitary and other washing needs would be provided by the Los Angeles County Waterworks District No. 40. Process wastewater would be treated using a zero liquid discharge system, separating water for reuse from solids in the form of brine that would be processed into solids for landfill disposal. Sanitary waste water would be sent to an existing 12-inch sewer line operated by the Los Angeles County Sanitation District in a new one mile sanitary wastewater line (COP 2008a, pg. 2-2).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant visual resources impact generated by a project, staff reviews the project using the 2010 CEQA Guidelines

Appendix G Environmental Checklist pertaining to “Aesthetics.” The checklist questions are as follows:

A. Would the project have a substantial adverse effect on a scenic vista?

B. Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

C. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

D. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Staff evaluates the existing visible physical environmental setting from a fixed vantage point (called a “Key Observation Point” [KOP]), and the visual change introduced by the proposed project to the view from that KOP. The view as seen from the KOP is referred to as the viewshed. Staff uses a KOP[1] to represent a location(s) from which to conduct detailed analyses of the proposed project and to obtain existing condition photographs and prepare visual simulations. KOPs are selected to be representative of the most critical viewshed locations from which the project would be seen. Because it is not feasible to analyze all the views in which a proposed project would be seen, it is necessary to select KOPs that would most clearly display the visual effects of the proposed project. KOPs may also represent primary viewer groups that would potentially be affected by the project. In addition to KOP photo(s), staff presents landscape character photos that help provide a visual overview of a project site, its vicinity, and the selected KOP area.

Staff also reviews federal, state, and local LORS and their policies or guidelines for the protection or preservation of visual resources that may be applicable to the project site and surrounding area; these LORS include local government land-use planning documents (e.g., General Plan, zoning ordinance). Please refer to **Appendix VR-1** for a complete description of staff’s Visual Resources evaluation process and **Appendix VR-2** for definitions of visual related terms.

VISUAL RESOURCES Figure 2 - KOP Locations **-** shows the locations and view directions of the four selected KOPs for the proposed project and accompanying photo simulations of the proposed power plant structures after construction. Staff’s analysis of each of the applicant’s submitted KOPs is presented under Direct/Indirect Impacts and Mitigation section below. The four KOPs are:

- KOP 1 – Looking west on East Avenue M; the PHPP site is south (left) of the Street and behind the stop light at Site 1 Road.
- KOP 2 – Looking south on 30th Street toward East Avenue M.
- KOP 3 – Looking north on Pearlblossom Highway.

[1]The use of KOPs or similar view locations is common in visual resource analysis. The U.S. Bureau of Land Management (USDI BLM 1986a, 1986b, 1984) and the U.S. Forest Service (USDA Forest Service 1995) use such an approach.

- KOP 4 – Looking East at the PHPP site near the intersection of Sierra Highway and East Avenue M.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The impact discussion is presented under the following topics: scenic vista, scenic resources, visual character or quality, and light or glare.

A. SCENIC VISTA

CEQA checklist question: "Would the project have a substantial adverse effect on a scenic vista?"

The project would not have a significant effect on a scenic vista. Based on staff's field reconnaissance and review of the city of Palmdale General Plan documents, there are no scenic vistas in the viewsheds of the selected KOPs though there are moderately scenic views of the San Gabriel Mountains visible from KOPs 1, 2, and 4. As discussed below under Visual Character or Quality, the visual impacts to these KOPs are less than significant.

B. SCENIC RESOURCES

CEQA checklist question: "Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor?"

A scenic resource for the purpose of this analysis includes a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique visual/historical importance to a community (a tree linked to a famous event or person, an old growth tree); historic building; or a designated federal scenic byway or state scenic highway corridor.

In the KOP 1 viewshed (see **VISUAL RESOURCES Figures 1 and 3A**) there are numerous Joshua trees visible which the city of Palmdale and staff consider scenic resources. Based on staff's reconnaissance of the surrounding area, a review of the inventory of the Joshua trees and California Junipers report prepared for the city of Palmdale, and after discussions with biological resources staff (see the **Biological Resources** section of this FSA for more information), Energy Commission staff believes mitigation involving transplanting Joshua trees and other vegetation is needed on the south side of East M Avenue along the northern border of the project, and on the west side of Site 1 Road along the east side of the project (see additional discussion below regarding KOP-1).This would help screen the projects industrial structures and provide a more natural view from KOP 1. With this mitigation, staff believes the project's impact on scenic resources would be less than significant.

C. VISUAL CHARACTER OR QUALITY

CEQA checklist question: "Would the project substantially degrade the existing visual character or quality of the site and its surroundings?"

The project aspects evaluated under this criterion are broken down into two categories: 1) Construction Impacts; and, 2) Operation Impacts – Analysis From Key Observation Points and Publicly Visible Water Vapor Plumes.

Construction Impacts

Construction activities for the project would occur during an approximate 27-month period. Main activities that would be ongoing on the power plant site during the construction period include: grading of 377 acres for the power block and solar fields involving cut and fill of approximately 1.5 million cubic yards of soil; the installation of the combustion turbine generators (CTGs); steam turbine generator (STG) and power train foundations; the installation of pipe supports; liner plates and baffles and aboveground electrical; exhaust stack fabrication and condenser work; the installation of aboveground tanks; prefabricated buildings; and parabolic solar-thermal collectors with associated heat transfer equipment. In addition, during the construction period, construction materials, heavy equipment, cranes, trucks, modular offices, and parked vehicles would be publicly visible on the construction laydown areas.

The public visibility of the construction site and activities on it would be unobstructed, because of the largely undeveloped and vacant land surrounding the project site and the proximity of Sierra Highway and East Avenue M. Motorists on East Avenue M currently see a desert landscape with Joshua trees and other vegetation at the proposed site. It is likely that there has been no significant construction in the project area for many years since the military buildings and airport were constructed. Motorists are used to a relatively benign and pastoral desert setting. Construction activity as noted above would attract motorist's attention and substantially degrade the view from this KOP. Therefore, staff believes that the construction of the PHPP would be a significant impact to the existing viewshed. Typically, screening of onsite construction site activities is accomplished by attaching a fabric or adding wooden slats to a perimeter fence. This screening is effective in limiting ground level visual exposure of the construction site (see proposed Condition of Certification **VIS-1**). With implementation of **VIS-1**, visual impacts associated with project construction activities would be less than significant (see KOP 1 analysis for additional discussion).

During the construction and installation of the overhead transmission line and associated structures, construction materials, equipment, trucks, and vehicles will be visible from nearby areas along the linear facility routes, but only for a short duration. From the use of drilling augers for the transmission poles, setting the poles and pouring of concrete, and stringing of the transmission conductor, the anticipated timeframe at each juncture is approximately one week. Because of the constant movement of crews from one pole to another, the viewer exposure, and viewer sensitivity is low. Staff concludes that because the visual changes associated with the construction period of the transmission lines would be minor and temporary; impacts would be less than significant.

During pipeline construction, the ground surface along the proposed alignments would be temporarily disrupted by the presence of construction equipment, excavated piles of dirt, concrete and pavement, and construction personnel and vehicles. Along the construction route, visibility from nearby areas would be of a short duration, as each

pipeline segment is generally constructed and installed within a few days, before proceeding to the next segment installation. After construction, the ground surfaces would be restored. The restored ground surfaces and buried pipelines would not create a change to the existing visual condition.

Construction activities would not result in a long-term visual degradation. Overall, the project's construction activities with mitigation identified in **VIS-1** would generate a less than significant visual effect.

Operation Impacts

Analysis from Key Observation Points

KOP 1 – Looking West from the North Lane of East Avenue M (The PHPP Site is south of the Street and Behind the Traffic Signal) – Existing Conditions

KOP 1 **(VISUAL RESOURCES Figure 3A)** was selected to represent views of motorists traveling west along East Avenue M just east of the intersection with Site 1 Road, and a couple hundred yards east of the project site.

Visual Sensitivity
The major elements in this view are the four lane street, expanse of flat, open desert lands south of East Avenue M with numerous Joshua trees and other vegetation in the midground view, and the San Gabriel Mountains and sky in the background. The section of the street in the foreground and midground provides a distinct variation from the typical high desert coloration. The transmission lines and towers are a noticeable feature along the right side of the viewshed in both the fore and midground. The access road (Site 1 Road) to U.S. Air Force Plant 42 is also visible in the left side of the view. The visual quality of the KOP 1 viewshed is considered to be moderate because of the combination of natural features of Joshua trees, other vegetation, San Gabriel Mountains, and sky and industrial features such as a four-lane street, power lines, poles, and street lights,

Both Sierra Highway and East Avenue M have a high number of vehicles per day (over 20,000 [COP 2008a, Table 5.13-6, pg. 5.13-9]). Generally, motorists on these stretches of highway consist of workers traveling to and from the high concentration of military industrial facilities in this area. Typically, workers are not considered highly sensitive to visual change, so the estimated level of viewer concern of motorists along these road segments is considered moderate.
The project site is highly visible from this KOP. The estimated number of motorist exposures would be considered high. Staff visited the project site and estimates the duration of view for motorists traveling east on East Avenue M at the legal speed limit (55-miles per hour) through the KOP 1 viewshed would be on the order of 10 to 20 seconds, which is considered to be moderately low. The overall visual sensitivity for a motorist is considered moderate from the KOP 1 location. This assessment is the result of the moderate visual quality, moderate viewer concern, and moderately low overall viewer exposure.

Visual Change

VISUAL RESOURCES Figure 3B presents a photo simulation of the proposed project's berm and landscaping after the completion of construction in the KOP 1 viewshed.

Figure 3B shows a change in the existing view involving a slated fence, re-planted Joshua trees and other desert vegetation replanted from the project site, and the upper portion of the solar arrays in the north field area.

The project would be noticeable from the KOP 1 location with the vertical form and line of the solar arrays that would differ from the existing view. Without landscaping, the degree of contrast introduced by the project's structures is considered moderately high when compared to the natural and industrial features in the KOP viewshed (road and sky). The photo simulation of the project's structures shows the proportionate size relationship to the other elements in the view. The project structures would occupy a considerable portion of the total field-of-view from KOP 1. Though the structures would be more than 300 feet south of East Avenue M, they would be a co-dominate feature in the view shed when compared to the desert landscape, East Avenue M, and sky.

The project would introduce publicly visible industrial structures to the KOP viewshed that would provide a moderate degree of view disruption and blockage. The overall visual change to the view from KOP 1 would be moderate due to the moderately high contrast, co-dominance, and moderate blockage. Given the moderate visual sensitivity of the viewer, the moderate degree of visual change would be adverse but less than significant. Staff believes the introduction of the PHPP would not substantially degrade the existing viewshed at KOP 1.

City of Palmdale Municipal Code Section 14.04 requires the protection and preservation of vegetation, particularly Joshua trees, so as to retain unique natural desert aesthetics in some areas of the City. Staff is proposing Condition of Certification **VIS-5** which would require landscaping (transplanting existing Joshua trees and other desert vegetation) within the 30 foot setback area between the fence line and East Avenue M and Site 1 Road, to ensure conformity with city LORS. As shown in the simulation, the landscaping would retain and enhance a portion of existing desert vegetated land and would block or disrupt the view of a considerable amount of the solar arrays further reducing the less than significant visual impacts at KOP 1.

KOP 2 – Looking South on 30th Street toward East Avenue M and PHPP Site - Existing Conditions

KOP 2 **(VISUAL RESOURCES Figure 4A)** was chosen to represent views by travelers heading south on 30th Street toward East Avenue M, approximately 2.25 miles northeast of the PHPP.

Visual Sensitivity

The major elements in this view are the roadway in the center of the view, flat open desert views to the left and right in the fore and midground, telephone poles and lines in the left side of the view shed in the fore and midground, and military industrial facilities in the midground. The San Gabriel Mountains and sky are in the background. The KOP

2 viewshed does not include a scenic resource or vista, based on review of the city of Palmdale and county of Los Angeles general plans. The visual quality of the KOP 2 viewshed is considered to be moderate due to the combination of natural and industrial features. The estimated level of viewer concern towards preserving the existing KOP 2 viewshed is considered to be moderate. Given the flat landscape and wide-open viewshed, the natural and industrial features in this view are highly visible.
The estimated number of motorists (2,900 average annual daily traffic) using 30th street is considered to be moderate (COP 2004). Staff visited the project site and estimates the duration of view for motorists and cyclists traveling north or south in the KOP 2 viewshed to an exposure of the project site is on the order of 10 to 20 seconds, which is considered to be moderately low. Overall, view exposure for motorists and cyclists from this KOP is considered moderately low. The overall visual sensitivity for a motorist would be considered moderately low from the KOP 2 location. This assessment is the result of a moderate visual quality, moderately low viewer concern, and moderately low overall viewer exposure.

Visual Change

The KOP 2 simulation displays one difference between the existing photo and the simulation; the transmission line and towers. The new transmission lines would be located adjacent to existing transmission lines in the left fore and mid-ground view and would be consistent with the current lines and forms so the contrast would be low. The new structures would be subordinate to existing features in this viewshed. The simulation shows the proposed steel poles would be a non-reflective grayish color and would have a minor color contrast with the sky compared to the existing dark brown wooden poles. The degree of view disruption or blockage introduced by the new transmission lines and poles is low. The applicant has noted that the color and non-reflected surface of the transmission line structures would reduce their visual contrast with the background view (CPO 2008a, pg. 5.15-13).

The overall visual change to the view from KOP 2 would be low due to the low contrast, subordinate dominance, and low blockage. Given the moderately low visual sensitivity of the viewer and the low degree of visual change, the project's impact would be less than significant with mitigation such as painting and texturing/finishing (see staff's proposed Condition of Certification **VIS-2**).

KOP 3 – Looking Northwest From Pearlblossom Highway Toward the Proposed Transmission Line Route Crossing the Highway – Existing Conditions

KOP 3 **(VISUAL RESOURCES Figure 5A)** is located approximately 12 miles southeast of the project on the north side of Pearlblossom Highway (State Route 138), just west of the Southern California Edison's Pearlblossom Substation. It was chosen to represent the view of the motorists that use this highway. The proposed transmission line would be visible from this KOP.

Visual Sensitivity

The view from KOP 3 towards the proposed project transmission line route includes a view of the four lane highway and flat desert land with transmission lines and towers in the fore and middleground. Background views include flat desert land and sky. The

visual quality of the KOP 3 viewshed is considered moderately low due to the industrial character of transmission lines and towers. Although Pearlblossom Highway is considered a scenic highway by the city of Palmdale, viewer concern is considered moderately low because the motorists are accustomed to the existing viewshed with multiple transmission lines and poles. The estimated number of potential motorist exposures is considered high given the 28,500 average annual daily traffic counts for local motorists using this section of the Highway (Caltrans 2007). The duration of view would be moderately low since motorists are traveling at 55 miles per hour on this section of the highway and would pass through the KOP viewshed fairly quickly. Overall viewer exposure is considered moderately high. The flat landscape and wide-open viewshed from this KOP allows the natural and industrial features to be highly visible.

The overall visual sensitivity for motorists using the Highway at KOP 3 would be considered moderate. This assessment is the result of moderately low visual quality, moderately low viewer concern, and moderately high overall viewer exposure.

Visual Change

VISUAL RESOURCES Figure 5B presents a photo simulation in the KOP 3 viewshed of the proposed project's transmission line and poles after the completion of construction.

The project would be noticeable from the KOP 3 location with the vertical form and line of its transmission lines and poles. The introduced forms and lines would be consistent with the existing transmission lines and poles in the area with a similar size and scale. The degree of contrast introduced by the project's structures is considered low when compared to the natural and industrial features in the KOP viewshed. The photo simulation of the project's structures shows the proportionate size relationship to the other elements in the view. The project structures would occupy a small portion of the total field-of-view of KOP 3. In addition, the structures would visually appear subordinate when compared to other elements in the KOP view. Although the project would introduce publicly visible structures to the KOP viewshed (transmission poles and lines), the degree of view disruption and blockage introduced by the structures is low.

With mitigation, the overall visual change to the view from KOP 3 would be low due to the low contrast, subordinate dominance, and low blockage. Given the moderate visual sensitivity of the viewer and the low degree of visual change, the project's visual impact at KOP 3 would be less than significant with mitigation involving painting, and texturing/finishing (see Condition of Certification **VIS-2**).

As shown in the simulation from KOP 3 (**Visual Resources Figure 5B**), there are existing large lattice shaped transmission towers and lines and two new poles and associated lines related to the PHPP. The project's poles appear to be of similar height compared with the transmission towers though much narrower in size and less visually intrusive. Staff' is proposing Condition of Certification **VIS 2** which would require the project owner to work with the city of Palmdale to ensure that all applicable standards are met to protect the scenic quality of this section of Pearlblossom Highway.

KOP 4 – Looking East Toward PHPP Site Near the Intersection of Sierra Highway

and East Avenue M – Existing Conditions

KOP 4 **(VISUAL RESOURCES Figure 6A)** is located just west of the Union Pacific railroad tracks and just south of East Avenue M near the intersection with Sierra Highway. The project site is located approximately 0.5 miles east of this KOP. It was chosen to represent the view of the motorists that use this portion of East Avenue M which is visible in the left mid-ground portion of the photograph. A similar view could also be experienced by cyclists using the Sierra Bike Trail; particularly if they were using the rest area about one mile south of the intersection of East Avenue M and Sierra Highway. This KOP is the only one of the four KOPs selected by staff where viewers would see cooling tower plumes.

Visual Sensitivity

The view from KOP 4 towards the proposed project includes a view of the railroad tracks and disturbed desert landscape in the foreground. A portion of the four lane East Avenue M, flat desert land with transmission lines and towers and a round water tank are in the middleground. Background views include flat desert land, industrial buildings, transmission lines and towers, mountains and sky. The visual quality of the KOP 4 viewshed is considered moderate due to the combination of industrial and natural features. Viewer concern is moderately low because the motorists are accustomed to the existing viewshed with industrial structures related to U.S. Air Force Plant 42. The estimated number of potential motorist exposures is considered high given the 21,800 average annual daily traffic counts for local motorists using this section of the East Avenue M (AECOM 2009a). The duration of view would be moderately low since motorists are traveling at 65 miles per hour on this section of the highway and would pass through the KOP viewshed fairly quickly. Overall viewer exposure is considered moderately high. The flat landscape and wide-open viewshed from this KOP allows the natural and industrial features to be highly visible.

The view from KOP 4 for cyclists using the Sierra Bike trail would be roughly the same as described above in terms of landscape features, visual quality, and visual concern. However, the duration of view would be considerably longer since cyclists are not moving as fast as motorists. Indeed, the cyclists who use the rest area could see the view for several minutes or longer. However, some cyclists may keep their focus on the Bike Trail and would not look left or right. Staff has been advised that the city of Palmdale does not keep track of the number of cyclists that use the Bike Trail (City of Palmdale 2010). Overall viewer exposure is considered moderate.

The overall visual sensitivity for motorists using the Highway at KOP 4 would be considered moderate. This assessment is the result of moderate visual quality, moderately low viewer concern, and moderately high overall viewer exposure. The overall visual sensitivity for cyclists would be moderately low based on the moderate visual quality, moderately low viewer concern, and moderate viewer exposure.

Visual Change

VISUAL RESOURCES Figure 6B presents a photo simulation in the KOP 4 viewshed of the proposed project's structures and 20th percentile plume during project operation.

The project would be noticeable from the KOP 4 location with the vertical form and line of project structures that would differ from the existing industrial buildings. However, the solar array component would block the view of the lower portion of the existing industrial buildings and PHPP structures. The degree of contrast introduced by the project's structures in the simulation is considered moderately high when compared to the natural and industrial features in the KOP viewshed because the structures appear bright white. However, the applicant noted in the Visual Resources section of the AFC that the neutral color and non-reflective surface of project structures will reduce their visual contrast with the surrounding area (COP 2008a, pp. 5.15-12 & 13).

The photo simulation of the project's structures shows the proportionate size relationship to the other elements in the view. The project structures would occupy a small portion of the total field-of-view from KOP 4. In addition, the structures would visually appear subordinate when compared to the desert landscape, mountains, and sky in the KOP view. The PHPP would be subordinate to the desert landscape and sky in the viewshed.

Although the project would introduce publicly visible structures to the KOP viewshed the degree of view disruption and blockage introduced by the structures is low. The duration of view for motorists traveling at 65 miles per hour on this section of the highway would be moderately low and would pass through the KOP viewshed fairly quickly. The duration of view for cyclists would be longer particularly for those using the northern rest area (See **Visual Resources Figure 7**).

For KOP 4, the overall visual change would be moderately low. Staff believes that the visual impacts of PHPP structures are less than significant with mitigation requiring painting and texturing/finishing (see staff's proposed Condition of Certification **VIS 2**). In the context of the moderately low to moderate visual sensitivity, subordinate dominance, and low blockage, the introduction of the PHPP would not substantially degrade the existing viewshed at KOP 4. In addition, the simulation shows the size and character of the 20th percentile plume which will be discussed in more detail below.

PUBLICLY VISIBLE WATER VAPOR PLUMES

Although not specifically identified in the Appendix G Environmental Checklist under Aesthetics, staff includes a separate analysis of the potential visual impact of water vapor plumes generated by proposed power plants during operation. The proposed PHPP includes a 570 MW gas-fired power plant that would include two 145-foot tall combustion exhaust stacks and a ten-cell mechanical-draft cooling tower. Under certain weather conditions, visible water vapor plumes would emanate from the exhaust stacks and cooling tower. Because water vapor plumes are generally associated with heavy industrial land uses, they tend to be regarded negatively by sensitive observers and as such could have an adverse effect on visual resources in the vicinity of the project. The severity of the impacts created by the project's visible plumes depends on several factors, including the duration, and physical size of the plumes, the sensitivity of the viewers who will see the plumes, the distance between the plumes and the viewers, the visual quality of the existing viewshed, and whether any scenic landscape features would be blocked by the plumes.

COOLING TOWER PLUMES

Staff used the Combustion Stack Visible Plume (CSVP) model and a three-year meteorological data set obtained from Victorville with relative humidity from Lancaster, to calculate the frequencies and sizes of the PHPP cooling tower plumes (Aspen 2009a). Staff selected a worst-case operating profile of full load, no duct firing, and no solar operation for seasonal hours up to 10 a.m. daily with full load solar and duct firing occurring the rest of the day (refer to **APPENDIX VR-3**). For this worst-case operating profile, visible water vapor plumes from the project's cooling towers are predicted to occur 49.21% of the seasonal (November through April) clear hours (daylight, no rain/fog, high visual contrast).

Because the cooling tower plume frequency exceeds staff's 20% threshold, plume dimensions were calculated to assess the visual impact of the expected plume in terms of contrast, scale, and view disruption. Staff considers the 20th percentile plume to be the reasonable worst case plume dimensions on which to base its visual impact analysis. The 20th percentile plume is the smallest of the plumes that are predicted to occur zero to 20% of the time. Eighty (80)% of the time the dimensions of the clear hour plumes would be smaller than the 20th percentile plume dimensions. A one percentile clear hour plume would be extremely large (physical size) and very noticeable to a wide area but it occurs very infrequently. The 20th percentile plume dimensions, based on air flow data used by the applicant, from the proposed power plant's ten-cell cooling towers are approximately 574 feet high, 161 feet wide, and 225 feet long. Since the proposed cooling towers are 68 feet tall, the effective plume height above the ground would be 642 feet. This assumes that the plant will run 100% of the time but it is likely that it would operate at 80% or less so the plume dimensions would be smaller (Aspen 2009).

There was a discussion about plume dimensions at the PSA workshop and the applicant and staff agreed to work together to refine the calculations. Staff has attached a revised plume modeling analysis (**Appendix VR-3)** to this analysis. The plume dimensions at the 20th percentile are somewhat larger than the earlier plume modeling calculations (622 feet high, 203 feet wide, and 231 feet long). In addition, staff agreed to use the existing photo and a revised simulation from the original KOP 2 (Sierra Highway and East Avenue M West of the PHPP) which represents motorists traveling east on East Avenue M and cyclists using the Sierra Bike Trail. As noted above, staff has identified this location as KOP 4.

The plume depicted in the simulation (**VISUAL RESOURCES Figure 6b**) is a reasonable representation of the size of the predicted plume. The 20th percentile plume dimensions for the project's cooling tower plumes would interject a new form in the viewshed and the degree of contrast with the background sky would be moderately high. It would be co-dominant when compared to other elements in the view from KOP 4. Viewer exposure for motorists would be high but view disruption and blockage would be moderately low. Viewer exposure for cyclists would be moderate and view disruption and blockage would be moderately low. Overall visual change would be moderate. In the context of the moderately low to moderate visual sensitivity, the introduction of the PHPP 20th percentile plume would not substantially degrade the existing viewshed.

GAS TURBINE/HRSG EXHAUST PLUMES

Visible plumes from the exhaust stacks are predicted to occur very infrequently when operating under full load, without duct firing or solar operation. The predicted visible plume frequencies increase significantly when operating with peak duct firing or operating with solar and duct firing. If the facility were to only operate at full duct firing load, the plume frequency would be predicted to occur greater than 20% of seasonal daylight clear hours. However, staff has modeled the HRSG exhaust plumes and has found that it is not reasonable to assume operation at this level year round. Therefore, staff concludes that the gas turbine/HRSG exhausts will have a plume frequency of less than 20% of seasonal clear hours, and would therefore result in less than significant visual impacts.

LIGHT

CEQA checklist question: “Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?”

During construction and operation, the project has the potential to generate offsite lighting impacts to surrounding properties and public viewing areas. Existing evening light is very low due to the open desert landscape, and sparse housing in the vicinity of the project site. The applicant states in the AFC “To reduce offsite lighting impacts, lighting at the facility will be restricted to areas required for safety, security, and operation” (COP 2008a, pg. 5.15-9). In addition, lighting will be directed onsite, and would be shielded from public view, and the use of non-glare fixtures, use of switches, sensors, and timers to minimize the time that lights are not needed for safety and security (Ibid pp. 5.15-15 & 16).

There are many mitigation options available that are extremely effective at limiting off-site light. With the effective implementation of the mitigation measures recommended by the applicant and incorporation of the proposed Condition of Certification **VIS-3** and **VIS-4**, staff believes that the PHPP would not result in a substantial new source of light that could adversely affect existing nighttime views. Proposed Condition of Certification **VIS-3** limits lighting during construction, and **VIS-4** limits lighting during operation and requires submittal of a Lighting Mitigation Plan that includes sufficient mitigation to ensure that significant impacts are avoided.

The PHPP site is adjacent to the U.S. Air Force Plant 42. Energy Commission staff has recommended the installation of one, non-blinking red aviation obstruction light on each of the project’s two, 145-foot tall HRSG stacks, both ends of the 48-foot cooling tower, and at each corner of the power block area. For a discussion on aviation safety, please refer to the **TRAFFIC AND TRANSPORTATION** section of this FSA.

The red aviation warning lights would be visible to varying degrees to travelers on Sierra Highway and East Avenue M. Except for the aviation safety lights, all project lighting would include hoods/shields, would be directed downward or toward the area to be illuminated, and would be kept off when not in use (to the extent feasible) to minimize illumination of the night sky and impacts to surrounding properties and public viewing areas (see Condition of Certification **VIS-3** and **4**). Considering the overall visual

sensitivity of the KOP 1 through KOP 4 viewsheds (moderately low to moderate), the illumination from the relatively few, unshielded, aviation warning lights would not be so substantial as to adversely affect nighttime views.

Glint and Glare

The solar field comprises many parallel rows of solar collectors, normally aligned on a north-south horizontal axis. The height of the solar array support structures are approximately nine feet in height with the array system approximately 20 feet in height. Each solar collector has a linear parabolic-shaped reflector that focuses the sun's direct beam radiation on a linear receiver located at the focus of the parabola. The applicant believes the collectors track the sun from east to west during the day to ensure that the sun's energy is continuously focused on the linear receiver and would not produce any significant glare (COP 2008a, pg. 5.15-6). However, staff believes that there could be significant glint/glare impacts for viewers (motorists) at KOP 1 caused by the solar array movements in and out of stow position, when they are purposely misaligned, or during the middle of winter when (end loss) glare could be emitted out of the north end of each array toward East Avenue M. Staff is proposing Conditions of Certification **TRANS 7** and **8** which would mitigate the potential for glint and glare to a less than significant level (see the **Traffic and Transportation** section of this FSA for more information).

For a more in depth discussion of glare, please refer to the **Traffic and Transportation** section of this FSA.

Project Structures

The photo simulations (KOPs 2 and 3) of the transmission line and poles provided by the applicant show the use of a surface treatment consisting of a neutral grayish color with a flat finish. This finish would limit excessive glare. The applicant noted in the Visual Resources section of the AFC that the color and non-reflective surface of the transmission line structures will reduce their visual contrast with their background and help them to be absorbed into the overall view to a moderate degree (COP 2008a, pg. 5.15-13). Staff has proposed Condition of Certification **VIS-2** which requires submittal of a surface treatment plan for the power plant structures and electric transmission line poles.

CUMULATIVE IMPACTS AND MITIGATION

As defined in Section 15355 of the CEQA Guidelines (Public Resources Code, Division 13, Article 20), a cumulative impact is created as a result of the combination of the project under consideration together with other existing or reasonably foreseeable projects causing related impacts. Cumulative impacts can result from individually minor but collectively significant impacts taking place over a period of time. In other words, while any one project may not create a significant impact to visual resources including visible water vapor plumes, the combination of the new project with all existing or planned projects in an area may create significant impacts. The significance of the cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) views of a scenic resource is impaired; or (3) visual quality is diminished.

The proposed PHPP would be built within the city limits of Palmdale, within an expanse of open space. There is no identified scenic resource or vista in the KOP 1, KOP 2, KOP 3, or KOP 4 viewsheds that would be disrupted if the project were constructed. Project-related nighttime light and daytime glare impacts of the PHPP would be mitigated to a level that would be less than significant, although existing light and glare levels in the vicinity of the project would increase cumulatively as a result of the project and existing land uses. The project's light and glare impacts in combination with the impacts of existing projects would not be cumulatively considerable if the project is mitigated according to staff's proposed conditions of certification.

The PHPP would introduce to the KOPs 1 through 3 viewsheds publicly visible structures and plume (KOP 4) that are industrial in nature to an area that currently has large-scale military structures and transmission lines and towers. The city of Palmdale has slated this area for future growth in the City's general plan and Palmdale Planning staff has advised Energy Commission staff that there is one small commercial project (gas station) in the planning stage within a two mile radius of the PHPP. Please see the **LAND USE** section of this FSA for additional future growth discussion. The incremental effect of the project would not be cumulatively considerable when combined with the effects of past, present and reasonably foreseeable projects.

Staff has reviewed Census 2000 information (maps) that shows a minority population greater than fifty% within a six-mile radius of the proposed power plant (see the **SOCIOECONOMICS** section of this PSA). **SOCIOECONOMICS Figure 1** shows that an identified minority population may potentially have a limited exposure to the project's publicly visible structures. These structures would be surface treated to help soften their visual presence (see Condition of Certification **VIS-1**), and lighting will be minimized as to not illuminate the sky and minimize the illumination of the project from the immediate vicinity (see Conditions of Certification **VIS-3** and **4**).

Staff has determined that all significant direct or cumulative impacts specific to visual resources resulting from the construction or operation of the project will be mitigated. Therefore, the proposed project would not introduce a significant adverse visual resources impact related to environmental justice.

COMPLIANCE WITH LORS

VISUAL RESOURCES Table 2 provides an analysis of the applicable LORS pertaining to aesthetics, or preservation and protection of sensitive visual resources relevant to the proposed project. Conditions of certification are proposed to make the project conform to a LORS where appropriate.

VISUAL RESOURCES Table 2
Proposed Project's Consistency with
Local LORS Applicable to Visual Resources

Applicable Law	Description
Federal	None
State	None
Local County of Los Angeles – General Plan Chapter VI – Scenic Resources	The County recognizes that the coastline, mountain vistas, and other scenic features of the region are a significant resource for County residents and businesses.
	Consistent: The project would not significantly impact mountain vistas and other scenic features of the region.
City of Palmdale – General Plan Environmental Resources Policy ER1.2.2 Implementation Program G	Several roadways within the City, including Pearlblossom Highway, are designated scenic highways which require special design standards (i.e. height limits) for projects adjacent to these highways in order to protect their scenic qualities.
	Consistent: Consistent with implementation of staff's proposed Condition of Certification **VIS-1**
City of Palmdale Municipal Code Section 14.04	It has been determined by the City Council that appropriate action must be taken in order to protect and preserve vegetation, and particularly Joshua trees, so as to retain the unique natural desert aesthetics in some areas of the City, and to promote the general welfare of the community.
	Consistent: Consistent with implementation of staff's proposed Condition of Certification **VIS-5**

NOTEWORTHY PUBLIC BENEFITS

From a visual resources perspective, noteworthy visual benefits of the proposed project have not been identified.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments have been received pertaining to visual resources.

CONCLUSIONS

The visual analysis focused on two main issues; (1) would construction and operation of the project cause visual impacts; and (2) would the project comply with applicable local

LORS. With the adoption of staff's proposed conditions of certification, the project would not cause significant visual impacts for viewers at any KOP and would be consistent with the applicable city of Palmdale LORS.

1. Visual resources surrounding the project site include open desert landscape and industrial features such as U.S. Air Force Plant 42 to the south and east.

2. The power plant site does not use or have frontage on a segment of road designated as a State Scenic Highway. However, the transmission line will cross Pearlblossom Highway which is a designated Scenic Highway by the city of Palmdale.

3. With staff's proposed mitigation, the introduction of proposed PHPP structures including the associated linear facilities would generate a less than significant visual impact.

4. With mitigation, the introduction of the proposed PHPP including the associated linear facilities would generate a less than significant new source of light or glare to nighttime or daytime views.

5. The PHPP's visible water vapor plumes would not substantially degrade the existing visual setting. The 20th percentile plumes dimensions are substantial but would not block significant portions of the sky and the mountain range in the backdrop.

6. The proposed project's publicly visible project structures may potentially be seen by an identified minority population of greater than fifty%. Staff has determined that all significant direct impacts specific to visual resources resulting from the operation of the project will be mitigated, and there are no significant cumulative impacts. Therefore, the proposed project does not introduce a significant visual resource related to environmental justice issues.

7. The construction and operation of the PHPP as proposed, with the effective implementation of the applicant's proposed design measures and staff's recommended conditions of certification (below) would ensure that visual impacts generated by the project are less than significant, and ensure that the project complies with all applicable LORS regarding visual resources.

PROPOSED CONDITIONS OF CERTIFCATION

CONSTRUCTION SCREENING

VIS-1 The project owner shall reduce the visibility of construction equipment, materials, and activities at the project site and as appropriate at any staging and material and equipment storage areas with temporary screening such as fabric attached to fencing or berms prior to the start of ground disturbance. Screening shall be of an appropriate height, design, opacity, and color for each specific location, as determined by the CPM.

The project owner shall submit to the CPM for review and approval a specific screening plan whose proper implementation will satisfy these

requirements. The project owner shall provide a sample (at least 3” x 5”) of the proposed screening material with the plan.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit the screening plan to the CPM for review and approval. The screening shall be installed during the site mobilization phase. The project owner shall notify the CPM when installation is completed. The project owner shall provide the CPM with electronic color photographs after installing screening at the power plant site and at staging, material and equipment storage areas showing the effectiveness of the screening.

SURFACE TREATMENT OF PROJECT STRUCTURES AND BUILDINGS

VIS-2 The project owner shall also color and finish the surfaces of all non-mirror project structures and buildings visible to the public to ensure that they: (1) minimize visual intrusion and contrast by blending with the landscape; (2) minimize glare; and (3) comply with local design policies and ordinances including special design standards for project development within a scenic highway viewshed pursuant to the city of Palmdale General Plan’s Environmental Resources Policy. The transmission line conductors shall be non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive.

The project owner shall submit a Surface Treatment Plan to the Compliance Project Manager (CPM) for review and approval. The treatment plan shall include:

A. A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes;

B. A list of each major project structure, building, tank, pipe, and wall; transmission line towers and/or poles; and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and number; or according to a universal designation system;

C. One set of color brochures or color chips showing each proposed color and finish;

D The construction of the transmission line and towers near Pearlblossom Highway shall implement special design standards (i.e. height limits) pursuant to the city of Palmdale General Plan’s Environmental Resources;

E. One set of 11” x 17” color photo simulations at life size scale of the proposed treatment for project structures, including structures treated during manufacture, from the Key Observation Points;

F. A specific schedule for completing the treatment; and

G. A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not request vendor treatment of any buildings or structures during their manufacture, or perform final field treatment on any buildings or structures, until the project owner has received Surface Treatment Plan approval by the CPM.

Verification: At least 90 days prior to specifying vendor color(s) and finish (es) for structures or buildings to be surface treated during manufacture, the project owner shall submit the proposed Surface Treatment Plan to the CPM for review and approval and simultaneously to the city of Palmdale Planning Department for review and comment. The project owner shall provide the CPM with the City's comments at least 30 days prior to the estimated date of providing paint specification to vendors.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a plan with the specified revision(s) for review and approval by the CPM before any treatment is applied. Any modifications to the Surface Treatment Plan must be submitted to the CPM for review and approval.

Within ninety (90) days after the start of commercial operation, the project owner shall notify the CPM that surface treatment of all listed structures and buildings has been completed and is ready for inspection; and shall submit one set of electronic color photographs from the Key Observation Points.The project owner shall provide a status report regarding surface treatment maintenance in the Annual Compliance Report. The report shall specify a): the condition of the surfaces of all structures and buildings at the end of the reporting year; b) maintenance activities that occurred during the reporting year; and c) the schedule of maintenance activities for the next year.

CONSTRUCTION LIGHTING

VIS-3 The project owner shall ensure that lighting for construction of the power plant is used in a manner that minimizes potential night lighting impacts, as follows:

A. All lighting shall be of minimum necessary brightness consistent with worker safety and security;

B. All fixed position lighting shall be shielded/hooded, and directed downward and toward the area to be illuminated to prevent direct illumination of the night sky and obtrusive spill light beyond the boundaries of the power plant site or the site of construction of ancillary facilities, including any security related boundaries;

C. Wherever feasible and safe and not needed for security, lighting shall be kept off when not in use; and

D. Complaints concerning adverse lighting impacts will be promptly addressed and mitigated.

Verification: Within seven days after the first use of construction lighting, the project owner shall notify the CPM that the lighting is ready for inspection. If the CPM requires modifications to the lighting, the project owner shall implement the necessary

modifications within 15 days of the CPM's request and notify the CPM that the modifications have been completed.

Within 10 days of receiving a lighting complaint, the project owner shall provide the CPM with a complaint resolution form report as specified in the compliance General Conditions including a proposal to resolve the complaint, and a schedule for implementation. The project owner shall notify the CPM within 10 days after completing implementation of the proposal. A copy of the complaint resolution form report shall be included in the subsequent Monthly Compliance Report following complaint resolution.

PERMANENT EXTERIOR LIGHTING

VIS-4 To the extent feasible, consistent with safety and security considerations and commercial availability, the project owner shall design and install all permanent exterior lighting such that a) light fixtures do not cause obtrusive spill light beyond the project site; b) lighting does not cause excessive reflected glare; c) direct lighting does not illuminate the nighttime sky; d) illumination of the project and its immediate vicinity is minimized, and e) lighting complies with local policies and ordinances.

The project owner shall submit to the CPM for review and approval and simultaneously to the City of Palmdale Department of Public Works and Planning, Development Services Division for review and comment a Lighting Mitigation Plan that includes the following:

A. A process for addressing and mitigating complaints received about potential lighting impacts;

B. Lighting shall incorporate commercially available fixture hoods/shielding, with light directed downward or toward the area to be illuminated;

C. Light fixtures shall not cause obtrusive spill light beyond the project boundary;

D. All lighting shall be of minimum necessary brightness consistent with operational safety and security; and

E. Lights in high illumination areas not occupied on a continuous basis (such as maintenance platforms) shall have (in addition to hoods) switches, timer switches, or motion detectors so that the lights operate only when the area is occupied.

Verification: At least 90 days prior to ordering any permanent exterior lighting, the project owner shall contact the CPM to determine the required documentation for the Lighting Mitigation Plan.

At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to the CPM for review and approval and simultaneously to the City of Palmdale Department of Public Works and Planning, Development Services Division for review and comment a Lighting Mitigation Plan. The project owner shall provide the

city's comments to the CPM at least 10 days prior to the date lighting materials are ordered.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM a revised plan for review and approval by the CPM.

The project owner shall not order any exterior lighting until receiving CPM approval of the Lighting Mitigation Plan.

Prior to commercial operation, the project owner shall notify the CPM that the lighting has been installed and is ready for inspection. If after inspection the CPM notifies the project owner that modifications to the lighting are needed, within 30 days of receiving that notification the project owner shall implement the modifications and notify the CPM that the modifications have been completed and are ready for inspection.

Within 10 days of receiving a lighting complaint, the project owner shall provide the CPM with a complaint resolution form report as specified in the Compliance General Conditions including a proposal to resolve the complaint, and a schedule for implementation. A copy of the complaint resolution form report shall be submitted to the CPM within 30 days of complaint resolution.

LANDSCAPING

VIS-5 The project owner shall provide landscaping within the 30 foot setback area between the fence line and East Avenue M/Site 1 Road. The landscaping should be consistent with the conceptual Joshua Tree and Native Desert Vegetation Preservation Chapter 14.04 of the Palmdale Municipal Code (shown on **VISUAL RESOURCES Figure 3B).** The landscaping shall also comply with the city of Palmdale municipal code requirements stipulated in section 18-60.140 (Landscape Development). The project owner shall maintain the landscaping for the life of the project, including providing any needed irrigation, removing debris on an annual or semi-annual basis, and replacing dead or dying vegetation.

The project owner shall submit simultaneously to the city of Palmdale Planning Department for review and comment and to the CPM for review and approval, a landscaping plan whose proper implementation will satisfy these requirements.

The project owner shall not implement the plan until the project owner receives approval of the plan from the CPM. The planting must be completed by the start of commercial operation, and the planting must occur during the optimal planting season.

Verification: Prior to commercial operation and at least 90 days prior to installing the landscaping, the project owner shall submit the Landscaping Plan to the CPM for review and approval and simultaneously to city of Palmdale Planning Division for review and comment. The project owner shall provide the city's comments (if any) 30 days prior to the installation of the landscaping.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM and city of Palmdale Planning Division a plan with the specified revision(s) for review and approval by the CPM before the plan is implemented.

The project owner shall simultaneously notify the CPM and city of Palmdale Planning Division within seven days after completing installation of the landscaping and is ready for inspection.

The project owner shall report landscape maintenance activities, including replacement of dead or dying vegetation, for the previous year of operation in each Annual Compliance Report.

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COP 2009a – City of Palmdale Municipal Code. 9/2/09.

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APPENDIX VR-1

STAFF'S VISUAL RESOURCES EVALUATION METHODOLOGY

Staff evaluates the visual characteristics of the existing physical setting, the proposed project, the circumstances affecting the viewer, and the degree of visual change that a proposed project may introduce using the elements generally accepted criteria for determining substantial environment impact significance identified below.

ELEMENTS OF THE METHODOLOGY

Key Observation Points

Staff evaluates the existing visible physical environmental setting from a fixed vantage point (called a "Key Observation Point" [KOP]), and the visual change introduced by the proposed project to the view from that KOP. The view as seen from the KOP is referred to as the viewshed. Staff uses a KOP[2] to represent a location(s) from which to conduct detailed analyses of the proposed project and to obtain existing condition photographs and prepare photo simulations. KOPs are selected to be representative of the most critical viewshed locations from which the project would be seen. Because it is not feasible to analyze all the views in which a proposed project would be seen, it is necessary to select a KOP that would most clearly display the visual effects of the proposed project. A KOP may also represent a primary viewer groups that would potentially be affected by the project. In addition to KOP photo(s), staff reviews landscape character photos that help provide a visual overview of a project site, its vicinity, and the selected KOP area, as appropriate. Prior to application submittal, staff participates in the selection of appropriate KOP(s) for the analysis.

LORS Consistency

Energy Commission staff consider federal, state, and local laws, ordinances, regulations, and standards (LORS) relevant to aesthetics, or protection and preservation of visual sensitive resources. Conflicts with such LORS can constitute significant visual impacts. For example visual staff examines land use planning documents, such as a local government's General Plan, Specific Plan, and zoning ordinances applicable to the project site and surrounding area to gain insight as to the type of land uses intended for the area, and the guidelines given for aesthetics, or protection and preservation of visual sensitive resources.

Visible Water Vapor Plume Frequency

When a proposed power plant is operated at times of low temperature and high humidity, the potential exists for the exhaust from its cooling towers to condense and form visible water vapor plumes (steam plume). The formed plume potentially could have an adverse effect on visual sensitive resources in the vicinity of the project.

[2]The use of KOPs or similar view locations is common in visual resource analysis. The U.S. Bureau of Land Management (USDI BLM 1986a, 1986b, 1984) and the U.S. Forest Service (USDA Forest Service 1995) use such an approach.

The severity of the visual impacts created by a project's visible plumes depends on five factors: 1) the frequency of the plumes, 2) the physical size of the plumes (dimensions), 3) the sensitivity of the viewers who would see the plumes, 4) the distance between the plumes and the viewers, 5) the visual quality of the existing viewshed; and, 6) whether a scenic resource or vista would be blocked by the plumes.

Staff completes water vapor plume modeling of the proposed project's cooling towers using design parameters provided by the applicant. Staff models the estimated plume frequency and dimensions for the cooling tower and turbine exhaust using the Combustion Stack Visible Plume (CSVP) model, and a multi-year meteorological data set obtained for the area where the project is proposed.

Staff considers the 20th percentile plume to be the reasonable worst case plume dimensions on which to base its visual impact analysis. The 20th percentile plume is the smallest of the plumes that are predicted to occur zero to 20% of the time. Eighty (80)% of the time the dimensions of the clear hour plumes would be smaller than the 20th percentile plume dimensions. A one percentile clear hour plume would be extremely large, very noticeable to a wide area, but would occur very infrequently.

Staff focuses its frequency of the plumes analysis on the portion of the year when the ambient conditions (i.e., cool/cold temperatures and high relative humidity) are such that plumes are most likely to occur (typically from November through April) and when "clear" sky conditions exist because this is when the plumes would cause the most visual contrast with the sky and have the greatest potential to cause adverse visual impacts. Staff eliminates from consideration plumes that occur at night or during rain or fog conditions because plume visibility, and overall visual quality, is typically low during those conditions. In addition, plumes that occur during specific cloudy conditions are also eliminated because under these conditions, plumes have less contrast with the background sky. A plume frequency of 20% of seasonal daylight no rain/fog high visual contrast (i.e. "clear") hours is used to determine potential plume impact significance. If it is determined that the seasonal daylight clear hour plume frequency is greater than 20%, then plume dimensions are determined and a significance analysis is included in the Visual Resources section of the Staff Assessment for the proposed project.

Plume frequencies of less than 20% have been determined to generally have a less than significant impact. If the modeling predicts seasonal daylight clear plume frequencies greater than 20%, staff calculates the dimensions of the clear hour plumes and then conduct an assessment of the visual change (in terms of contrast, dominance and view blockage) that would be caused by the 20th percentile plume dimensions. Staff also analyzes the predicted plume's potential luminescence (light refraction resulting in a glare or glow) and color contrast, and opacity (the degree to which light is prevented from passing through an emission plume) that may be introduced to the KOP viewsheds. Considering the visual sensitivity of the existing landscape and viewing characteristics, the degree of visual change caused by the plumes may result in a significant visual impact.

California Environmental Quality Act Guidelines

The CEQA Guidelines define a "significant effect on the environment" to mean a

“substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance” (California Code of Regulations, Title 14, Section 15382).

Appendix G Environmental Checklist Form of the CEQA Guidelines, under “Aesthetics,” lists the following four questions to be addressed regarding whether the potential impacts of a project are significant:

A. Would the project have a substantial adverse effect on a scenic vista?

B. Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

C. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

D. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Staff answers each of the four checklist questions for the proposed project, including any related facility such as a transmission line or gas pipeline; and for both construction and operation phases.

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APPENDIX VR-2

ENERGY COMMISSION STAFF - VISUAL ANALYSIS TERMS

For the purpose of this visual analysis, Energy Commission staff has defined the following visual related terms:

Duration of View - ranges from high (extended) a view of the project site that is reached across a stretched out distance, or amount of time; to, low (brief) a view of the project site that is reached in a short amount of distance or time. The range of view duration generally differs depending on the type of activity in which the viewers is engaged.

Scenic Resource - a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique visual/historical importance to a community (a tree linked to a famous event or person, an ancient old growth tree); historic building; or a designated federal scenic byway or state scenic highway corridor.
Scenic Vista - a distant view through and along a corridor or opening that exhibits a high degree of pictorial quality.

Viewer Concern - estimated level of a viewer's anticipated interest in preserving and protecting the existing physical environment. Viewer attitudes and expectations is often correlated with viewer activity type (e.g., viewers engaged in certain activities, such as recreation, are considered to have high levels of concern for scenic quality, while those engaged in other activities, such as work, are generally considered to have lower levels of concern). Residences are generally considered to have high viewer concern. Existing landscape character may temper viewer concern on some State and locally designated scenic highways and corridors. Similarly, travelers on other highways and roads, including those in agricultural areas, may have moderate viewer concern depending on viewer expectations as conditioned by regional and local landscape features. Commercial uses, including business parks, typically have low-to-moderate viewer concern, though some commercial developments have specific requirements related to visual quality, with respect to landscaping, building height limitations, building design, and prohibition of above-ground utility lines, indicate a higher level of viewer concern. Industrial uses typically have the lowest viewer concern because workers are focused on their work, and generally are working in surroundings with relatively low visual value.

Viewer Exposure – visibility of a landscape feature, the number of viewers, distance, and the duration of the view are primary factors affecting viewer susceptibility to impacts.

Viewshed – an area visible to an observer from a fixed vantage point (Key Observation Point [KOP]). Staff uses a 35mm camera with a focal length of 50mm which encompasses an approximate image angle of 46^0 similar to the field-of-view of the human eye. The staff uses a viewshed that is not to be confused with a panoramic (180^0) or cycloramic (360^0). These are broad horizontal composition with no apparent limits to the view.

Visibility - the level the proposed project site is visually obstructed by natural and/or man-made surface features (development, vegetation, hills) from the Key Observation Point.

Visual Contrast - The conspicuousness or prominence of a project, and its compatibility with its setting. Contrast is described in terms of formal attributes of form, line, color, and texture of the project in comparison to those of the setting. Consider the proposed project's introduction of **form** (shape and mass), **line** (changes in edge types and interruption or introduction of edges, bands and silhouette lines), **color** (surface color, reflectivity, and glare), and **texture** (noticeable differences in the grain, or irregularity and directional patterns) to the existing physical environment to determine the degree of contrast**.** Degree of contrast: None – the element contrast is not visible or perceived; Weak – the element contrast can be seen but does not attract attention; Moderate – the element contrast begins to attract attention and begins to dominate the characteristic landscape; Strong – the element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Visual Disruption - the extent to which a previously visible scenic resource or scenic vista in the existing physical environment is blocked from view by the proposed project. The view disruption is assigned greater weight according to the quality and importance of the block view.

Visual Quality – the estimated visual impression and appeal of the existing physical environmental setting and the associated public value attributed to it. An outstanding visual quality is a rating reserved for landscapes that would be what a viewer might think of as "picture postcard" landscapes. Low visual quality describes landscapes that are often dominated by visually discordant human alterations, and do not provide views that people would find inviting or interesting (Buhyoff et al., 1994).

Visual Scale - the proposed project's apparent size relationship with other components in the existing physical environment relative to the total field-of-view as viewed by the human eye, or the lens of a 35mm camera with a focal length of 50mm.

Visual Sensitivity - the overall level of sensitivity of a viewshed due to visual change is a function of visual quality, viewer concern, and viewer exposure.

APPENDIX VR-3

VISIBLE PLUME MODELING ANALYSIS

Testimony of William Walters

INTRODUCTION

The following provides the assessment of the Palmdale Hybrid Power Project gas turbine/HRSG and cooling tower exhaust stack visible plumes. Staff completed a modeling analysis for the applicant's proposed unabated cooling tower and turbine design based on data provided by the applicant.

PROJECT DESCRIPTION

The proposed project will utilize two 7F frame gas turbine/HRSGs with duct burners. The applicant has also proposed a ten-cell mechanical-draft cooling tower. The cooling tower will serve the heat load from the gas turbine/HRSGs and the thermal solar collection array. The applicant has not proposed to use any methods to abate visible plumes from gas turbine/HRSG or cooling tower exhausts.

VISIBLE PLUME MODELING METHODS

PLUME FREQUENCY AND DIMENSION MODELING

The Combustion Stack Visible Plume (CSVP) model was used to estimate plume frequency and plume dimensions for the cooling tower exhaust. This model provides conservative estimates of both plume frequency and plume size. This model uses hourly cooling tower exhaust parameters and hourly ambient condition data to determine the plume frequency. This model is based on the algorithms of the Industrial Source Complex model (Version 2), that determine temperatures at the plume centerline, but this model does not incorporate building downwash.

The modeling method combines the cooling tower cell exhausts into an equivalent single stack. This method may overestimate cooling tower plume size (particularly height) during plume hours with higher winds due to little cell interaction and the potential for building downwash, but will be more accurate during low wind and calm periods when the exhausts from the cooling tower cells will combine into one coherent body. Wind speeds are set to one meter per second during calm hours.

CLOUD COVER DATA ANALYSIS METHOD

A plume frequency of 20% of seasonal (November through April) daylight no rain/fog high visual contrast (i.e. "clear") hours is used to determine potential plume impact significance. The methodology used to determine high visual contrast hours is provided below:

Energy Commission staff has identified a "clear" sky category during which plumes have the greatest potential to cause adverse visual impacts. For this project the

meteorological data set[3] used in the analysis categorizes total sky cover as “clear”, “scattered”, “broken”, and “overcast”. For the purpose of estimating the high visual contrast hours staff has included in the “Clear” category a) all hours with total sky cover defined as “clear” plus b) half of the hours with unlimited ceiling height (i.e. hours with a sky opacity equal to or less than 50%). The rationale for including these two components in this category is as follows: a) plumes typically contrast most with sky under clear conditions and b) for a substantial portion of the time when total sky cover is not clear or obscured the opacity of the sky cover is relatively low (equal to or less than 50%), and these clouds do not substantially reduce contrast with plumes. Staff has estimated that approximately half of the hours with sky opacity of less than 50% can be considered high visual contrast hours and are included in the “clear” sky definition.

If it is determined that the seasonal daylight clear hour plume frequency is greater than 20% then plume dimensions are calculated, and a significance analysis of the plumes is included in the Visual Resources section of the Staff Assessment.

COOLING TOWER VISIBLE PLUME MODELING ANALYSIS

APPLICANT’S COOLING TOWER MODELING RESULTS

The applicant modeled the cooling tower using the SACTI model. Staff reviewed the model input and output files and did not find any major issues with the applicant’s modeling, but did identify a few minor input problems, such as the heat rejection being somewhat too low and the air flow rate somewhat too high based on a comparison of the applicant’s cooling tower operating data provided in the data responses (AECOM 2009h). Staff corrected these issues and found that the SACTI model does not predict frequent large plumes from the PHPP cooling tower. However, the SACTI model groups meteorological data into only a few representative cases so the SACTI results, particularly the high and low end of the frequencies, can be skewed. The applicant did not present results in the format that staff uses to determine whether potentially significant visual plume impacts could occur. The applicant also, has not provided revised modeling data for the revised cooling tower design data provided in 2010.

STAFF’S COOLING TOWER MODELING RESULTS

Cooling Tower Design and Operating Parameters

The following cooling tower design characteristics, presented below in **Visible Plume Table 1**, were provided from the applicant’s data responses (AECOM 2009h). This data was used to model the cooling tower plume frequency and dimensions.

[3] This analysis uses a three year formatted meteorological data set, for Victorville with relative humidity from Lancaster, obtained from the applicant (Victorville 2007c). The applicant provided meteorological data for Palmdale; however, that data did not have all of the necessary parameters to complete a CSVP model analysis, so the previously formatted Victorville/Lancaster data was used. The Victorville/Lancaster meteorological data had nearly identical average temperature (62.1°F vs. 62.6°F) and relative humidity (42.4 percent vs. 44.3 percent) as the Palmdale meteorological data, but did have lower average wind speeds (6.3 knots vs. 8.2 knots). This means the use of the Victorville/Lancaster data will provide reasonable plume frequency results, but conservative plume size results.

Visible Plume Table 1
Cooling Tower Operating and Exhaust Parameters

Parameter		**Cooling Tower Design Parameters**		
Number of Cells		10 Cells (2 x 5)		
Cell Height		59 feet (17.98 meters)		
Cell Stack Diameter		28 feet (8.53 meters)		
Case	**Ambient Condition**	**Heat Rejection Rate (MW)**	**Exhaust Flow Rate (K lbs/hr)**	**Exhaust Temp (°F) [a]**
Full Load No Duct Firing Solar				
1	23°F, 92% RH	453.9	52,101	73.4
2	64°F, 40% RH	445.4	50,790	86.6
3	98°F, 17% RH	441.3	58,155	93.3
Full Load Duct Firing and Solar				
1	23°F, 92% RH	492.2	51,951	76.1
2	64°F, 40% RH	484.3	50,680	88.7
3	98°F, 17% RH	481.1	48,198	95.1

Source: AECOM 2010x
Note: Staff revised these reported temperatures downward between 2 to 3.5 degrees as part of completing a heat balance for the cooling tower and used the lower temperatures in the plume modeling analysis.

The applicant has provided revised/corrected cooling tower operating data and fogging frequency curve information (AECOM 2010x), which have addressed staff's concerns regarding the quality of the cooling tower operating data noted in the Preliminary Staff Assessment.

Cooling Tower Visible Plume Modeling Results

Visible Plume Table 2 provides the CSVP model visible plume frequency results for the most representative full load operating scenarios. Considering that duct firing is more likely to occur seasonally during high summer demand periods rather than the cooler seasonal period evaluated by Energy Commission staff, staff has determined that non duct-fired operations are the most reasonable seasonal daytime worst-case condition, but also believe that the inclusion of solar field operation is reasonable for the determination of worst-case daytime cooling tower visible plume impacts.

Visible Plume Table 2 – Predicted Hours with Cooling Tower Steam Plumes
Victorville 2002-2004 Meteorological Data

Case	Modeled Hours	Full Load, Solar/No Duct Firing	
		Plume (hr)	Percent
All Hours	25,468	12,326	48.4%
Daylight Hours	12,897	4,763	36.9%
Daylight Clear Hours	11,808	3,847	32.6%
Seasonal Daylight Clear Hours*	5,025	3,103	61.8%

*Seasonal conditions occur from November through April.

The plant design, incorporating several conservative operating assumptions indicates that the cooling tower plume frequency potential (assuming year round full load operation, 100% capacity factor) will be significantly greater than the 20% threshold trigger.

Since the determined plume frequencies are above 20% of the seasonal daylight clear hours the corresponding plume dimensions were estimated. The plume dimensions are estimated by the CSVP model and presented in **Visible Plume Table 3**.

Visible Plume Table 3
Predicted Cooling Tower Visible Plume Dimensions

Full Load, Solar/No Duct Firing			
	Cooling Tower Seasonal "Clear" Hours Plume Dimensions Meters (Feet)		
Percentile	**Length**	**Height**	**Width**
5%	232 (762)	467 (1,532)	117 (384)
10%	128 (421)	335 (1,099)	84 (275)
15%	91 (298)	249 (818)	71 (231)
20%	**70 (231)**	**189 (622)**	**62 (203)**
30%	48 (156)	112 (369)	52 (171)
40%	33 (109)	65 (213)	46 (152)
50%	20 (66)	40 (133)	41 (133)

These results assume that the power plant will operate full time (100% capacity factor). In reality, it is likely that the power plant will operate at a capacity factor no higher than 80%. The actual operation during the winter will normally be expected to be reduced from the reasonable worst case assessed by staff.

The large predicted size of the PSPP cooling tower plumes is caused by three main factors: 1) the large size of the cooling tower (heat release rate of over 400 MWh); 2)

the comparatively low air flow for this cooling tower design (less than 15 kg/s/MW[4]); and 3) the CSVP model is conservative in its prediction of plume height due both to the dispersion modeling program used and the fact that the meteorological data used is from Victorville rather than Palmdale, which has lower wind speeds. While staff acknowledges that our analysis is conservative, certainly in terms of plume height, we also note that the specific design of the proposed PSPP cooling tower is more conducive to the creation of visible plumes than almost all of the power plant siting case cooling towers evaluated over the past ten years.

HRSG VISIBLE PLUME MODELING ANALYSIS

APPLICANT'S GAS TURBINE/HRSG MODELING RESULTS

The applicant provided plume modeling results for the gas turbine/HRSGs using a combination of the U.S. EPA approved AERMOD dispersion model and a proprietary model called VIZDET (AECOM 2009g). While there is no contention in the overall findings since staff has predicted that the gas turbine/HRSG plume frequency will be not be significant, the results from the applicant's modeling analysis are troubling. Specifically, a comparison of staff's CSVP and the applicant's VIZDET results for the same exhaust conditions indicates that the predicted ambient conditions with plumes have nearly identical temperature versus relative humidity limit curves; however, the provided VIZDET results are missing many hours that are identical or more plume conducive that other hours that are noted to have plumes. Therefore, staff believes that there is an error in the VIZDET code and that the applicant's consultant should review and fix this problem. Staff noted this problem in the Victorville 2 siting case and noted that corrections should be made before the next time VIZDET modeling results were provided to the Commission; however, this recommendation was not followed.

APPLICANT'S GAS TURBINE/HRSG MODELING RESULTS

HRSG Parameters

Based on the stack exhaust parameters anticipated by the Applicant, the frequency of visible plumes can be estimated. The operating data for these stacks, used to model the potential visible plume frequency, are provided in **Visible Plume Table 4**.

[4] In comparison, the recently licensed Victorville 2 Hybrid Power Project cooling tower was proposed with an air flow rate of over 22 kg/s/MW during low ambient temperature operation and over 25 kg/s/MW during average and high ambient temperature operation.

Visible Plume Table 4
HRSG Operating and Exhaust Parameters

Parameter		**HRSG Exhaust Parameters**		
Stack Height		145 feet (44.2 meters)		
Stack Diameter		18 feet (5.49 meters)		
Case	**Inlet Air Ambient Condition**	**Moisture Content (% by volume)**	**Exhaust Flow Rate (klb/hr)**	**Exhaust Temp (°F)**
Full Load No Duct Firing No Solar				
1	23°F, 92% RH	7.68	3,748	191.3
2	64°F, 40% RH	8.43	3,544	190.6
3	98°F, 17% RH	9.12	3,401	191.7
Full Load Duct Firing No Solar				
1	23°F, 92% RH	9.31	3,767	177.0
2	64°F, 40% RH	10.21	3,564	176.1
3	98°F, 17% RH	11.06	3,422	176.6
Full Load Duct Firing and Solar				
1	23°F, 92% RH	8.14	3,753	172.9
2	64°F, 40% RH	8.93	3,549	174.1
3	98°F, 17% RH	9.65	3,407	174.8

Source: AECOM 2009h

HRSG Visible Plume Modeling Analysis

Staff modeled the HRSG plumes using the CSVP model with a three-year meteorological data set provided by the applicant that combined most ambient conditions from Victorville with relative humidity from Lancaster. **Visible Plume Table 5** provides the CSVP model visible plume frequency results for no duct firing, duct firing no solar, and duct firing with solar operations as determined by the staff.

Visible Plume Table 5 – Predicted Hours with HRSG Steam Plumes
Victorville 2002-2004 Meteorological Data

Case	Modeled Hours	Full Load, Solar/No Duct Firing		Full Load, No Solar/ Duct Firing		Full Load Solar and Duct Firing	
		Plume (hr)	Percent	Plume (hr)	Percent	Plume (hr)	Percent
All Hours	25,468	652	2.56%	4,163	16.35 %	2,367	9.29%
Daylight Hours	12,897	210	1.63%	1,258	9.75 %	739	5.73%
Daylight Clear Hours	11,808	189	1.60%	1,018	8.62 %	629	5.33%
Seasonal Daylight Clear Hours*	5,025	189	3.76%	977	19.44 %	615	12.24 %

*Seasonal conditions occur from November through April.

Visible plumes are predicted to occur very infrequently when operating under full load no duct firing no solar. The predicted visible plume frequencies increase significantly when operating with peak duct firing or operating with solar and duct firing. If the facility were to only operate at full duct firing load then the plume frequency would be predicted to occur greater than 20% of seasonal daylight clear hours. However, it is not reasonable to assume operation at this level year round. Therefore, staff concludes that the gas turbine/HRSG exhausts will have a plume frequency of less than 20% of seasonal clear hours.

A visible plume frequency of 20% of seasonal (November through April) daylight clear hours is used as a plume impact study threshold trigger, therefore plume dimension modeling and additional impact analysis for the HRSG visible plumes is not required for this project.

CONCLUSIONS

Visible water vapor plumes from the proposed PHPP cooling towers are expected to occur more than 20% of seasonal daylight clear hours considering worst-case maximum facility operation. Therefore, further visual impact analysis of the expected twenty percentile plume size has been completed in the Visual Resources section.

Visible water vapor plumes from the proposed PHPP gas turbine/HRSG exhaust stacks are not expected to occur more than 20% of seasonal daylight clear hours considering worst-case maximum facility operation. Therefore, further visual impact analysis of worst-case plume frequencies and plume sizes has not been completed.

REFERENCES

AECOM2009g – AECOM/ S. Head (tn: 50961). Supplemental Response # 3 to CEC Data Request Set 1 & Response to CEC Data Request Set 2, # 147 & # 155. Dated on 04/09/09. Submitted to CEC/ Docket Unit on 04/10/09.

AECOM2009h – AECOM/ S. Head (tn: 51417). Applicant Responses to CEC Data Request Set 2 & Supplemental Responses # 4. Dated on 05/01/09. Submitted to CEC 05/04/09.

AECOM2010x - AECOM/Various (tn: 56051). Applicant revised cooling tower operating data. Received by e-mail to William Walters during March 2010.

COP2008a – City of Palmdale/ S. Williams (tn: 47383). Application for Certification for the Palmdale Hybrid Power Project. Dated on 07/30/08. Submitted to CEC/ Docket Unit on 08/04/08.

VISUAL RESOURCES - FIGURE 1

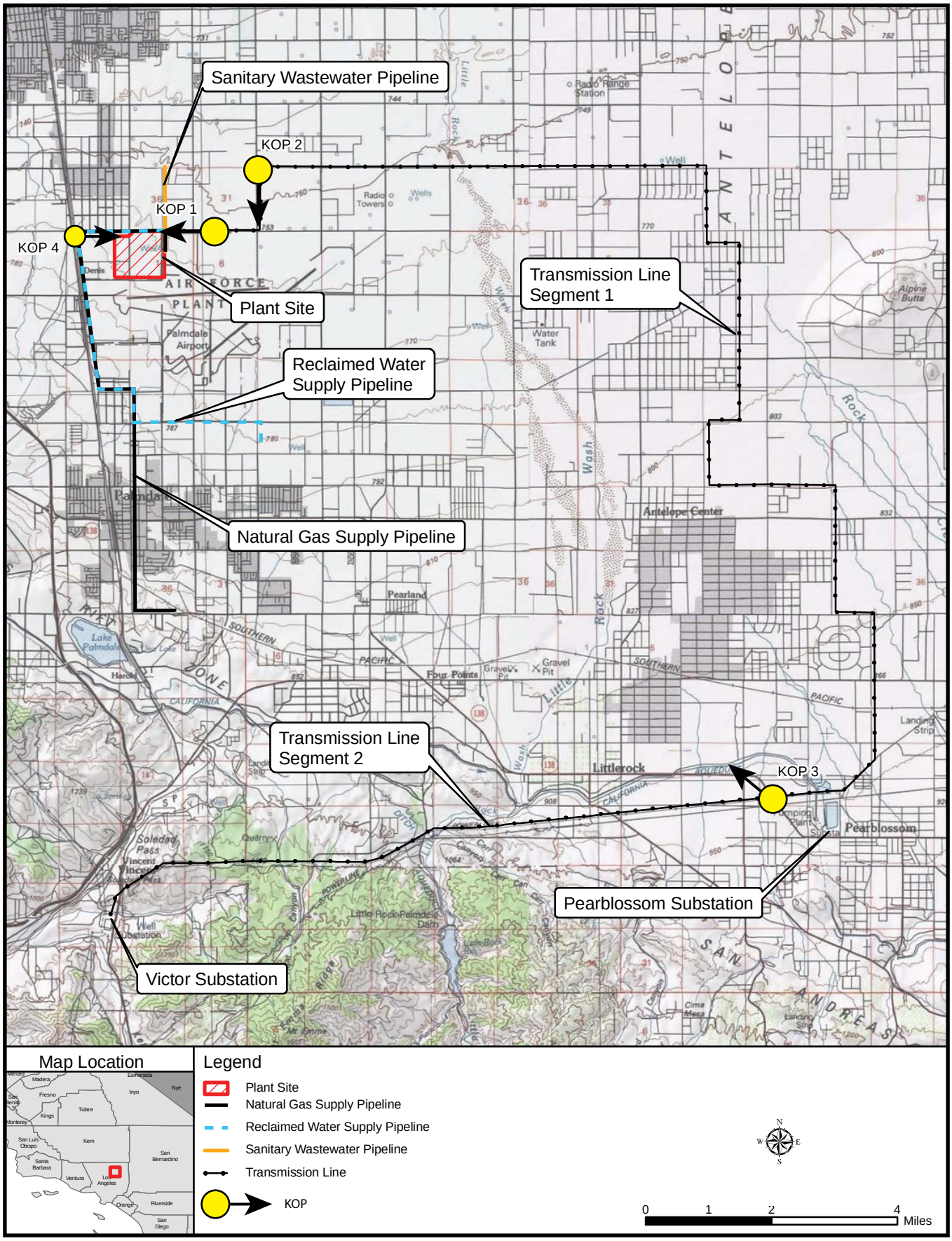
Palmdale Hybrid Power Project - Existing Condition

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 2-2

VISUAL RESOURCES - FIGURE 2

Palmdale Hybrid Power Project - Project Site and Key Observation Points



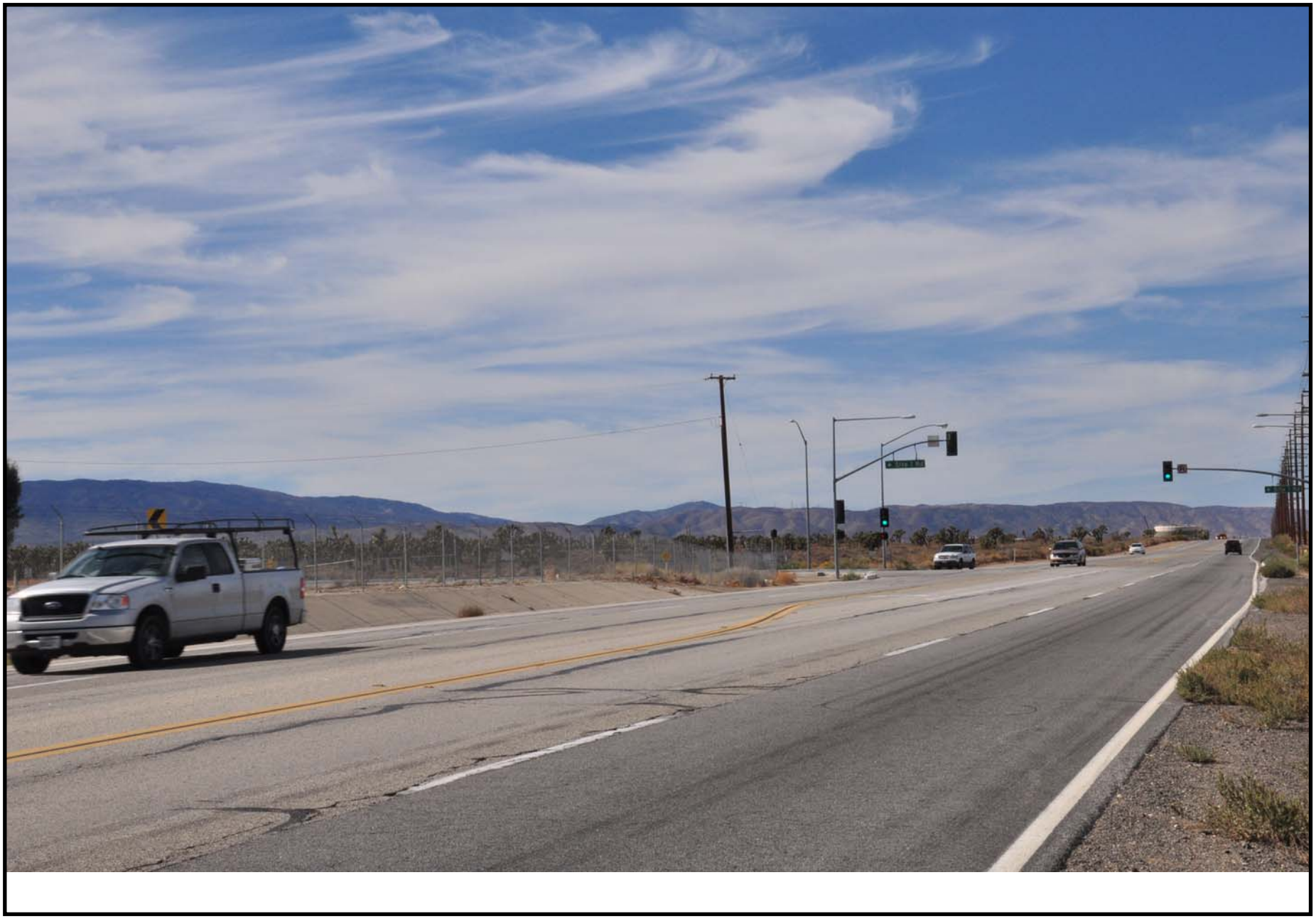
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.15-3

VISUAL RECOURCES

VISUAL RESOURCES - FIGURE 3A

Palmdale Hybrid Power Project - KOP1 - Looking West on East M Street - PHPP Site is South (left) of the Street and Behind the Stop Light
Existing Condition



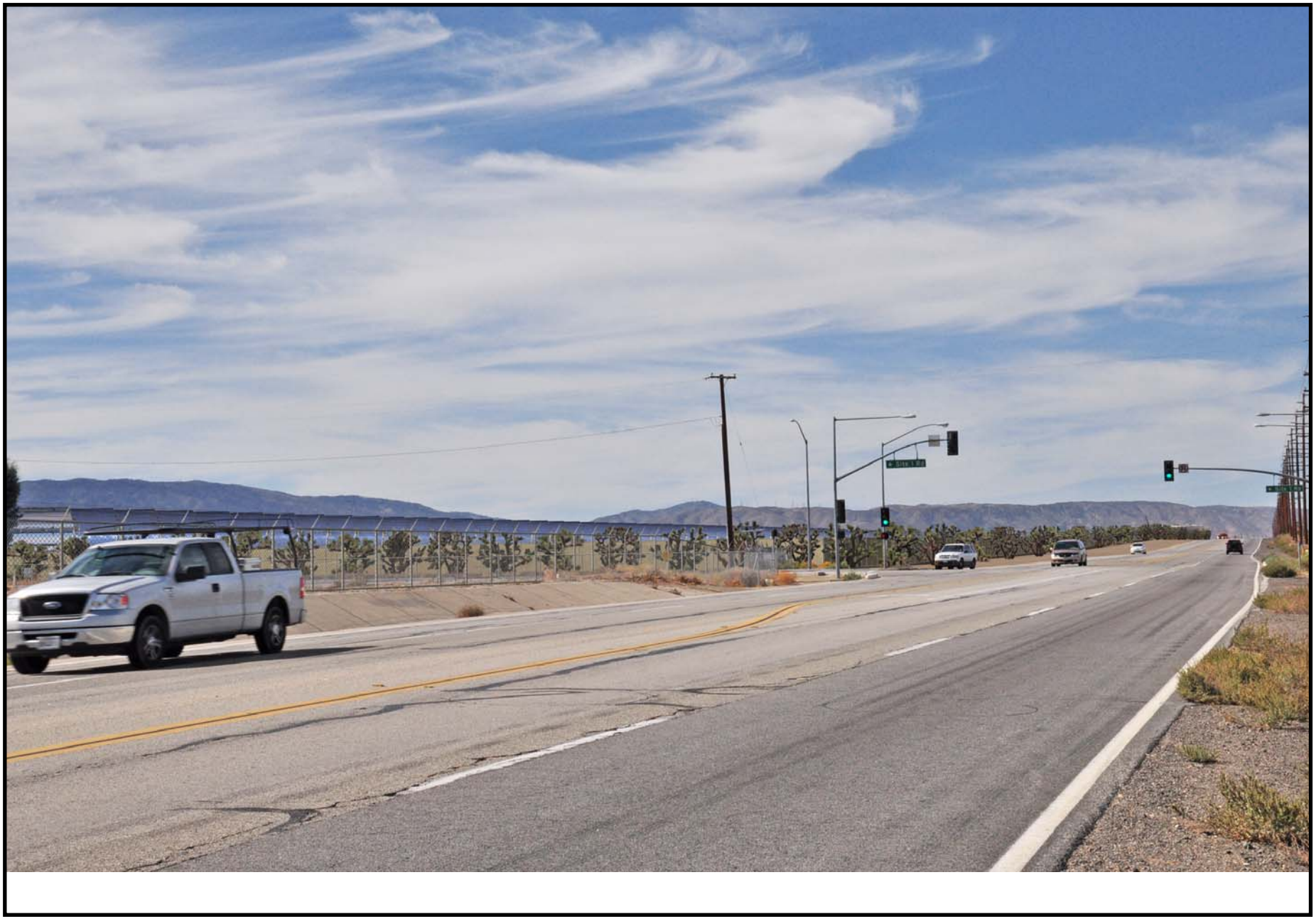
VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CEC Staff Photo

VISUAL RESOURCES - FIGURE 3B

Palmdale Hybrid Power Project - KOP1 - Looking West on East M Street - PHPP Site is South (left) of the Street and Behind the Stop Light
Simulated Condition



VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CEC Staff Photo

VISUAL RESOURCES - FIGURE 4A

Palmdale Hybrid Power Project - KOP2 - Looking South on 30th Street Toward East M Street - Existing Condition

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CEC Staff Photo

VISUAL RESOURCES - FIGURE 4B

Palmdale Hybrid Power Project - KOP2 - Looking South on 30th Street Toward East M Street - Simulated Condition

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CEC Staff Photo

VISUAL RESOURCES - FIGURE 5A

Palmdale Hybrid Power Project - View from KOP-3 Looking North Along Pearlblossom Highway - Existing Condition

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Applicants Visual Resource Consultant

VISUAL RESOURCES - FIGURE 5B

Palmdale Hybrid Power Project - View from KOP-3 Looking North Along Pearlblossom Highway - Simulated Condition

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Supplemental Filing - July 16, 2009

VISUAL RESOURCES - FIGURE 6A

Palmdale Hybrid Power Project - View from KOP-4 Looking East Toward PHPP Site Near East Avenue M - Existing Condition

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.15-5a

VISUAL RESOURCES - FIGURE 6B

Palmdale Hybrid Power Project - View from KOP-4 Looking East Toward PHPP Site Near East M Avenue With Project Structures and 20th Percentile Plume - Simulated Condition

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: PSA Supplemental Figure 5.15-5c

VISUAL RESOURCES - FIGURE 7

Palmdale Hybrid Power Project - Sierra Bike Trail

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: City of Palmdale - ESRI - California Energy Commission

WASTE MANAGEMENT

Testimony of Suzanne Phinney, D.Env.

SUMMARY OF CONCLUSIONS

Management of wastes generated during construction and operation of the Palmdale Hybrid Power Project (PHPP) would not result in any significant adverse impacts and would comply with applicable waste management laws, ordinances, regulations, and standards if the measures proposed in the Application for Certification and staff's proposed conditions of certification are implemented.

INTRODUCTION

This Final Staff Assessment (FSA) presents an analysis of issues associated with wastes generated by the proposed construction and operation of the PHPP. The technical scope of this analysis encompasses solid wastes existing on site and wastes that would likely be generated during facility construction and operation. Management and discharge of wastewater is addressed in the **Soil and Water Resources** section of this document. Additional information related to waste management may also be covered in the **Worker Safety** and **Hazardous Materials Management** sections of this document.

In accordance with the California Environmental Quality Act (CEQA) Guidelines and waste management significance criteria (CCR 2008), the California Energy Commission (Energy Commission) staff's objectives in conducting this waste management analysis are to ensure that:

- The management of project wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS).
- During project construction and operation, wastes are managed in such a way that the wastes themselves, or any waste constituents, would not result in contamination or releases that pose a significant risk to humans or the environment.
- The disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental laws, ordinances, regulations, and standards (LORS) have been established to ensure the safe and proper management of both solid and hazardous wastes in order to protect human health and the environment. Project compliance with the various LORS is a major component of staff's determination regarding the significance and acceptability of the PHPP project with respect to management of waste.

Waste Management Table 1
Laws, Ordinances, Regulations, and Standards

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.)	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 (also known as *Superfund*)	Establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things, the statute addresses: • Reporting requirements for releases of hazardous substances; • Requirements for remedial action at closed or abandoned hazardous waste sites, and brownfields; • Liability of persons responsible for releases of hazardous substances or waste; and • Requirements for property owners/potential buyers to conduct “all appropriate inquiries” into previous ownership and uses of the property to 1) determine if hazardous substances have been or may have been released at the site, and 2) establish that the owner/buyer did not cause or contribute to the release. A Phase I Environmental Site Assessment is commonly used to satisfy CERCLA “all appropriate inquiries” requirements.
Title 40, Code of Federal Regulations (CFR), Subchapter I – Solid Wastes	Implements 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, CFR, Parts 172 and 173. Hazardous Materials Regulations	Addresses the United States Department of Transportation established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with Title 40, CFR, Section 262.20.
Federal Clean Water Act, 33 USC § 1251 *et seq.*	Controls discharge of wastewater to the surface waters of the U.S.
State	
California Health and Safety Code (HSC), Chapter 6.5, §25100, et seq. Hazardous Waste Control Act of 1972, as amended	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 (CalEPA), Department of Toxic Substances Control (DTSC) administers and implements the provisions of the law at the state level. Certified Unified Program Agencies (CUPAs) implement some elements of the law at the local level.
Title 22, California Code of Regulations (CCR), Division 4.5. Environmental Health Standards for the Management of Hazardous Waste	Establishes 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, CCR 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.
HSC, Chapter 6.11 §§25404 – 25404.9 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (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 Material Management Plan / Hazardous Material 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 Los Angeles County Fire Department is the CUPA for the PHPP project. Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program.
Title 27, CCR, Division 1, Sub-division 4, Chapter 1, §15100, et seq. Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	Primarily addresses certification and implementation of the program by the local CUPAs, but also contains 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	Establishes mandates and standards for management of solid waste in California. The law addresses solid waste landfill diversion requirements; establishes the preferred waste management hierarchy (source reduction first, then recycling and reuse, and treatment and disposal last); sets standards for design and construction of municipal landfills; and addresses programs for county waste management plans and local implementation of solid waste requirements.
Title 14, CCR, Division 7, §17200, et seq.	Implements the provisions of the California Integrated Waste Management Act and sets forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste

California Integrated Waste Management Board	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.
HSC, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq. Hazardous Waste Source Reduction and Management Review Act of 1989	Expands 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, CCR, §67100.1 et seq. Hazardous Waste Source Reduction and Management Review	Further clarifies and implements 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.
Local	
Los Angeles County Fire Department, Health and Hazardous Materials Division County of Los Angeles Codes, Title 32 Fire Code	Establishes requirements for the use, generation, storage, and disposal of hazardous materials and wastes within the Los Angeles County.
Solid Waste Handling and Recycling Services Chapter 5.52 City of Palmdale Municipal Code	Establishes requirements for commercial and industrial collection of solid waste.
Los Angeles County Code Chapter 20.87	Requires projects in the County unincorporated areas to recycle or reuse 50% of the debris generated, in accordance with the mandates of Integrated Waste Management Act of 1989. The County of Los Angeles Department of Public Works enforces the ordinance in unincorporated areas of the County.

SETTING

The PHPP would be located in the northernmost part of the City of Palmdale, in Los Angeles County. The high desert city is 60 miles north of Los Angeles and just south of Lancaster, at the southwestern edge of the Antelope Valley. The 383-acre project site is part of a 600-acre City-owned property, bounded by Sierra Highway to the west, East Avenue M to the north, and the U.S. Air Force Plant 42 to the south and east. The undeveloped site supports Joshua tree woodland, Mojave creosote bush scrub, and rabbit bush scrub.

With a nominal output of 570 MW, the PHPP would consist of a hybrid of natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment. The solar thermal input would provide approximately 10% of the peak power generated by the Project during the daily periods of highest energy demand.

A 35.6-mile transmission interconnection would connect from SCE's Vincent Substation south of Palmdale. From the substation, the interconnection would travel east to Lone Oak Rd, north on 126th St., west on E. Ave. S, north on 120th St., west on E. Ave. Q, north on 100th St. E, east on E. Ave. P, north on 100th St. E., west on E. Ave. M, north again on 100th St. E., west on E. Ave. L, south on 30th St. E, and west on E. Ave M to the project site. The Southern California Gas Company would construct an 8.7-mile pipeline to deliver natural gas to the PHPP; from the gas main, the pipeline would travel west on E. Ave. S, north on 10th St., west on Blackbird Way, north on Sierra Hwy, and east along E. Ave. M. The Los Angeles County Waterworks District No. 40 would supply potable water; the 1-mile potable water pipeline would originate on E Ave. N near the water tanks between 5th and 6th St. E, proceed along E Ave. M, turn south at the new entrance on 10th St. E, and follow the new access road entering the power block from the west. The City of Palmdale Water Reclamation Plant (PWRP) would supply reclaimed water, with a 1-mile alignment that heads west on E Ave. P, north on 10th St. E, west on Blackbird Way, North on Sierra Highway, and east on E Ave. M to the project site. Meanwhile, sanitary wastewater would be disposed by a 1-mile long sewer connection to the Los Angeles County Sanitation District. The applicant modified the pipeline location (originally proposed to connect to an existing sewer line at E. Ave. L and 10th St. E, approximately 1.0 mile north of the plant site); the revised route would proceed north from the east side of the power block, east along E Ave. M, and connect with the sanitary wastewater main at 25th St. E. (COP2008a, Sections 2, 5.3, and 5.7; AECOM2009E, p. PD 1-5; AECOM2009i, p. WASTE-1).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This **Waste Management** analysis addresses; a) existing project site conditions and the potential for contamination associated with prior activities on or near the project site and b) the impacts from the generation and management of wastes during project construction and operation.

a) For any site in California proposed for the construction of a power plant, the applicant must provide documentation about the nature of any potential or existing

releases of hazardous substances or contamination at the site. If potential or existing releases or contamination at the site are identified, the significance of the release or contamination would be determined by site-specific factors, including, but not limited to: the amount and concentration of contaminants or contamination; the proposed use of the area where the contaminants/contamination is found; and any potential pathways for workers, the public, or sensitive species or environmental areas to be exposed to the contaminants. Any unmitigated contamination or releases of hazardous substances that pose a risk to human health or environmental receptors would be considered significant by Energy Commission staff.

As a first step in documenting existing site conditions, the Energy Commission's power plant site certification regulations require that a Phase I Environmental Site Assessment (ESA) be prepared[1] and submitted as part of an application for certification. The Phase I ESA is conducted to identify any conditions indicative of releases and threatened releases of hazardous substances at the site and to identify any areas known to be contaminated (or a source of contamination) on or near the site.

In general, the Phase I ESA uses a qualified Environmental Professional (EP) to conduct inquiries into past uses and ownership of the property, research hazardous substance releases and hazardous waste disposal at the site and within a certain distance of the site, and visually inspect the property, making observations about the potential for contamination and possible areas of concern. After conducting all necessary file reviews, interviews, and site observations, the EP then provides findings about the environmental conditions at the site. In addition, since the Phase I ESA does not include sampling or testing, the EP may also give an opinion about the potential need for any additional investigation. Additional investigation may be needed, for example, if there were significant gaps in the information available about the site, an ongoing release is suspected, or to confirm an existing environmental condition.

In conducting its assessment of a proposed project, Energy Commission staff will review the project's Phase I ESA and work with the appropriate oversight agencies, as necessary, to determine if additional site characterization work is needed. If additional investigation is needed to identify the extent of possible contamination, a Phase II ESA may be required. The Phase II ESA usually includes sampling and testing of potentially contaminated media to verify the level of contamination and the need for remediation at the site. If a hazardous substance release or contamination is identified at the site, staff will again work with the appropriate oversight agencies to identify what mitigation, if any, may be necessary to protect human health and the environment from any releases or contamination identified.

b) Regarding the management of project-related wastes generated during construction and operation of the proposed project, staff reviews the applicant's proposed solid and hazardous waste management methods and determines if the methods

[1] Title 20, California Code of Regulations, section 1704(c) and Appendix B, section (g)(12)(A). Note that the Phase I ESA must be prepared according to American Society for Testing and Materials protocol or an equivalent method agreed upon by the applicant and the Energy Commission staff.

proposed are consistent with the LORS identified for waste disposal and recycling. The federal, state, and local LORS represent a comprehensive regulatory system designed to protect human health and the environment from impacts associated with management of both nonhazardous and hazardous wastes. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management.

Staff then reviews the capacity available at off-site treatment and disposal sites and determines whether or not the proposed power plant's waste would have a significant impact on the available capacity.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Site Conditions and Possible Contamination

A Phase I ESA, dated May 2008, was prepared by ENSR in accordance with the American Society for Testing and Materials Standard Practice E 1527-05 for ESAs. The Phase I ESA addressed conditions on the 383-acre vacant site located to the southwest of the intersection of E. Avenue M Road and Sierra Highway, in the City of Palmdale – but did not review transmission, gas, and water linear routes. It is included as Appendix K of the project's AFC.

The site consists of entire or partial portions of 16 parcels. Based on maps, aerial photographs, and other historical records, the site has been vacant, undeveloped desert land since at least the early 1900s. The City purchased the property from Lockheed Martin in March 2007, at which time there was no evidence of recognized environmental conditions (RECs) in connection with the site (Tetra Tech 2007). Prior to Lockheed Martin assuming ownership in 1984, a succession of private owners date back to the 1940s.

During ENSR's March 4, 2008 site visit, municipal trash and miscellaneous debris were sporadically observed. Such debris included tar piles, asphalt piles, scattered tiles/bricks, rusty metal cans, broken glass bottles, clothing, roofing materials, tires, piles of sand/gravel/dirt, concrete debris, and wood. A slightly disturbed surface area, which appeared to have been used for unauthorized dumping, was observed in the central portion of the site. The site visit, however, did not find any evidence of hazardous materials. No observations were made of groundwater monitoring wells, clarifiers, or dry wells; discolored soil, water, or unusual vegetative conditions; or of staining or visual evidence of a hazardous materials release. Buildings and structures were not present, curbing potential concerns about asbestos-containing material, lead-based paint, and mold or water intrusion. In addition, no power line transformers, aboveground storage tanks, underground storage tanks, or petroleum hydrocarbon storage/use/disposal were observed. ENSR considered the scattered trash and debris a de minimis condition and did not recommend further assessment of the site. Staff concurs that no further assessment is necessary at this time given the nature of the wastes. Staff discusses appropriate disposal of these wastes below under Construction Impacts and Mitigation.

Air Force Plant 42, a federally-owned military aerospace facility to the east and south of the proposed PHPP site, was developed in the 1950s. ENSR reviewed the Air Force's

January 2008 Installation Restoration Program (IRP) Monitoring Report, which describes a plume of contaminated groundwater adjacent to the east side of the PHPP site. The report shows the plume is migrating to the south, away from the PHPP site. The closest groundwater monitoring wells (on Air Force property) have historically detected trichloroethylene (TCE), chloromethane, toluene, acetone, and perchloroethylene. Since the groundwater plume does not extend to the proposed site, ENSR does not expect the plume from the adjacent site to present a REC to the proposed site.

To verify this information, staff reviewed the Air Force's proposed interim remediation plan (CH2M Hill 2008); the plan indicates that the majority of the remaining TCE in the vadose (unsaturated) zone and groundwater is located beneath Building 150, located approximately 1000 feet east of the PHPP boundary. As noted above, groundwater flow is to the south. The plume boundary is approximately 700 feet east of the PHPP boundary. A soil vapor extraction treatment system is located on the west side of Building 150 and a groundwater treatment system is located southeast of the building. No other off-site sources of concern were identified. Staff does not expect PHPP construction and operation activities to affect Air Force Plant 42 remedial actions associated with Building 150, nor would these remedial actions affect PHPP construction or operation.

ENSR conducted a subsequent Phase I ESA, dated February 2009, on the proposed 8.7-mile natural gas, 7.4-mile reclaimed water, 1.0-mile potable water, and 1.0-mile sanitary wastewater pipeline (original and revised) routes. The pipeline routes are primarily in the City of Palmdale, with a short segment in unincorporated Los Angeles County; they are either along city-controlled parcels or land owned by gas and electric utilities. No RECs were identified from historical research (review of topographic maps), database and records review, and a field survey (conducted on January 6, 2009). Portions of the routes are located within the vicinity of active regulatory cases, although no offsite sources of concern were identified. Furthermore, as pipeline construction would not have an impact on soils below a depth of 10 to 15 feet, ENSR did not recommend additional assessment of the routes (AECOM2009b, Attachment DR-86). The applicant subsequently relocated the sanitary wastewater pipeline to proceed east along East Ave. M (located approximately 2,000 feet north of Building 150), and conducted a review of the EDR database the week of April 20, 2009. Staff concurs with the EDR review conclusion that contamination from the adjacent Air Force Plant 42 is not expected to have impacted the proposed sanitary wastewater route (AECOM2009i, p. WASTE-1).

The Applicant conducted a Phase I ESA for portions of the 35.6-mile transmission interconnection, and has agreed to Condition of Certification **WASTE-1** to evaluate potentially contaminated sites for the entire length of the transmission route where construction would occur. **WASTE-1** would require a Phase I ESA, and subsequent Phase II ESA and Health Risk Assessment, as appropriate, of those areas that have not been evaluated in the Phase I ESA. In addition, portions of the alignment will traverse properties where there has been agricultural activity. Past agricultural land use can result in remnant concentrations of potentially hazardous pesticides and other agricultural chemicals**. WASTE-2** would require the project owner to test for residual pesticides/herbicides on currently or historically farmed land in agricultural areas where

transmission line construction would occur. These conditions will ensure that any potentially hazardous substances are identified and appropriate mitigation measures are implemented to ensure public health and safety during project construction.
If contamination is identified during construction of any part of the project (the power block, pipeline routes, transmission line, etc.), staff recommends the applicant be required to comply with Conditions of Certification **WASTE-3**, **4,** and **5. WASTE-3** would require that an experienced and qualified Professional Engineer or Professional Geologist be available for consultation in the event contaminated soil is encountered. If contaminated soil is identified, **WASTE-4** would require that the Professional Engineer or Professional Geologist inspect the site, determine what is required to characterize the nature and extent of contamination, and provide a report to the Energy Commission Compliance Project Manager (CPM) and DTSC with findings and recommended actions. **WASTE-5** would require that any additional work be conducted under the oversight of DTSC, with review and approval from the CPM.

Construction Impacts and Mitigation

Site preparation and construction of the proposed hybrid solar project and its associated facilities would last approximately 27 months (COP2008a p. 2-41) and generate both non-hazardous and hazardous wastes in solid and liquid forms. Before construction can begin, the project owner will be required to develop and implement a Construction Waste Management Plan as described in the proposed Condition of Certification **WASTE-6**. This plan must describe all waste streams and methods of managing each waste.

Nonhazardous Wastes

Construction activities would generate, on a weekly basis, 40 cubic yards of construction waste, 3 cubic yards of office waste, and 4 spent compressed gas cylinders. Recyclable materials (including the gas cylinders) would be separated and removed as needed to recycling facilities. Non-recyclable items (such as insulation, other plastics, food waste, paint containers, and packing materials) would be disposed at a Class III landfill (COP2008a p. 5.16.12).

Non-hazardous liquid wastes generated during construction would include 200 gallons per day of sanitary waste, which would be disposed by a sewer connection to the Los Angeles County Sanitation District. Storm water runoff would be managed in accordance with appropriate LORS. Please see the **Soil and Water Resources** section of this document for more information on the management of project wastewater and storm water.

Hazardous Wastes

During construction, anticipated hazardous wastes include waste paint, spent construction solvents, waste cleaners, waste oil, oily rags, waste batteries, and HRSG cleaning waste. Estimated amounts are 1 cubic yard of empty hazardous material containers (per week), 175 gallons of solvents/oil/paint/oily rags (every 90 days), 60,000 gallons of chealant-type solution (one-time event), and 20 spent alkaline batteries (in two years). Empty hazardous material containers would be returned to the vendor or regularly disposed at a permitted Class I hazardous waste facility; solvents, used oils,

paint, oily rags, and adhesives would be recycled and spent batteries would be disposed at a recycling facility (COP2008a, pages 5.14-11 to 5.14-12).

Hazardous waste would be collected and stored in a satellite accumulation area or an appropriately-contained hazardous waste accumulation area for less than 90 days. Accumulated wastes would then be properly manifested, transported, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. 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 the proposed Condition of Certification **WASTE-7** to notify the CPM. Along with the notification, the project owner must describe how the violation will be corrected and include a timeline for completion of the correction. In the event that construction excavation, grading, or trenching activities for the proposed project encounter potentially contaminated soils, specific waste handling, disposal, or other precautions may be necessary pursuant to hazardous waste management LORS.

Both the construction contractor and the project owner/operator could be considered the generators of hazardous wastes at the site during the construction period. Because hazardous waste generator status is determined by site, the project owner would be required to obtain a unique hazardous waste generator identification number for the site prior to starting construction, pursuant to proposed Condition of Certification **WASTE-8**. Wastes would be accumulated on site for less than 90 days and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies.

Staff has reviewed the proposed construction waste management methods described in AFC section 5.16.3.1 and in the responses to data requests, and concludes that project construction wastes would be managed in accordance with all applicable LORS. Absent any unusual circumstances and with the implementation of Conditions of Certification **WASTE-7** described above, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management activities.

Construction and Demolition (C&D) Waste Diversion

The Integrated Waste Management Act of 1989 [Assembly Bill (AB) 939, Sher, Chapter 1095, Statutes of 1989] established landfill waste diversion goals for both the state and local jurisdictions. Accordingly, the County of Los Angeles added Chapter 20.87 to the Los Angeles County Code, requiring construction projects (valued at over $100,000 or requiring demolition or grading permits) to recycle or reuse at least 50% of the debris generated. Steps to meet ordinance requirements include submitting the County's Recycling and Reuse Plan and Final Compliance Report. Any violations are subject to administrative penalty, enforcement, and collection proceedings. The ordinance applies to projects in the County's unincorporated areas, where portions of the project's transmission lines would be located. Adoption of Condition of Certification **WASTE-9** will ensure the Applicant meets Los Angeles County C&D diversion requirements for transmission line construction in County jurisdiction.

The majority of the project, including the power block and solar arrays, is located within the city of Palmdale, which does not operate a formal Construction and Demolition (C&D) Waste Diversion Program. The Applicant would coordinate with the City's Public Works Department in its recovery, recycling, and reuse efforts (L&W 2010b), as specified in **WASTE-9**. Staff believes that compliance with proposed Condition of Certification **WASTE-9** would help ensure that project construction wastes are managed properly and further reduce potential impacts to local landfills from project wastes.

Operation Impacts and Mitigation

The proposed PHPP project would generate both non-hazardous and hazardous wastes in solid and liquid forms under normal operating conditions. Table 5.16-6 of the project AFC gives a summary of the anticipated operation waste streams, estimated waste volumes and generation frequency, and proposed management methods. Before operations can begin, the project owner would be required to develop and implement an Operations Waste Management Plan as required in the proposed Condition of Certification **WASTE-10**.

Heat Transfer Fluid Releases

The PHPP would use Therminol VP-1™ (a synthetic oil consisting of diphenyl ether and biphenyl) for the heat transfer fluid (HTF). The PHPP solar system would contain 260,000 gallons of Therminol, which would not be stored onsite outside of the closed-loop system (COP2008a p. 5.6-23).

Occasional spills of HTF from either equipment failure or human error can result in the generation of contaminated soil. HTF spills typically spread laterally on the bare ground and soak down to a relatively shallow depth. The contaminated soil is regulated as a hazardous material by the State of California due to the constituent biphenyl. Biphenyl is listed in Title 22, CCR, Chapter 11 Appendix X (list #299) as an extremely hazardous waste. The listing of a chemical in Appendix X creates the regulatory presumption that a waste containing that chemical (i.e. HTF contaminated soil) is hazardous unless determined otherwise, pursuant to specified procedures. The determination is required to be based on criteria and lists in Title 22, California Code of Regulations, Section 66261.1 et seq., which identify hazardous wastes subject to regulation. DTSC made a 1995 determination that a 10,000 mg/kg concentration of HTF would be assumed hazardous for SEGS III-VI at Kramer Junction. This determination, however, cannot be extrapolated to the proposed project, and DTSC has indicated that determination of whether a discharge of HTF constitutes a hazardous waste would have to be made on a case by case basis (CEC2009t). Title 22, CCR, section 66260.200(f) places the responsibility of determining whether a waste must be classified as hazardous on the generator of that waste. Once a history of discharges has been established, the applicant may petition DTSC for their concurrence on a standardized waste classification for HTF contaminated soils generated at the facility (title 22, CCR, section 66260.200(d)).

The applicant estimates generating 10 cubic yards per year of hazardous HTF-contaminated soils and 750 cubic yards per year of non-hazardous soils (COP2008a, p. 5.16-13). The applicant has stated that no onsite bioremediation unit would be established, and that all HTF contaminated soil would be disposed at properly permitted

landfills based on the level of contamination (L&W 2010b). Unless the project owner expects all HTF contaminated soil to be classified and disposed as hazardous waste, the project owner will be required to assess the waste classification for HTF-impacted soils at the PHPP facility in consultation with the CEC and DTSC per **WASTE-11**.

Nonhazardous Solid Wastes

Non-hazardous solid wastes generated during project operations would consist of: air filters (2,100 every five years), spent demineralizer resins (10 cubic feet every 3 years), sand and filter media (100 cubic feet every 3 years), cooling tower basin sludge (2 tons per year), spent softener resins (100 cubic feet every 3 years), water treatment solids (1,200 pounds per hour), and office wastes.

The wastes generated from cooling tower operations (sludge) and from the processing of cooling tower blowdown in an onsite Zero-Liquid Discharge (ZLD) system (filter press solids, dewatered sludge cake) would be containerized and stored in designated areas prior to disposal at an approved waste management facility. To ensure appropriate disposal of these wastes, Condition of Certification **WASTE-12** requires testing of the material and documentation of the handling, testing, and disposal methods in the Operation Waste Management Plan required in Condition of Certification **WASTE-10**.

There would be no onsite treatment of nonhazardous solid wastes, including of any HTF-contaminated soils. Wastes would be recycled to the greatest extent possible, and the remainder would be removed on a regular basis for disposal in a Class III landfill (COP2008a p. 5.16-3 to 5.16-5).

Non-hazardous Liquid Wastes

Non-hazardous liquid wastes would include 5,400 gallons per day of sanitary wastewater (COP2008a, p. 5.16-4) and storm water runoff. Wastewater would be disposed by the sewer connection to the Los Angeles County Sanitation District. Sanitary wastewater and storm water runoff generated during facility operation is discussed in the **Soil and Water Resources** section of this document.

Hazardous Wastes

The project owner/operator would be considered the generator of hazardous wastes at the site during facility operations. Therefore, the project owner's unique hazardous waste generator identification number, obtained prior to construction in accordance with proposed Condition of Certification **WASTE-8**, would be retained and used for hazardous waste generated during facility operation.

Hazardous wastes that may be generated during routine project operation include hydraulic fluid/oils/grease/oily filters from turbines and hydraulic actuators (less than 5 gallons per day), oily effluent from water separation systems (3,000 gallons per year), oily rags/oil absorbent/oil filters from various sources (55 gallons per month), spent SCR catalyst (20,000 cubic feet every 3 to 5 years), batteries with lead acid (20 every 2 years), household batteries (less than 10 per month), and fluorescent light bulbs (less than 50 per year) (COP2008a p. 5.16-3). Spills and unauthorized releases of hazardous materials or hazardous wastes may generate contaminated soils or cleanup materials that may also require management and disposal as hazardous waste. Proper

hazardous material handling and good housekeeping practices would help keep spill wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, staff proposes Condition of Certification **WASTE-13,** requiring the project owner/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 on project hazardous materials management provisions, including emergency response and spill reporting and spill control and countermeasures plan requirements is provided in the **Hazardous Materials Management** and **Worker Safety and Fire Protection** sections of this document.)

The amounts of hazardous wastes generated during the operation of the PHPP project would be limited, with source reduction and recycling of wastes implemented whenever possible. The hazardous wastes 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, CCR, §66262.10 et seq.). Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-7** to notify the CPM when advised of any such action and provide information on how the violation(s) causing the enforcement action would be corrected.

Impact on Existing Waste Disposal Facilities

Nonhazardous Solid Wastes

During construction and operation of the proposed project, approximately 43 cubic yards per week of nonhazardous solid waste (including scrap wood, concrete, steel, glass, plastic, paper, aluminum, and food) would be generated and recycled or disposed of in a Class III landfill. Approximately 4 spent compressed gas cylinders per week would be recycled. An estimated 750 cubic yards per year of nonhazardous HTF-contaminated soil would also be generated during operations.

Table 5.16-4R of AECOM2009b lists 10 non-hazardous (Class III) waste disposal facilities in Los Angeles County that could potentially take the non-hazardous construction and operation wastes generated by the PHPP project. The combined remaining capacity for the landfill facilities is approximately 118.8 million cubic yards. The total amount of nonhazardous waste generated from project construction and operation would contribute significantly less than 1% of the available landfill capacity. Staff finds that disposal of the solid wastes generated by the PHPP project could occur without significantly impacting the capacity or remaining life of any of these facilities.

Hazardous Wastes

Hazardous wastes generated during construction and operation would be recycled to the extent possible and practical. AFC Table 5.16-4 lists landfills and recycling facilities that could be used to manage project wastes. Any wastes that cannot be recycled would be transported off-site to a permitted landfill.

Two hazardous waste (Class I) disposal facilities are currently accepting waste and could be used to manage PHPP wastes: the Clean Harbors Buttonwillow Landfill in Kern County and the Chemical Waste Management Kettleman Hills Landfill in Kings County. The Kettleman Hills facility also accepts Class II wastes. In total, there is a combined excess of 15.5 million cubic yards of remaining hazardous waste disposal capacity at these landfills. The Kettleman Hills facility is in the process of permitting an additional 15 million cubic yards of disposal capacity (EEC2006a, Section 8.14.3.5.2), and the Buttonwillow facility has 40 years to reach its capacity at its current disposal rate (CEC2008aa).

Given the availability of recycling facilities for high volume hazardous wastes such as used oil and solvents, along with the remaining capacity available at Class I disposal facilities, staff concludes that the volume of hazardous waste from the PHPP project requiring off-site disposal would be minor and would therefore not significantly impact the capacity or remaining life of the Class I waste facilities.

CUMULATIVE IMPACTS AND MITIGATION

In general, cumulative impacts consist of impacts that are created as a result of the proposed project in combination with impacts from other closely related past, present, or reasonably foreseeable future projects. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time (Cal. Code Regs., tit. 14, §15355.). Foreseeable projects within a 3-mile radius of the PHPP are the Fairway Business Park (a 120-acre park for industrial tenants), Palmdale Transit Village Specific Plan (a transit-oriented village with up to 1,027 new housing units and 221,000 square feet of retail and office space), Amargosa Creek Specific Plan (a 152-acre site for a Commercial District and a Medical District), and 30th St W and Avenue K Projects (commercial and townhome developments).

The wastes generated by these projects and the proposed PHPP would incrementally increase the volumes of waste requiring offsite management and disposal at local landfills. However, staff has concluded that the PHPP project's proposed waste management methods and mitigation measures (implementation of source reduction, waste minimization and recycling), along with staff's proposed conditions of certification (including compliance with Los Angeles County's construction and demolition waste recycling and diversion requirements), would ensure that wastes generated by the proposed project would not result in a significant cumulative impact to local waste management and disposal facilities.

COMPLIANCE WITH LORS

Management of wastes generated during construction and operation of the Palmdale Hybrid Power Project (PHPP) would not result in any significant adverse impacts and would comply with applicable waste management laws, ordinances, regulations, and standards if the measures proposed in the Application for Certification and staff's proposed conditions of certification are implemented.

For all wastes, the applicant would be required to recycle and/or dispose of hazardous and nonhazardous wastes at facilities licensed or otherwise approved to accept the

wastes. Because hazardous wastes would be produced during both project construction and operation, the PHPP project would be required to obtain a hazardous waste generator identification number from U.S. EPA. The PHPP project would also be required to properly store, package, and label all hazardous waste; use only approved transporters; prepare hazardous waste manifests; keep detailed records; and appropriately train employees, in accordance with state and federal hazardous waste management requirements.

RESPONSE TO COMMENTS

Applicant **(L&W 2010b, AECOM 2010c)**: Revise WASTE-5 to require DTSC coordination only for material of significant contamination levels.	Staff revised WASTE-5 to require consultation with DTSC for hazardous wastes as defined in the California Health and Safety Code. Staff incorporated components of the applicant's proposed language.
Applicant **(L&W 2010b)**: Revise WASTE-9 to reflect that the City of Palmdale does not have a construction and demolition waste diversion requirement. For construction activities within Palmdale limits, include proposed steps to encourage waste recovery and reuse.	Staff revised WASTE-9 as requested.
Applicant **(L&W 2010b):** Delete WASTE-11 (which requires a RWQCB permit for onsite storage and treatment of HTF-contaminated soils) to reflect that the project would not involve a Land Treatment Unit or onsite soil treatment.	Staff removed the requirement for a RWQCB permit, and inserted provisions for consulting with DTSC for a hazardous determination of HTF-contaminated soils and for disposal at properly permitted landfills.

CONCLUSIONS

Consistent with the three main objectives for staff's waste management analysis (as noted in the Introduction section of this analysis), staff provides the following conclusions:

1) After review of the applicant's proposed waste management procedures, staff concludes that project wastes would be managed in compliance with all applicable waste management LORS. Staff notes that both construction and operation wastes would be characterized and managed as either hazardous or non-hazardous waste. All non-hazardous wastes would be recycled to the extent feasible, and non-recyclable wastes would be collected by a licensed hauler and disposed of at a permitted solid waste disposal facility. Hazardous wastes would be accumulated onsite in accordance with accumulation time limits (90,180, 270, or 365 days depending on waste type and volumes generated), and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies.

To help ensure and facilitate ongoing project compliance with LORS, staff proposes Conditions of Certification **WASTE-1** through **13**. These conditions would require the project owner to do all of the following:

- Ensure the project site is investigated and any contamination identified is remediated as necessary, with appropriate professional and regulatory agency oversight (**WASTE-1**, **2**, **3, 4, 5,** and **11**).
- Prepare 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-6** and **10**).
- 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-7 and 11, 12** and **13**).
- Obtain a hazardous waste generator identification number (**WASTE-8**).
- Comply with local waste recycling and diversion requirements (**WASTE-9**).
- Report any waste management-related LORS enforcement actions and how violations will be corrected (**WASTE-13**).

2) To reduce and remediate, as necessary, any impacts from hazardous substance or hazardous waste releases at the site to a level of insignificance, staff proposes Conditions of Certification **WASTE-4**, **5**, **11,12** and **13**. Staff concludes that construction and operation of the proposed PHPP project would not result in contamination or releases of hazardous substances that would pose a substantial risk to human health or the environment.

3) Regarding impacts of project wastes on existing waste disposal facilities, the existing available capacity for the 10 operating Class III landfills that may be used to manage nonhazardous project wastes is approximately 18.3 million cubic yards. The total amount of nonhazardous wastes generated from construction and operation of PHPP would be minimal compared to the remaining landfill capacity. Therefore, disposal of project generated non-hazardous wastes would have a less than significant impact on Class III landfill capacity.

4) The two Class I disposal facilities that could be used for hazardous wastes generated by the construction and operation of PHPP have a combined remaining capacity in excess of 16 million cubic yards. The total amount of hazardous wastes generated by the PHPP project would be minor. Therefore, impacts from disposal of PHPP generated hazardous wastes would also have a less than significant impact on the remaining capacity at Class I landfills.

Staff concludes that management of the waste generated during construction and operation of the PHPP project would not result in any significant adverse impacts, and would comply with applicable LORS, if the waste management practices and mitigation measures proposed in the PHPP project AFC and staff's proposed conditions of certification are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall implement the following steps at locations where excavation or significant ground disturbance will occur for the construction of the project transmission line. All steps shall be completed at least 60 days prior to the project transmission line construction to prevent mobilization of contaminants and exposure of workers and the public:

- Step 1. Investigate the tower locations and associated laydown and staging areas for construction of the transmission line to determine whether these locations have a record of hazardous material contamination which would affect construction activities. This investigation shall be performed as a Phase I Environmental Site Assessment (ESA). If contamination is identified that could potentially affect the health and safety of workers or the public during construction of the Proposed Project, proceed to Step 2.
- Step 2. Perform a Phase II ESA to characterize the locations and determine the nature and extent of the contamination present at the location before construction activities proceed within the Project Right-of-Way near the suspect site. If it is determined there are conditions that may pose a risk to the health and safety of workers or the public, or could mobilize contamination, then proceed to Step 3.
- Step 3. Prepare a Health Risk Assessment to determine whether risks may be present and a Remedial Action Plan to identify what remedial measures would be required to facilitate linear construction if there were conditions that pose a risk. Mitigate the health and safety risk according to applicable regulations or requirements. This would include preparation and implementation of site-specific Health and Safety Plans, Work Plans, and/or Remediation Plans.

Verification: The project owner shall submit the Phase I ESA, and Phase II ESA, Health Risk Assessment results and other plans, as applicable, to the CPM at least 60 days prior to commencement of transmission line construction.

WASTE-2 In areas where the land has been or is currently being farmed, and where excavation or significant ground disturbance will occur for the construction of the project transmission line, soil samples shall be collected and tested for herbicides, pesticides, and fumigants to determine the presence and extent of any material levels of contamination.

The sampling and testing plan shall be prepared in consultation with the appropriate Los Angeles County agency, conducted by an appropriate California licensed professional, and sent to a California Certified laboratory for testing. Sampling and analysis shall be consistent with the DTSC's 'Interim Guidance for Sampling Agricultural Fields for School Sites (Third Revision)' or equivalent. A report documenting the areas proposed for sampling, and the process used for sampling and testing shall be submitted to the Energy Commission for review and approval at least 90 days before transmission line construction occurs in the affected areas.

Results of the laboratory testing and recommended resolutions for handling and excavation of material found to exceed regulatory requirements shall be submitted to the Energy Commission 60 days prior to transmission line construction occurs in the affected areas. Should sampling indicate additional remediation or mitigation is required, Conditions of Certification **WASTE-3** and **-4** would apply.

Excavated materials containing elevated levels of pesticide or herbicide require special handling and disposal according to procedures established by the regulatory agencies. Effective dust suppression procedures shall be used in construction areas to reduce airborne emissions of these contaminants and reduce the risk of exposure to workers and the public. Regulatory agencies for the State of California and Los Angeles County shall be contacted by Applicant or its contractor to plan handling, treatment, and/or disposal options.

Verification: The project owner shall identify the current/previous land use for the project transmission tower locations and associated laydown and staging areas for construction of the transmission line. The project owner shall submit a report documenting the areas proposed for sampling, and the process used for sampling and testing to the CPM for approval at least 90 days before transmission line construction occurs in the affected areas. Results of the laboratory testing and recommended mitigation or remediation plan for handling and excavation of material found to exceed regulatory requirements shall be submitted to the CPM for review and approval 60 days prior to transmission line construction.

WASTE-3 The project owner shall contract with an experienced and qualified Professional Engineer or Professional Geologist, who shall be available for consultation and oversight of earth moving activities throughout all phases of site construction. The Professional Engineer/Geologist shall be given full authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil. Selection of the Professional Engineer/Geologist shall be subject to CPM approval.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit the resume of their preferred Professional Engineer or Geologist to the CPM for review and approval. The project owner shall then provide a copy of the contract with the approved Professional Engineer/Geologist prior to the start of site construction activities.

WASTE-4 If potentially contaminated soil is identified during any phase of site construction, including excavation or grading at either the proposed site or linear facilities, as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the Professional Engineer or Professional Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and provide a written report to the project owner, representatives of DTSC, and the CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the Professional Engineer or Professional Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. The Professional Engineer or Professional Geologist shall contact the project owner, the CPM, and representatives of the DTSC for guidance and oversight in accordance with Condition of Certification **WASTE-3**.

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-5 In the event that contamination is identified during assessment of the project site, during any phase of PHPP construction, and if the Project Engineer (PE), Professional Geologist (PG), or CPM reasonably determines that sampling is needed to confirm the nature and extent of contamination, then the Project PE and/or PG shall file a written report to the CPM stating a recommended course of action. If significant contamination (i.e., contamination levels which exceed the EPA Reportable Quantity [RQ] thresholds as listed under the Emergency Planning and Community Right to Know Act [EPCRA]) are identified and which the PG, PE, or CPM reasonably determines may pose a significant risk to workers, the public, or the environment, then the DTSC will be consulted regarding the proposed course of action.

Verification: The project owner shall consult with DTSC, and enter into an agreement at DTSC's request, to ensure oversight of any additional site assessment and remediation work needed to reevaluate the site or address contamination levels above Reportable Quantities, that have been determined to pose a significant risk to workers or the public found during any phase of PHPP site construction. The project owner shall ensure that the CPM is involved and apprised of all discussions with DTSC, and CPM review and approval shall be required for project decisions addressing site remediation.

WASTE-6 The project owner shall prepare a Construction Waste Management Plan for all wastes generated during construction of the facility and shall submit the plan to the 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; and
- Management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans.

Verification: The project owner shall submit the Construction Waste Management Plan to the CPM for approval no less than 30 days prior to the initiation of construction activities at the site.

WASTE-7 Upon notification of any impending waste management-related enforcement action 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, and describe how the violation will be corrected.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action and provide a description and timeline for correction of the violation. The CPM shall notify the project owner of any changes that will be required in the way project-related wastes are managed to ensure compliance with LORS.

WASTE-8 The project owner shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency (U.S. EPA) prior to generating any hazardous waste during construction and operations.

Verification: The project owner shall keep a copy of the identification number on file at the project site and provide documentation of the hazardous waste generation notification and receipt of the number to 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-9 The project owner shall provide a Recycling and Reuse Plan to the County of Los Angeles, consistent with the Chapter 20.87 of the Los Angeles County Code. The project owner shall ensure compliance with all of the County's diversion program requirements in unincorporated areas of Los Angeles County. For construction activities within Palmdale city limits, contractors shall be required to coordinate with the City of Palmdale Public Works Department and utilize the existing recycling and reuse resources available to City contractors, and shall:

- Incorporate C&D recovery plans and BMPs in the project design, where practical
- Include recovery requirements and goals in project specifications and contracts
- Educate contractors and crew on material recovery and reuse techniques
- Coordinate with local agencies and materials exchanges to maximize recovery of C&D reusable materials

Verification: At least 60 days prior to the start of any construction activities, the project owner shall submit the proposed Recycling and Reuse Plan and list of recycling services to the County of Los Angeles and CPM for review and approval. Upon completion of construction, the project owner shall submit proof that the 50% diversion rate within the unincorporated portions of Los Angeles County and goals set by the City of Palmdale limits has been achieved and that the requirements of the Recycling and Reuse Plan have been complied with to the County and CPM.

WASTE-10 The project owner shall prepare an Operation Waste Management Plan for all wastes generated during operation of the PHPP facility and shall submit the 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 assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
- Information and summary records of conversations with the Palmdale area CUPA – Los Angeles County Fire Department– and 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 of upon closure of the facility.

Verification: The project owner shall submit the Operation Waste Management Plan to the CPM for approval no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions to 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-11 If the project owner chooses not to classify all HTF-contaminated soil as hazardous, the project owner shall consult with DTSC to determine the

hazardous or non-hazardous classification of contaminated soils. As part of such consultation, the project owner shall:

- Assume that HTF-contaminated soil is hazardous until determined otherwise.
- Establish a history of discharges.
- Petition DTSC for concurrence on a standardized waste classification for HTF-contaminated soils generated at the facility.
- Dispose of soils classified as hazardous and non-hazardous at properly permitted landfills.

Until the CPM is notified of DTSC's standardized waste classification, all HTF-contaminated soils shall be considered hazardous and disposed of at a hazardous waste facility. The project owner shall also inform the CPM upon any plans to change or modify the proposed offsite disposal methods.

Verification: At least 90 days prior to start of project operation, the project owner shall notify the CPM whether it will classify all HTF-contaminated soil as hazardous or whether it will seek standardized waste classification from DTSC. If it chooses to seek standardized waste classification, the project owner shall provide DTSC's determination to the CPM within 30 days' receipt.

WASTE-12 The project owner shall ensure that the cooling tower basin sludge is tested pursuant to Title 22, California Code of Regulations, and section 66262.10 and report the findings to the CPM. The handling, testing, and disposal methods for sludge shall be identified in the Operation Waste Management Plan required in Condition of Certification **WASTE-10**.

Verification: The project owner shall report the results of filter cake testing to the CPM within seven days of sampling. If two consecutive tests show that the sludge is non-hazardous, the project owner may apply to the CPM to discontinue testing. The test results and method and location of sludge disposal shall also be reported in the Annual Compliance Report required in Condition of Certification **WASTE-10**.

WASTE-13 The project owner shall ensure that all spills or releases of hazardous substances, hazardous materials, or hazardous waste are documented and cleaned up and that wastes generated from the release/spill are properly managed and disposed of, in accordance with all applicable federal, state, and local requirements.

The project owner shall document all unauthorized releases and spills of hazardous substances, materials, or wastes that are in excess of reportable quantities (RQs) that occur on the project property or transmission corridors during construction and on the project property during operation. The documentation shall include, at a minimum, the following information:

- location of release;
- date and time of release;

- reason for release;
- volume released;
- amount of contaminated soil/material generated;
- how release was managed and material cleaned up;
- if the release was reported;
- to whom the release was reported;
- release corrective action and cleanup requirements placed by regulating agencies;
- level of cleanup achieved and actions taken to prevent a similar release or spill; and
- disposition of any hazardous wastes and/or contaminated soils and materials that may have been generated by the release.

Verification: Copies of the unauthorized spill documentation shall be provided to the CPM within 30 days of the date the release was discovered.

REFERENCES

AECOM 2009b – AECOM / S. Head (tn: 50094). Applicant Supplemental Responses to CEC Data Request Set 1. Dated on 02/13/09. Submitted to CEC / Docket Unit on 02/13/09.

AECOM 2009e – AECOM/ S. Head (tn: 50363). Responses to CEC Data Request Set 1. Dated on 03/28/09. Submitted to CEC/ Docket Unit on 03/28/09.

AECOM 2009i – AECOM/ S. Head (tn: 51417). Applicant Responses to CEC Data Request Set 2 & Supplemental Responses # 4. Dated on 05/01/09. Submitted to CEC/ Docket Unit on 05/04/09.

AECOM 2010c – AECOM/ S. Head (tn:56649). City of Palmdale's Supplemental Info & Comments on Pre. Staff Assessment. Dated on 05/12/10. Submitted to CEC/Docket Unit on 05/12/10.

CCR 2008 – California Environmental Quality Act (CEQA) Guidelines. Title 14, California Code of Regulations, section 15000 and the following (Cal. Code Regs., tit. 14, §15000 et seq,).

CEC 2009t – California Energy Commission/E. Solorio (tn: 51934). CEC Staff Dialogue with DTSC Regarding HTF, dated 6/9/09. Submitted to CEC/Docket Unit on 6/11/09.

CH2MHill 2008 - Proposed Plan for Interim Remedial Action at Installation Restoration Program Site 29, Air Force Plant 42, Palmdale, CA.

COP 2008a – City of Palmdale/ S. Williams (tn: 47383). Application for Certification for the Palmdale Hybrid Power Project. Dated on 07/30/08. Submitted to CEC/ Docket Unit on 08/04/08.

L&W 2010b – Latham & Watkins / P. Kihm (tn:55276) City of Palmdale's Comments on Volume 1 of the Preliminary Staff Assessment. Dated 02/08/10. Submitted on 02/09/10.

Tetra Tech 2007 - Phase I Environmental Site Assessment – Avenue M and Sierra Highway, Palmdale. Prepared for the Lockheed Martin Corporation. Dated March 14, 2007.

WORKER SAFETY AND FIRE PROTECTION

Testimony of Alvin Greenberg, Ph.D. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff concludes that if the applicant for the proposed Palmdale Hybrid Power Project (PHPP) provides project construction safety and health and project operations and maintenance safety and health programs, and fulfills the requirements of conditions of certification **WORKER SAFETY -1** through **-9**, the project would incorporate sufficient measures to both ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards (LORS). These proposed conditions of certification ensure that these programs, proposed by the applicant, will be reviewed by the appropriate agencies before they are implemented. The conditions also require verification that the proposed plans adequately ensure worker safety and fire protection and comply with applicable LORS.

Staff also concludes that the proposed project and its new natural gas pipeline would not have significant impacts on local fire protection services. The proposed facility would be located in an area that is currently served by the local fire department. The fire risks at the proposed facility do not pose significant added demands on local fire protection services. Staff also concludes that the Los Angeles County Fire Department Hazmat Team located at Station #129 is adequately equipped and staffed to respond to hazardous materials incidents at the proposed facility with an adequate response time (LACFD 2008).

INTRODUCTION

Worker safety and fire protection are regulated through federal, state, and local LORS. Industrial workers at the facility both operate equipment and handle hazardous materials daily, and could face hazards resulting in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or minimize their risk through special training, protective equipment, and procedural controls.

The purpose of this final staff assessment (FSA) is to assess the worker safety and fire protection measures proposed by the PHPP applicant and determine whether the applicant has proposed adequate measures to:

- Comply with applicable safety LORS;
- Protect workers during the construction and operation of the facility;
- Protect against fire; and
- Provide adequate emergency response procedures.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Worker Safety and Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
29 U.S. Code sections 651 et seq (Occupational Safety and Health Act of 1970)	This Act mandates safety requirements in the workplace, with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC § 651).
29 CFR sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR sections 1952.170 to 1952.175	These sections provide federal approval of California's plan for enforcement of its own safety and health requirements, in lieu of most of the federal requirements found in 29 CFR §1910.1 to 1910.1500.
State	
8 CCR all applicable sections (Cal/OSHA regulations)	Requires that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during the construction, commissioning, and operation of power plants, as well as safety around electrical components, fire safety, and hazardous materials usage, storage, and handling.
24 CCR section 3, et seq.	Incorporates the current edition of the Uniform Building Code.
California Health and Safety Code, section 25531 to 25543.4	The California Accidental Release Program (Cal-ARP) requires the preparation of a Risk Management Plan (RMP) and Off-site Consequence Analysis (OCA) and submittal to the local Certified Unified Program Authority (CUPA) for approval.
Health and Safety Code sections 25500 to 25541	Requires a Hazardous Materials Business plan detailing emergency response plans for hazardous materials emergencies at a facility.
Local (or locally enforced)	
City of Palmdale Municipal Code, Title 8 Health and Safety, Chapter 8.04	Adoption of Health, Safety, and Technical Construction Codes from the Los Angeles County Code. Addresses organization, roles, responsibilities, etc. of Los Angeles County Fire Department and provisions of Palmdale City fire code.
City of Palmdale Building	Includes specific building codes, such as the electrical code.

Code	
Los Angeles County Fire, Certified Unified Permitting Agency	Responsible for administering the hazardous materials release response plans and inventory program and the California Accidental Release Prevention Program (Cal-ARP).
Los Angeles County Fire Department, Title 32, Chapter 40 Consolidated Fire Protection District Code	The adoption and incorporation of the fire code for the District of Los Angeles County.
2007 California Fire Code and 2006 International Fire Code	The fire code contains general provisions for fire safety, including requirements for proper storage and handling of hazardous materials and listing of the information needed by emergency response personnel. Enforced by the Los Angeles County Fire Department.

SETTING

Fire support services to the site would be under the jurisdiction of the Los Angeles County Fire Department (LACFD). Station #129, located at 42110 6th Street in Lancaster, would be the first responder to PHPP with a response time of 2-4 minutes. Station #129 has one fire engine staffed with four firefighters and a fully-equipped hazmat unit staffed with nine personnel. The next closest station to the PHPP would be Station #135, located roughly 2-2.5 miles away in Lancaster, with a response time of 4-5 minutes. This station has one engine staffed with three firefighters and a paramedic vehicle staffed with two personnel (LACFD 2008). The LACFD has ten fire stations in the City of Palmdale and seven stations in the City of Lancaster. In the event of a fire or incident at the proposed facility, a full response would be dispatched from several nearby stations (LACFD 2008).

All LACFD personnel are trained at minimum to Emergency Medical Technician Level 1 (EMT-1) and as first responders for hazardous materials incidents. The Hazmat unit at Station #129 is capable of responding to any type of hazardous materials spill (LACFD 2008).

Worker Safety and Fire Protection Table 2
Response Capabilities of the LACFD*

PFD Station	Response Time	Distance to PHPP	EMS Capability
Station 129	2-4 minutes	~1.5 miles	Yes
Station 135	4-5 minutes	~2-2.5 miles	Yes

*Source: Telephone communication with LACFD Captain Richard Robinson, November 20, 2008.

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 2008 identified 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 any other environmental concern that would require remedial action (PHPP 2008a, Section 5.16.2.3). In the event that any unexpected contamination is encountered during construction of the PHPP, 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.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are assessed in **WORKER SAFETY AND FIRE PROTECTION**:

1. The potential for impacts on the safety of workers during demolition, construction, and operation activities; and

2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety is essentially a LORS compliance matter and if all LORS are followed, workers will be adequately protected. Thus, the standard for staff’s review and determination of significant impacts on worker health is whether the applicant has demonstrated adequate knowledge of and commitment to implementation of all pertinent and relevant Cal-OSHA standards.

Staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant, as well as the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the PHPP site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates local fire department capabilities and response times, and interviews local fire officials to determine if they are adequately trained, staffed, and equipped to respond to the needs of a power plant. Staff then determines if the presence of the power plant would cause a significant impact on a local fire department. If it does, staff will recommend that the applicant mitigate this impact by providing additional resources to the fire department.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Worker Safety

Industrial environments are potentially dangerous during both construction and operation. Workers at the proposed project will be exposed to loud noises, moving equipment, trenches, and confined space entry and egress. Workers may sustain falls, trips, burns, lacerations, and other injuries. They may be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks or electrocution. It is important that PHPP has well-defined policies and procedures, training, and hazard recognition and control to minimize these hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

Water for worker sanitary needs, emergency showers and eyewashes, and fire suppression is required and the source of this water is an important factor. Portable sanitary facilities and bottled water will be used during construction. During Project operations, potable water for drinking, sanitary uses, safety showers, etc. will be obtained from the Los Angeles County Waterworks District No. 40. The District has a potable water pipeline along E Ave M that currently terminates a short distance west of the plant site's northern border. A one mile water pipeline along E Ave M will be constructed to connect the PHPP to the existing pipeline. A dedicated 250,000 gallons of reclaimed tertiary-treated water will be used for fire suppression.

A Safety and Health Program will be prepared by the applicant to minimize worker hazards during construction and operation of the project. "Safety and Health Program," for staff, refers to measures that will be taken to ensure compliance with the applicable LORS during the construction and operation of the project.

In addition, a new 20-inch natural gas pipeline will be constructed, owned, and operated by the Southern California Gas Company. This 8.7-mile gas pipeline will be constructed in existing street right-of-ways within the City of Palmdale. Worker safety while constructing this pipeline will be the responsibility of the Southern California Gas Company.

Construction Safety and Health Program

PHPP includes the construction and operation of a hybrid, combined-cycle, natural gas-fired power plant and solar thermal generating equipment. For the Power Block, workers will be exposed to hazards typical of construction and operation of a gas-fired combined-cycle facility; while the solar component will present similar construction risks and minimal operational risks to workers.

Construction safety orders are published at Title 8 of the California Code of Regulations, section 1502 et seq. These requirements are promulgated by Cal/OSHA and apply to

the construction phase of the project. The construction safety and health program will include the following:

- Construction injury and illness prevention program (8 CCR § 1509);
- Construction fire prevention plan (8 CCR § 1920);
- Personal protective equipment program (8 CCR §§ 1514 - 1522); and
- Emergency action program and plan.

Additional programs under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) will include:

- Motor vehicle and heavy equipment safety program;
- Forklift operation program;
- Excavation/trenching program;
- Fall protection program
- Equipment inspection program;
- Scaffolding/ladder safety program;
- Articulating boom platforms program;
- Crane and material handling program;
- Employee exposure monitoring program;
- Electrical safety program;
- Hand and portable power tool safety program;
- Housekeeping and material handling and storage program;
- Hearing conservation program;
- Respiratory protection program;
- Hazard communication program;
- Heat and cold stress monitoring and control program;
- Pressure vessel and pipeline safety program;

The AFC includes adequate outlines for each of the above programs (PHPP 2008a, section 5.18.3.1). Prior to the project's start of construction, detailed programs and plans will be provided pursuant to Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start-up of PHPP, an operations and maintenance safety and health program will be prepared. This program will include the following programs and plans:

- Injury and illness prevention program (8 CCR § 3203);

- Fire prevention program (8 CCR § 3221);
- Personal protective equipment program (8 CCR §§ 3401 to 3411); and
- Emergency action plan (8 CCR § 3220).

In addition, the requirements under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) will apply to this project. Written safety programs for PHPP, which the applicant will develop, will ensure compliance with those requirements.

The AFC includes adequate outlines for an injury and illness prevention program, an emergency action plan, a fire prevention program, and a personal protective equipment program (PHPP 2008a, section 5.18.3.1). Prior to operation of PHPP, all detailed programs and plans will be provided pursuant to Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

As mentioned above, the applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. The major items required in both Safety and Health Programs are as follows:

Injury and Illness Prevention Program (IIPP)

The IIPP will include the following components (PHPP 2008a, section 5.18.3.1):

- Identify persons with the authority and responsibility for implementing the program;
- Establish the safety and health policy of the plan;
- Define work rules and safe work practices for construction activities;
- Establish a system for ensuring that employees comply with safe and healthy work practices;
- Establish a system to facilitate employer-employee communication;
- Develop procedures for identifying and evaluating workplace hazards and establish necessary program(s);
- Establish methods for correcting unhealthy/unsafe conditions in a timely manner;
- Determine and establish training and instruction requirements and programs;
- Specify safety procedures; and
- Provide training and instruction.

Fire Prevention Plan

The California Code of Regulations requires an operations fire prevention plan (8 CCR § 3221). The AFC outlines a proposed fire prevention plan that is acceptable to staff (PHPP 2008a, section 5.18.3.1). The plan will include the following:

- Determine general program requirements;
- Develop good housekeeping practices and proper materials storage;
- Establish employee alarms and/or communication system(s);
- Provide portable fire extinguishers at appropriate site locations;
- Locate fixed fire fighting equipment in suitable areas;
- Specify fire control requirements and procedures;
- Establish proper flammable and combustible liquid storage facilities;
- Identify the location and use of flammable and combustible liquids;
- Provide proper dispensing and determine disposal requirements for flammable liquids;
- Determine proper disposal requirements for flammable liquids;
- Identify proper servicing and refueling locations; and
- Establish and determine training and instruction requirements and programs; and

Staff proposes conditions of certification **WORKER SAFETY-1** and **WORKER SAFETY-2** to require the applicant to submit a final fire prevention plan to the California Energy Commission compliance project manager (CPM) for review and approval and to the LACFD for review and comment to satisfy proposed.

Personal Protective Equipment Program

California regulations require personal protective equipment (PPE) and first aid supplies whenever hazards in the environment, or from chemicals or mechanical irritants, could cause injury or impair bodily function through absorption, inhalation, or physical contact (8 CCR sections 3380 to 3400). The PHPP operational environment will require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and will carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information about protective clothing and equipment:

- Proper use, maintenance, and storage;
- When protective clothing and equipment are used;
- Benefits and limitations; and

- When and how protective clothing and equipment are replaced.

The PPE program ensures that employers comply with applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential hazards in the workplace, and will be required as per proposed Conditions of Certification **WORKER SAFETY-1** and **-2**.

Emergency Action Plan

California regulations require an emergency action plan (8 CCR § 3220). The AFC contains a satisfactory outline for an emergency action plan (PHPP 2008a, section 5.18.3.1).

The outline lists the following features:

- Establishes emergency procedures for the protection of personnel, equipment, the environment, and materials;
- Identifies fire and emergency reporting procedures;
- Determines response actions for accidents involving personnel and/or property;
- Develops response and reporting requirements for bomb threats;
- Specifies site assembly and emergency evacuation route procedures;
- Defines natural disaster responses (for example, earthquakes, high winds, and flooding);
- Establishes reporting and notification procedures for emergencies (including on-site, off-site, local authorities, and/or state jurisdictions);
- Determines alarm and communication systems needed for specific operations;
- Includes a spill response, prevention, and countermeasure (SPCC) plan;
- Identifies emergency personnel (response team) responsibilities and notification roster;
- Specifies emergency response equipment and strategic locations; and
- Establishes and determines training and instruction requirements and programs.

An emergency action plan will be required as per proposed Conditions of Certification **WORKER SAFETY-1** and **-2**

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 operations safety programs will address safe work practices in 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 staff assessment.

Safety Training Programs

Employees will be trained in the safe work practices described in the above-referenced safety programs.

Additional Safety Issues

This “hybrid” power plant will present a unique work environment that includes a solar field located in the high desert. The solar field features thousands of mirrors that heat a heat transfer fluid (HTF) to approximately 750°F. The pipe containing the HTF will reach temperatures at the mirror focal point as high as 1100 °F. Experience at existing solar generating stations shows that these mirrors break, the pipes age, and HTF can leak and catch fire from ball joints or frayed flex hoses. The area under the solar arrays must be kept free from weeds and thus herbicides will be applied as necessary. Exposure to workers via inhalation and ingestion of dusts containing herbicides poses a health risk. Finally, workers will inspect the solar array for HTF leaks and broken mirrors at least once each day by driving up and down dirt paths between the rows of mirrors and even under the mirrors. Cleaning the mirrors will also be conducted on a routine schedule. All these activities will take place year-round and especially during the summer months of peak solar power generation, when outside ambient temperatures routinely reach 115 °F and above.

The applicant has indicated that workers will be adequately trained and protected, but has not included precautions against heat stress and exposure to herbicides. Therefore, to ensure that workers are indeed protected, staff has proposed additional requirements found in Conditions of Certifications **WORKER SAFETY-1** and **-2**. This requirement consists of the following provisions:

- A worker heat stress protection plan that implements and expands on existing Cal OSHA regulations (8 CCR 3395) requiring heat illness prevention; and
- The development and implementation of Best Management Practices (BMP) for the storage and application of herbicides used to control weeds beneath and around the solar array.

Staff believes that effective implementation of a Heat Stress Protection Plan will mitigate the potential for significant risks to workers from heat during both construction and operations. A BMP requiring proper herbicide storage and application, as recommended in Conditions of Certification **WORKER SAFETY-1** and **-2,** will mitigate potential risks to workers from exposure to herbicides and reduce the chance that herbicides will contaminate either surface water or groundwater. Staff suggests that a BMP follow either the guidelines established by the U.S. EPA (EPA 1993) or more recent guidelines established by the State of California or U.S. EPA.

Additional Mitigation Measures

Protecting construction workers from injury and disease is one of the greatest challenges today in occupational safety and health. The following facts are reported by 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 1980-1993, an average of 1,079 construction workers were killed on the job each year, with more fatal injuries than any other industry;
- Falls caused 3,859 construction worker fatalities, or 25.6 percent of the total, between 1980 and 1993;
- 15 percent of workers' compensation costs are spent on construction-related injuries;
- Ensuring safety and health in construction is a complex task involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity to one another;
- In 1990, Congress directed NIOSH to conduct research and training to reduce diseases and injury 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 well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex industrial projects like gas-fired 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 workers. This has been evident in the audits of power plants recently conducted by the staff. 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 to improve their safety and health performance; to assist them in striving to eliminate the four major construction hazards (falls, electrical, caught in/between, and struck-by hazards) that 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 subcontractors that have exemplary safety and health programs.

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” appears in many OSHA and Cal-OSHA standards, documents, and directives. A “Competent Person” is defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3,** which would require the applicant/project owner to designate and provide for a project 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 projects like gas-fired power plants.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past because of both the failure to recognize and control safety hazards and the inability to adequately monitor 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 include, but are not limited to, safety oversights like:

- 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 the commissioning team, and then to operations;
- Dangerous placement of hydraulic elevated platforms under one another;
- Inappropriate placement of fire extinguishers near hotwork;
- Dangerous placement of numerous power cords in standing water on the site, 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 that address the proper procedures to follow in the event of the discovery of suspicious packages or objects either onsite or offsite.

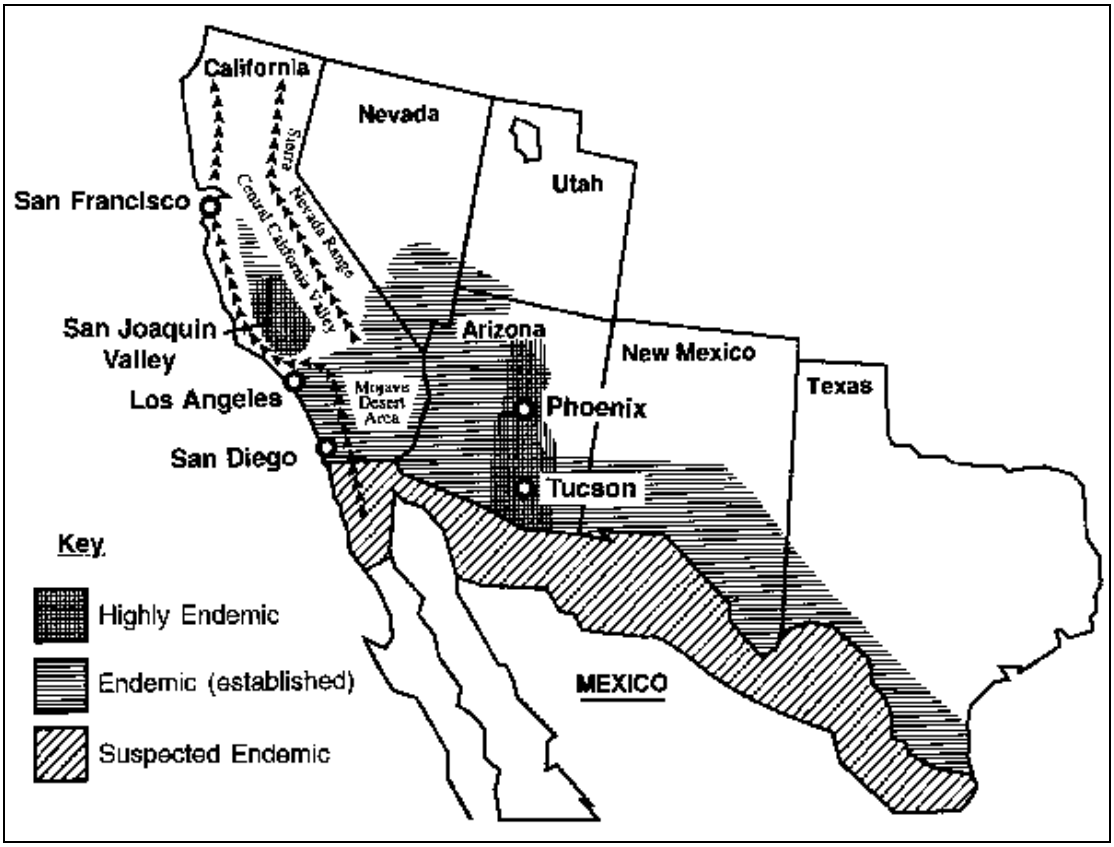
In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to require a professional Safety Monitor on-site to track compliance with Cal-OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to the operations staff. These requirements are outlined in Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner but reporting to the Chief Building Official (CBO) and the Compliance Project Manager (CPM), will serve as an extra set of eyes to ensure that safety procedures and practices are fully implemented during construction at all power plants certified by the Energy Commission. During audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged them 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 provides a fresh perspective" of the site.

Finally, in order to ensure that reconductoring of the transmission lines between the Pearl Blossom and Vincent substations is accomplished with the highest degree of worker safety, staff proposes Condition of Certification **WORKER SAFETY-7** that would require the project owner to provide to the CPM for review a copy of the worker safety plan for that reconductoring.

Valley Fever (Coccidioidomycosis)

Coccidioidomycosis or "Valley Fever" (VF) is primarily encountered in southwestern states, particularly in Arizona and California. It is caused by inhaling the spores of the fungus Coccidioides immitis, which are released from the soil during soil disturbance (e.g., during construction activities) or wind erosion. The disease usually affects the lungs and can have potentially severe consequences, especially in at-risk individuals such as the elderly, pregnant women, and people with compromised immune systems. Trenching, excavation, and construction workers are often the most exposed population. Treatment usually includes rest and antifungal medications. No effective vaccine currently exists for Valley Fever. VF is endemic to the San Joaquin valley in California, which presumably gave this disease its common name. Kern County, located at the southern end of San Joaquin valley, is where valley fever occurs most frequently (Valley Fever Vaccine Project of the Americas 2010; KCDPH 2008). Depending on the particular year, either Tulare or Fresno county have the second highest rates of VF.

Worker Safety Figure 1
The geographic distribution of coccidioidomycosis*



*Source: CDC 2006, Figure 2

In 1991, 1,200 cases of VF were reported to the California Department of Health Services (CDHS) compared with an annual average of 428 cases per year for the period of 1981 to 1990. In 1992, 4,516 cases were reported in California and 4,137 cases in 1993. Seventy percent of VF cases were reported from Kern County (CDC 1994; Flaherman 2007; CDHS 2010).

A 2004 CDC report found that the number of reported cases of coccidioidomycosis in the US increased by 32% during 2003-2004, with the majority of these cases occurring in California and Arizona. The report attributed these increases to changes in land use, demographics, and climate in endemic areas, although certain cases might be attributable to increased physician awareness and testing (CDC 2006).

According to the CDC Morbidity and Mortality Weekly Report of February 2009, incidences of valley fever have increased steadily in Arizona and California in the past decade. Cases of coccidioidomycosis averaged about 2.5 per 100,000 population annually from 1995 to 2000 and increased to 8.0 per 100,000 population between 2000 and 2006 (incident rates tripled). In 2007 there was a slight drop in cases, but the rate was still the highest it has been since 1995. The report identified Kern County as having the highest incidence rates (150.0 cases per 100,000 population), and non-Hispanic

blacks having the highest hospitalization rates (7.5 per 100,000 population). In addition, between the years 2000 and 2006, the number of valley fever related hospitalizations climbed from 1.8 to 4.3 per 100,000 population (611 cases in 2000 to 1,587 cases in 2006) and then decreased to 1,368 cases in 2007 (3.6 per 100,000 population). Overall in California, during 2000-2007, a total of 752 (8.7 percent) of the 8,657 persons hospitalized for coccidioidomycosis died (CDC 2009).

A 2007 study published in the Emerging Infectious Diseases journal of the Center for Disease Control and Prevention (CDC), found the frequency of hospitalization for coccidioidomycosis in the entire state of California to be 3.7 per 100,000 residents per year for the period between 1997 and 2002 (see Table 3 below). There were 417 deaths from VF in California in those years, resulting in a mortality rate of 2.1 per 1 million California residents annually. The data shows that Kern County had the highest total number and highest frequency of hospitalizations (Flaherman 2007).

Worker Safety Table 3
Hospitalizations for Coccidioidomycosis, California, 1997–2002*

Category	Total hospitalizations	Total person-years (× 10^6)	Frequency of hospitalization**	Frequency of hospitalization for coccidioidal meningitis**
Total	7,457	203.0	3.67	0.657
Year				
1997	1,269	32.5	3.90	0.706
1998	1,144	32.9	3.50	0.706
1999	1,167	33.4	3.5	0.61
2000	1,100	34.0	3.23	0.62
2001	1,291	34.7	3.7	0.58
2002	1,486	35.3	4.2	0.71
Highest incidence counties				
Kern	1,700	3.97	42.8	
Tulare	479	2.21	21.7	
Kings	133	0.77	17.4	
San Luis Obispo	170	1.48	11.5	

*Source: Flaherman 2007
**Per 100,000 residents per year

A 1996 paper that tried to explain the sudden increase in Coccidioidomycosis cases that began in the early 90s 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 (CDC 2006). 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 (CDC 2006). 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). The study concluded that the factors that cause fluctuations in VF cases are not weather-related but rather biological and anthropogenic (i.e. human activities, primarily construction on previously undisturbed soil) (Talamantes 2007).

Data from the Kern County Department of Public Health (KCDPH) on the period between 1995 and 2008 shows that VF cases increased in Kern County during the early 1990's, decreased during the late 1990's, increased again between 2000 and 2005, and have been declining slightly in the last several years. The KCDPH data also shows that the area of Ridgecrest CA does not have high incident rates of VF. The majority of VF cases are recorded in the Bakersfield area where 50 to 70 percent of all Kern County VF cases occur. Delano, Lamont, and Taft have the next highest recorded incidences of VF. With the exception of the year 2004 when 26 cases of VF were reported in the Ridgecrest area, less than 15 cases have been recorded annually in Ridgecrest since 1995, representing less than 5 percent of the total cases recorded in Kern County (KCDPH 2008). This information is useful because the Ridgecrest area is north of the Palmdale area and has similar soil characteristics.

During a phone conversation 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 (MacLean 2009). 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). Again, this information is relevant to the PHPP site because it is proposed to be built on undisturbed desert land that has been undeveloped since at least the early 1900s and thus may be more amenable to the growth and presence of the fungus.

Valley Fever is spread through the air. If soil containing the fungus is disturbed by construction, natural disasters, or wind, the fungal spores get into the air where people can breathe in the spores. The disease is not spread from person to person. Occupational or recreational exposure to dust is an important consideration. Agricultural workers, construction workers, or others (such as archeologists) who dig in the soil in the disease-endemic area of the Central Valley are at the highest risk for the disease (CDC 2006; CDHS 2010). The risk for disseminated coccidioidomycosis is much higher

among some ethnic groups, particularly African-Americans and Filipinos. In these ethnic groups, the risk for disseminated coccidioidomycosis is tenfold that of the general population (CDC 2006).

A VF website claims that most cases of valley fever do not require treatment. Even though 30-60 precent of the population in areas where the disease is highly prevalent - such as in the southern San Joaquin Valley of California - have positive skin tests indicating previous infection, most were unaware of ever having had valley fever ("Valley Fever Vaccine Project of the Americas" 2010).

Given the available scientific and medical literature on Valley Fever, it is difficult for staff to assess the potential for VF to impact workers during construction and operation of the proposed PHPP with a reasonable degree of certainty. To minimize potential exposure of workers and also the public to coccidioidomycosis during soil excavation and grading, extensive wetting of the soil prior to and during construction activities should be employed and dust masks should be worn at certain times during these activities. The dust (particulate matter less than 10 microns - PM10) control measures found in the Air Quality section of this FSA should be strictly adhered to in order to adequately reduce the risk of contracting VF to less than significant. Towards that, Commission staff proposes Condition of Certification **WORKER SAFETY-8** which would require that the dust control measures found in proposed Conditions **AQ-SC3** and **AQ-SC4** be supplemented with additional requirements.

Fire Hazards

During construction and operation of the proposed PHPP there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, insulating fluid, and heat transfer fluid (HTF) at the project site or switchyard or flammable liquids, explosions, and overheated equipment, may cause small fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely at power plants. Fires and explosions of natural gas or other flammable gasses or liquids are rare, however, fires involving spills/leaks of HTF have occurred at other solar generating facilities. Compliance with all LORS will be adequate to ensure protection from all fire hazards.

Staff reviewed the information provided in the AFC and spoke to representatives of the LACFD to determine if available fire protection services and equipment would adequately protect workers, and to further determine the project's impact on fire protection services in the area. The project will rely on both onsite fire protection systems and local fire protection services. The onsite 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 LACFD (PHPP 2008a, 5.18.3.1 and LACFD 2008).

Construction

During construction, portable fire extinguishers and other fire fighting equipment will be located and maintained throughout the site, and the permanent fire suppression system would be installed as soon as practical. Safety procedures and training will also be implemented as described in the Construction Fire Protection and Prevention Program (PHPP 2008a, section 5.18.3.1). Stations #129, #135, and other LACFD stations would be available to provide fire protection backup for larger fires that cannot be extinguished using the project's portable suppression equipment (LACFD 2008).

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the California Fire Code, all applicable recommended NFPA standards (including Standard 850, which addresses fire protection at electric generating plants), and all Cal-OSHA requirements with one exception (see below). Fire suppression elements in the proposed plant will include both fixed and portable fire extinguishing systems.

A dedicated 250,000-gallon portion of a 1,000,000-gallon raw water storage tank that would be located on the project site would supply water to the fire suppression system. A sophisticated diesel and electric pump system will ensure a continuous adequate water supply to the fire protection water-piping network, which includes fire hydrants throughout the site and sprinkler systems at each transformer and in the operations building (PHPP 2008a, Section 5.18.3.2).

A carbon dioxide (CO_2) fire protection system will be provided for the combustion turbine generators and accessory equipment. The system will have fire detection sensors that will trigger alarms, turn off ventilation, close ventilation openings, and automatically activate the system. A fire involving the Heat transfer Fluid (HTF) in the solar field will extinguish itself after burning the limited volume of fuel leaked since the lines will be isolated (see discussion of required isolation valves in the Hazardous Materials Management section of this staff assessment) and the remainder of the field is nonflammable (PHPP 2008a, section 5.18.3.2).

In addition to the fixed fire protection system, smoke detectors, flame detectors, temperature detectors, appropriate class of service portable extinguishers, and fire hydrants must be located throughout the facility at code-approved intervals. These systems are standard requirements of the fire code, NFPA, and staff has determined that they will ensure adequate fire protection.

The applicant would be required by conditions of certification **WORKER SAFETY-1** and **-2** to provide a final fire protection and prevention program to both staff and the LACFD prior to the construction and operation of the project in order to confirm the adequacy of proposed fire protection measures.

The one exception mentioned above pertains to fire department access to the site. Both the California Fire Code (24 CCR Part 9, chapter 5, section 503.1.2) and the Uniform Fire Code (sections 901 and 902) require that access to the site be reviewed and approved by the fire department. All power plants licensed by the Energy Commission have more than one access point to the power plant site. This is sound fire safety procedure and allows for fire department vehicles and personnel to access the site should the main gate be blocked. The proposed PHPP has only one access point, that being through the main gate off East Avenue M. The applicant has stated that they are in discussion with Air Force Plant 42 to determine a location for a second access point to the PHPP and that their tentative proposal is to construct a road off East Avenue M that would run parallel to the existing Site 1 Road (the entry way to Air Force Plant 42) and enter the PHPP site from the eastern boundary (AECOM 2009a). Staff finds that a second access point is necessary to ensure fire department access, and it can be restricted to emergency use only and, if possible, should be equipped with an Opticom System for remote keyless entry. Therefore, in order to comply with the requirements of LORS, staff proposes a Condition of Certification **WORKER SAFETY-6** that would require the project owner to identify and provide a second access point to the site for emergency vehicles and equip this secondary gate with either an Opticom System or a keypad for fire department personnel to open the gate.

Finally, this hybrid solar power plant will be the first one in LA County that will use a Heat transfer Fluid. Staff has reviewed in-depth past experience at existing solar power plants that are similar to the proposed thermal solar part of this project. Staff reviewed the records of emergency responses of the San Bernardino County Fire Department (SBCFD) to the only three thermal solar power plants in the state. These are the Solar Electric Generating Station (SEGS) 1 & 2 in Daggett (operating since 1984), SEGS 3-7 at Kramer Junction (1989), and SEGS 8 & 9 at Harper Dry Lake (1989). Staff also reviewed what records were immediately available at the three solar plant sites. Emergency response to the existing solar power plants includes medical, fire, rescue, and hazardous materials incidents. To summarize the data, the SBCFD responded to about 30 incidents and emergencies at the three solar sites, including three major fires and two hazardous materials spills.

The proposed PHPP is very different from the light industry and residential development in the Los Angeles County desert region and also very different from the natural gas power plants built in the Blythe area. The PHPP will have huge amounts of highly combustible (flammable at the elevated operating temperature) heat transfer fluid used and stored on site, as much as 260,000 gallons. It will also have 1200 gallons of diesel, 4,000 gallons of combustible lube oil, and 65,000 gallons of combustible mineral oil. The amount of combustible hydrocarbons stored and used on-site, combined with the potential for escalation of a small fire into a large conflagration, presents an emergency response challenge to the LACFD. The LACFD is adequately equipped to respond to fire, hazmat, rescue, and EMS emergencies in a timely manner but it is very important

to note that the PHPP will be located in an extremely harsh desert environment. The ability of a fire fighter to perform duties while wearing a turn-out coat, heavy boots, and a respirator (self contained breathing apparatus) is limited under the best of circumstances. If conducting a rescue or fighting a fire that necessitates use of a respirator, the high-temperatures of the desert, often exceed 115° F, severely limits a fire fighter's ability to perform the duties to 15 minutes at a time. This severe time restriction necessitates the mobilization of more fire fighters to respond to the emergency and a concentrated effort will be needed to prevent escalation if a fire in the solar array occurs.

Staff believes that joint training exercises with the LACFD in fire suppression, rescue, hazmat spill response, and EMS response is critical to being prepared to address an emergency. Therefore, staff proposes Condition of Certification **WORKER SAFETY-9** which would require the project owner to participate in joint training exercises with the LACFD. The project owner could coordinate this training with other Energy Commission-licensed solar power plants within LA County such that the PHPP would only be required to host the annual training on a rotating basis with the other solar, hybrid, and natural gas power plants in the area.

Emergency Medical Services Response

A statewide survey was conducted by staff to determine the frequency of emergency medical services (EMS) and off-site fire-fighters for natural gas-fired power plants in California. The purpose of this analysis was to determine what impact, if any, power plants might have on local emergency services. Staff concludes that incidents at power plants requiring fire or EMS responses are infrequent and represent an insignificant impact on local fire departments, except, in rare instances, where a rural fire department has a primarily 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 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 defibrillator often called an Automatic External Defibrillator or 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 including airports, factories, and government buildings, all of which maintain on-site cardiac defibrillation devices. Therefore, staff concludes that with the availability of modern cost-effective AED devices, it is proper in a power plant environment to maintain these devices on-site in order to treat cardiac arrythmias resulting from industrial accidents or other non-work related causes. Therefore, an additional condition of certification, **WORKER SAFETY-5**, is proposed so that a portable AED will be located on site, and workers trained in its use.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of the PHPP combined with existing industrial facilities and expected new facilities (as described in AFC section 5.1.1), to result in impacts on the fire and emergency service capabilities of the LACFD. The LACFD stated that every new facility has the potential to impact the fire department, but that the LACFD certainly has the resources and capability to respond to any incident at the proposed facility (LACFD 2008).

Given the lack of unique fire hazards associated with this modern hybrid power plant, staff finds that this project will not have any significant incremental burden on the department's ability to respond to a fire or medical emergency.

AGENCY AND PUBLIC COMMENTS

Other than the applicant, no comments were received on the topic of **WORKER SAFETY and FIRE PROTECTION.**

CONCLUSIONS

Staff concludes that if the applicant for the proposed PHPP project provides project construction safety and health and project operations and maintenance safety and health programs, as required by conditions of certification **WORKER SAFETY -1**, and **-2**; and fulfills the requirements of conditions of certification **WORKER SAFETY-3** through**-9**, PHPP would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that the proposed project would not have significant impacts on local fire protection services.

PROPOSED CONDITIONS OF CERTIFICATION

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 which shall also include a Heat Stress Protection Plan and a Best Management Practices (BMPs) for the storage and application of herbicides used to control weeds;
- A Construction Emergency Action Plan; and
- A Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable Safety Orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Los Angeles County Fire Department for review and comment prior to submittal to the CPM for approval.

Verification: At least thirty (30) days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Los Angeles County Fire Department stating the Fire Department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-2 The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- An Operation Injury and Illness Prevention Plan which shall also include a Heat Stress Protection Plan and a Best Management Practices (BMPs) for the storage and application of herbicides used to control weeds beneath and around the solar array;
- An Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Program (8 CCR § 3221); and;
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable Safety Orders. The Operation Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Los Angeles County Fire Department for review and comment.

Verification: At least thirty (30) days prior to the start of first-fire or commissioning, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Los Angeles County Fire Department stating the Fire Department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-3 The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards, is capable of identifying workplace hazards relating to the construction activities, and

has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- Have over-all 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 & federal regulations related to power plant projects;
- Assure that all construction and commissioning workers and supervisors receive adequate safety training;
- Complete accident and safety-related incident investigations, emergency response reports for injuries, and inform the CPM of safety-related incidents; and
- Assure that all the plans identified in **WORKER SAFETY-1** and **-2** are implemented.

Verification: At least thirty (30) days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement (CSS) shall be submitted to the CPM within one business day.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- Record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- Summary report of safety management actions and safety-related incidents that occurred during the month;
- Report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- Report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO, and will be responsible for verifying that the Construction Safety Supervisor, as required in **WORKER SAFETY-3**, implements all appropriate Cal/OSHA and Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: At least thirty (30) days prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that a portable automatic external defibrillator (AED) is located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During construction and commissioning, the following persons shall be trained in its use and shall be on-site whenever the workers that they supervise are on-site: the Construction Project Manager or delegate, the Construction Safety Supervisor or delegate, and all shift foremen. During operations, all power plant employees shall be trained in its use. The training program shall be submitted to the CPM for review and approval.

Verification: At least thirty (30) days prior to the start of site mobilization the project owner shall submit to the CPM proof that a portable AED exists on site and a copy of the training and maintenance program for review and approval.

WORKER SAFETY-6 The project owner shall identify and provide a second access point for emergency personnel to enter the site. This access point and the method of gate operation shall be submitted to the Los Angeles County Fire Department for review and comment and to the CPM for review and approval.

Verification: At least 60) days prior to the start of site mobilization, the project owner shall submit to the Los Angeles County Fire Department and the CPM preliminary plans showing the location of a second access point to the site and a description of how the gate will be opened by the fire department. At least thirty (30) days prior to the start of site mobilization, the project owner shall submit final plans to the CPM review and approval. The final plan submittal shall also include a letter containing comments from the Los Angeles County Fire Department or a statement that no comments were received.

WORKER SAFETY-7 The project owner shall provide to the CPM for review a copy of the worker safety plan for reconductoring the transmission lines between the Pearl Blossom and Vincent substations.

Verification: At least 60 days prior to the start of reconductoring, the project owner shall submit to the CPM the worker safety plan for review.

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:

i) site worker use of dust masks (NIOSH N-95 or better) whenever visible dust is present;

ii) implementation of methods consistent with Rule 402 of the Kern County Air Pollution Control District (as amended Nov. 3, 2004); and

iii) implementation of enhanced dust control methods (increased frequency of watering, use of dust suppression chemicals, etc. consistent with **AQ-SC4**)

immediately whenever visible dust comes from or onto the site or when PM10 measurements obtained when implementing ii (above) exceed 50 micrograms per cubic meter ($\mu g/m^3$).

Verification: At least 30 days prior to the commencement of site mobilization, the enhanced Dust control Plan shall be provided to the CPM for review and approval.

WORKER SAFETY-9 The project owner shall participate in annual joint training exercises with the Los Angeles County Fire Department (LACFD). The project owner may coordinate this training with other Energy Commission-licensed solar power plants within Los Angeles County such that this project shall host the annual 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 LACFD 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.

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ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Erin Bright

SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that the design, construction, and eventual closure of the Palmdale Hybrid Power Project and its linear facilities would likely comply with applicable engineering laws, ordinances, regulations, and standards. The proposed conditions of certification, below, would ensure compliance with these laws, ordinances, regulations, and standards.

INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering design of the Palmdale Hybrid Power Project (PHPP). The purpose of this analysis is to:

- verify that the laws, ordinances, regulations, and standards (LORS) that apply to the engineering design and construction of the project have been identified;
- verify that both the project and its ancillary facilities are sufficiently described, including proposed design criteria and analysis methods, in order to provide reasonable assurance that the project will 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 will 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 (COP2008a, Appendix C). Key LORS are listed in **FACILITY DESIGN Table 1** below.

FACILITY DESIGN Table 1
Key Engineering Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	Title 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health standards
State	2007 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	City of Palmdale regulations and ordinances Los Angeles 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

The PHPP, a 570-MW hybrid power plant combining natural gas-fired combined cycle power generation with parabolic trough solar thermal power generation, would be built on a 377-acre site in the City of Palmdale in Los Angeles County. The site lies in a seismically active zone. For more information on the site and related project description, please see the **Project Description** section of this document. Additional engineering design details are contained in the AFC (COP2008a, Appendices C).

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 will 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 PHPP AFC Appendix C, for representative lists 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; used for the storage, containment, or handling of hazardous or toxic materials; or capable of becoming 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.)

PHPP shall be designed and constructed to the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect when the design and construction of the project actually begin. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2007 CBSC takes effect, the 2007 CBSC provisions shall be replaced with the updated provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed according to

their appropriate lateral force procedure, staff has included Condition of Certification **STRUC-1**, below, which, in part, requires the project CBO's review and approval of the owner's proposed lateral force procedures before construction begins.

PROJECT QUALITY PROCEDURES

The applicant does not specifically discuss in the AFC the quality control program that would be followed for the project, however, a program insuring that the project's systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with all appropriate power plant technical codes and standards would have to be followed to meet the LORS summarized above and in the AFC (COP 2008a, AFC Appendix C). Compliance with design requirements would have to be verified through specific inspections, audits, and testing. Implementation of such a quality assurance/quality control (QA/QC) program would ensure that PHPP is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Section 104.1 in Appendix Chapter 1 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 103.3 in Appendix Chapter 1 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 may include the local building official and/or independent consultants hired to provide technical expertise that is not provided by the local official alone. In accordance with the CBC, the applicant 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, consistent with CBC section 108, pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will assign 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) that could be difficult to reverse or correct can proceed without prior CBO approval. Elements of construction that are not difficult to reverse may proceed without approval of the plans. The applicant bears the responsibility to fully modify construction elements in order to comply with all design changes resulting from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service (decommissioning) when it reaches the end of its useful life ranges from "mothballing" to the removal of all equipment and appurtenant facilities and subsequent restoration of the site. Future conditions that could affect decommissioning are largely unknown at this time.

In order to ensure that decommissioning will be completed in a manner that is environmentally sound, safe, and protects the public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval before the project's decommissioning begins. The plan shall include a discussion of:

- proposed decommissioning activities for the project and all appurtenant facilities that were constructed as part of the project;
- all applicable LORS and local/regional plans and proof of adherence to those applicable LORS and local/regional plans;
- the activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
- decommissioning alternatives other than complete site restoration.

Satisfying the above requirements should serve as adequate protection, even in the unlikely event that the project is abandoned. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure Plan.

CONCLUSIONS AND RECOMMENDATIONS

1. The laws, ordinances, regulations, and standards (LORS) identified in the AFC and supporting documents directly apply to the project.

2. 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.

3. The proposed conditions of certification will ensure that PHPP 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.

4. 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** section of this document prior to decommissioning, decommissioning procedures will comply with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The proposed conditions of certification be adopted to ensure that the project is designed and constructed in a manner that protects the public health and safety and complies with all applicable engineering LORS;

2. The project be designed and built to the 2007 CBSC (or successor standards, if in effect when initial project engineering designs are submitted for review); and

3. The CBO reviews the final designs, checks plans, and performs field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering laws, ordinances, regulations and standards (LORS) in effect at the time initial design plans are submitted to the chief building official (CBO) for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the

provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility (2007 CBC, Appendix Chapter 1, § 101.2, Scope). All transmission facilities (lines, switchyards, switching stations, and substations) are covered in the conditions of certification in the **Transmission System Engineering** section of this document.

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

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

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

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, 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 within a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO 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)
Reclaim and Fire Water Storage Tank Foundation and Connections	1
Brine Storage Tank Foundation and Connections	1
Process Surge Tank Foundation and Connections	1
Demineralized Water Tank Foundation and Connections	1
RO Water Tank Foundation and Connections	1
Combustion Turbine Wash Drain Tank Foundation and Connections	1
ACW Heat Exchangers Foundation and Connections	2
Cooling Tower Foundations and Connections	1
Cooling Tower Blowdown Filter Press and Shelter Foundation and Connections	1
Pretreatment Filter Press and Shelter Foundation and Connections	1
Crystallizer Vapor Body Foundation and Connections	1
Sludge Thickener Foundation and Connections	1
Solids Contact Clarifier Foundation and Connections	1
Fire Pump Module Foundation and Connections	1
Admin/Control Building Warehouse Foundation and Connections	1
Water Treatment Building Foundation and Connections	1
Auxiliary Cooling Water Pump Foundation and Connections	2
Circulating Water Pump Foundation and Connections	2
Gland Steam Regulating Skid Foundation and Connections	1
STG MCC XFMR & Module Foundation and Connections	1
Cycle Chemical Feed Module Foundation and Connections	1
Auxiliary Electric Module Foundation and Connections	1
Ammonia Storage Foundation and Connections	1
HRSG Structure, Foundation and Connections	2
HRSG Blowdown Sump Foundation and Connections	1
HRSG Blowdown Tank Foundation and Connections	2
CEMS Foundation and Connections	2
Combustion Turbine Generator Foundation and Connections	2
Gas Fired Oil Heater Foundation and Connections	2
Fuel Gas Filter/separator Foundation and Connections	2
Fuel Gas Heater Foundation and Connections	2
Auxiliary Transformer Foundation and Connections	2
Oil/water Separator Foundation and Connections	1
Emergency Shutdown Generator Foundation and Connections	1

Equipment/System	Quantity (Plant)
Switchgear Module Foundation and Connections	2
Switchyard Module Foundation and Connections	1
Diesel Tank Foundation and Connections	1
Condenser Exhausters Foundation and Connections	1
Steam Turbine Lube Oil Skid Foundation and Connections	1
Steam Turbine Drains Tank Foundation and Connections	1
ACW Pumps Foundation and Connections	2
Condensate Pumps Foundation and Connections	3
EHC Unit Foundation and Connections	1
Steam Turbine Generator Foundation and Connections	1
Thyristor Foundation and Connections	1
Valve House Foundation and Connections	1
Cooling Tower MCC and XFMRS Foundation and Connections	1
Solar Field and Components Foundation and Connections	1 Lot
Solar Array Heat Exchangers Foundation and Connections	1 Lot
HTF Oil Heater Foundation and Connections	1 Lot
HTF Surge Tanks Foundation and Connections	1 Lot

GEN-3 The project owner shall make payments to the CBO for design review, plan checks, and construction inspections, based upon a reasonable fee schedule to be negotiated between the project owner and the CBO, in accordance with the 2007 CBC. These fees may be based on the value of the facilities reviewed; may be based on hourly rates; or may be otherwise agreed upon by the project owner and the CBO.

Verification: A copy of the contract between the project owner and the CBO shall be submitted to the CPM. 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, structural engineer, or civil engineer, as the resident engineer in charge of the project (2007 California Administrative Code, § 4-209, Designation of Responsibilities). All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the conditions of certification in the **Transmission System Engineering** section of this document.

The resident engineer 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 resident engineer shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;

2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these conditions of certification, approved plans, and specifications;

3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;

4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets of stamped drawings, plans, specifications, and any other required documents;

5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and

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

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

If the resident engineer 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 within a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the resident engineer and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the resident engineer and other delegated engineer(s) within five days of the approval.

If the resident engineer or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has five days to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner

shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

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

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (for example, proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

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

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify 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; and 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 resident engineer during the construction phase of the project and recommend changes in the design of the civil works facilities and changes to the construction procedures.

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

1. Review all the engineering geology reports;

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

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

4. Recommend field changes to the civil engineer and resident engineer.

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

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare a final soils grading report; and

2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2007 California Administrative Code, section 4-211, Observation and Inspection of Construction (depending on the site conditions, this

may be the responsibility of either the soils engineer, the engineering geologist, or both).

D. The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;

2. Provide consultation to the resident engineer 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 within a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer, and engineering geologist assigned to the project.

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

The project owner shall notify 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, the project owner shall assign to the project qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2007 CBC, Chapter 17, Section 1704, Special Inspections; Chapter 17A, Section 1704A, Special Inspections; and Appendix Chapter 1, Section 109, Inspections. All transmission facilities (lines, switchyards, switching stations, and substations) are 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. Observe the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and resident engineer. All discrepancies shall be brought to the immediate attention of the resident engineer for correction, then, if uncorrected, to the CBO and the CPM for corrective action (2007 CBC, Chapter 17, § 1704.1.2, Report Requirements); and

4. Submit a final signed report to the resident engineer, 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 within a project owner- and CBO-approved alternative time frame) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to 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 (2007 CBC, Appendix Chapter 1, § 109.6, Approval Required; Chapter 17, § 1704.1.2, Report Requirements). The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification and, if appropriate, applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to 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 an alternative site approved by the CPM during the operating life of the project (2007 CBC, Appendix Chapter 1, § 106.3.1, Approval of Construction Documents). Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by 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" files (Adobe .pdf 6.0), 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 investigation reports required by the 2007 CBC, Appendix J, section J104.3, Soils Report, and Chapter 18, section 1802.2, Foundation and Soils Investigation.

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

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area (2007 CBC, Appendix Chapter 1, § 114, Stop Work Orders).

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

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

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM (2007 CBC, Chapter 17, § 1704.1.2, Report Requirements). 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 (2007 CBC, Chapter 17, § 1703.2, Written Approval).

Verification: Within 30 days (or within a project owner- and CBO-approved alternative time frame) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final grading plans (including final changes) and the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans and that the facilities are adequate for their intended purposes, along with a copy of the transmittal letter to 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 (2007 CBC, Appendix Chapter 1, § 109.6, Approval Required);

3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation (2007 California Administrative Code, § 4-210, Plans, Specifications, Computations and Other Data);

4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations, and specifications shall be signed and stamped by the responsible design engineer (2007 CBC, Appendix Chapter 1, § 106.3.4, Design Professional in Responsible Charge); and

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

Verification: At least 60 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of any increment of construction of any structure or component listed in **FACILITY DESIGN Table 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 procedure and results, welder

qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2007 CBC, Chapter 17, section 1704, Special Inspections, and section 1709.1, Structural Observations.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within 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 (2007 CBC, Chapter 17, § 1704.1.2, Report Requirements). 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 necessary to obtain the CBO's approval.

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

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

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

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

The project owner shall send copies of the CBO approvals of plan checks to 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. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of that construction (2007 CBC, Appendix Chapter 1, § 106.1, Submittal Documents; § 109.5, Inspection Requests; § 109.6, Approval Required; 2007 California Plumbing Code, § 301.1.1, Approvals).

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

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI/NFPA Z223.1 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- NACE R.P. 0169-83;
- NACE R.P. 0187-87;
- 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);
- Los Angeles County codes; and
- City Palmdale codes.

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

Verification: At least 30 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of any increment of major piping or plumbing

construction listed in **FACILITY DESIGN Table 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 (2007 CBC, Appendix Chapter 1, § 109.5, Inspection Requests).

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above-listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to 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 (2007 CBC, Appendix Chapter 1, § 109.3.7, Energy Efficiency Inspections; § 106.3.4, Design Professionals in Responsible Charge).

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

ELEC-1 Prior to the start of any increment of electrical construction for all electrical equipment and systems 110 Volts or higher (see a representative list, below) 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 diagram for the 13.8 kV, 4.16 kV and 480 V systems;
2. system grounding drawings;
3. lightning protection system; and
4. hazard area classification plan.

B. Final plant calculations must establish:

1. short-circuit ratings of plant equipment;
2. ampacity of feeder cables;

3. voltage drop in feeder cables;

4. system grounding requirements;

5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;

6. system grounding requirements;

7. lighting energy calculations; and

8. 110 volt system design calculations and submittals showing feeder sizing, transformer and panel load confirmation, fixture schedules and layout plans.

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

COP2008a – City of Palmdale/ S. Williams (tn: 47383). Application for Certification for the Palmdale Hybrid Power Project. Dated 07/30/08. Submitted to CEC/ Docket Unit on 08/04/08

GEOLOGY AND PALEONTOLOGY

Testimony of Dal Hunter, Ph.D., C.E.G.

SUMMARY OF CONCLUSIONS

The proposed Palmdale Hybrid Power Project (PHPP) is located in an active geologic area in eastern Los Angeles County, California. Based on the report by the geotechnical consultant, the site has considerable potential for hydrocollapse of near-surface soils which will require additional evaluation during final design. The site also will be subject to intense levels of earthquake-related ground shaking. While the potential for earthquake ground rupture is low, at least 52 major faults are located between 5.5 and 50 miles of the site. A short length of the proposed project's electric transmission line would cross the very active San Andreas fault. Also, the proposed natural gas supply line would be within the Alquist-Priolo zones for both the Cemetery fault and the broad, very active San Andreas fault. The effects of strong ground shaking must be mitigated, to the extent practical, through structural designs required by the California Building Code (CBC 2007). The CBC (2007) requires that structures be designed to resist seismic stresses from ground acceleration and, to a lesser extent, liquefaction potential. A design-level geotechnical investigation is required for the project by the California Building Code (Condition of Certification **GEO-1**), and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. The geotechnical report will present standard engineering design recommendations for mitigation of settlement due to compressible soils, dynamic compaction, and hydrocompaction. Conditions of Certification **GEO-2** through **GEO-5** are recommended to mitigate fault hazards, liquefaction potential, and landslide risk along appropriate portions of the project linears.

There are no known viable geologic or mineralogical resources at the proposed PHPP site. The paleontological survey by SWCA Environmental Consultants (SWCA) identified a fossil locality near the south end of the transmission line alignment and makes appropriate recommendations for their collection and preservation (SWCA 2008). Potential impacts to paleontological resources due to construction activities could be mitigated through worker training and monitoring by qualified paleontologists, as required by Conditions of Certification, **PAL-1** through **PAL-7**.

Based on its independent research and review, the California Energy Commission (Energy Commission) believes that the potential is low for significant adverse cumulative impacts to the project from geologic hazards during its design life and to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project, provided that the recommended Conditions for Certification are met. It is staff's opinion that the PHPP can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS), and in a manner that both protects environmental quality and assures public safety, to the extent practical.

INTRODUCTION

In this section, Energy Commission staff discusses the potential impacts of geologic hazards on the proposed PHPP as well as the PHPP's impact on geologic, mineralogic, and paleontologic resources. Staff's objective is to ensure that there would be no consequential adverse impacts to significant geological and paleontological resources

during the project construction, operation, and closure and that operation of the plant would not expose occupants to high-probability geologic hazards. A brief geological and paleontological overview is provided. The section concludes with staff's proposed monitoring and mitigation measures for geologic hazards and geologic, mineralogic, and palentologic resources, with the proposed conditions of certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable laws, ordinances, regulations and standards (LORS) are listed in the application for certification (AFC) (COP 2008a). 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	The proposed PHPP is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
State	
California Building Code (2007)	The CBC (2007) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control). The CBC has adopted provisions in the International Building Code (ICC 2006).
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), section 2621–2630	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings.
The 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. Seismic Hazards Maps have been prepared by California Geological Survey (CGS) for the project area.
The Seismic Hazards Mapping Act, PRC section 2693	Areas mapped as zones of required investigation for liquefaction, would require mitigation according to PRC 2693(c). "Mitigation" means those measures that are consistent with established practice and that will reduce seismic risk to acceptable levels.
PRC, Chapter 1.7, sections 5097.5 and 30244	Regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.
Warren-Alquist Act, PRC, sections 25527 and 25550.5(i)	The Warren-Alquist Act requires the Energy Commission to "give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical, archaeological, and cultural sites…" With respect to paleontologic resources, the Energy Commission relies on guidelines from the Society for Vertebrate Paleontology (SVP), indicated below.

Applicable Law	Description
California Environmental Quality Act (CEQA), PRC sections 15000 et seq., Appendix G	Mandates that public and private entities identify the potential impacts on the environment during proposed activities. Appendix G outlines the requirements for compliance with CEQA and provides a definition of significant impacts on a fossil site.
Society for Vertebrate Paleontology (SVP 1995)	The "Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures" is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.
Local	
City of Palmdale General Plan – Safety Element	Geotechnical reports must be provided for projects located within the Seismic Hazard Zones shown on the latest California Department of Conservation Seismic Hazard Zones Map, to the State Division of Mines and Geology (Policy S1.1.1).
City of Palmdale General Plan – Safety Element	Location of utility lines, whether above or below ground, should be restricted within an appropriate distance from active fault traces, as determined by geotechnical investigation and approved by the City. (Policy S1.1.7).
City of Palmdale General Plan	City staff shall require that new developments protect significant historic, paleontological, or archaeological resources, or provide for other appropriate mitigation (Policy ER7.1.3).

SETTING

The proposed PHPP would be constructed on approximately 377 acres of previously undeveloped land located in the northern portion of the City of Palmdale. The site is located on the northwest side of the LA-Palmdale Regional Airport/Air Force Plant 42, a municipal airport and government-owned/contractor-operated production and flight testing facility. The northeast corner of the PHPP would be at 15th Street East and East Avenue M. The site is presently undeveloped and is vegetated with low desert scrub and Joshua trees.

The proposed power plant would include two natural gas-fired combustion turbine generators, two associated heat recovery steam generators, and a steam turbine generator powered both by the solar equipment and gas-powered heat recovery steam generator systems. The heavy power equipment would be located on a power block approximately 27 acres in area on the east-central portion of the site. Associated equipment would include cooling water tower, a 230 kilovolt (kV) switchyard, a gas metering station, and an operations building. Arrays of solar parabolic troughs, heat-transfer fluid pipelines, and associated equipment would be located on 250 acres of the site.

The southwest corner of the power block would be approximately at level grade, and the northeast corner would require approximately seven feet of fill relative to existing grade. The solar collector areas would be sloped at 0.5% grade towards the northwest with grading to balance overall cuts and fills. Storm water from the northern third of the site

would discharge to an infiltration pond along the north edge of the overall site (adjacent to East Avenue M). Storm water from the southern two thirds of the overall plant site would be collected in two infiltration ponds approximately eight feet deep along the west and south edges of the power block area.

Extensive linear facilities would be required for the PHPP. Natural gas supply would be provided by a new 8.7-mile-long, 20-inch-diameter pipeline. This pipeline would run approximately 1.5 miles west on East Avenue M, and then south-southeast and south primarily on Sierra Highway and 10th Street East. The last half mile of the proposed pipeline alignment turns east from 10th Street East on East Avenue S to connect to an existing gas transmission line. The electric transmission line would interconnect to the Vincent Substation 11 miles southwest of the site by a circuitous, 35.6-mile-long route. The first phase of the transmission line would consist of a 23.7-mile-long first phase which runs approximately 11 miles east and 10 miles south to the Pearblossom substation. The second phase would parallel existing electrical transmission lines 11.9 miles west and southwest to the Vincent substation. Reclaimed water for cooling tower makeup would be obtained from a 7.4-mile-long pipeline. This pipeline would follow the same route and use the same trench as the gas supply pipeline for 5 miles, and then would connect 2.4 miles east from 10th Avenue East on East Avenue P to the City of Palmdale Water Reclamation Plant. Sanitary sewer disposal would be provided by new 1.0-mile-long pipelines connecting to existing services to the north along 15th Street East. Potable Water would be obtained from a water line less than one mile long along East Avenue M. The plant would be designed for “zero liquid discharge” such that wastewater or cooling water discharge is not expected from the plant operating systems (COP 2008a).

REGIONAL GEOLOGIC SETTING

The proposed PHPP site is located in Antelope Valley, an enclosed drainage basin in the western edge of the Mojave Desert Geomorphic Province. The Mojave Desert is a broad interior region of isolated mountain ranges and vast expanses of internally-drained desert plains which occupies approximately 25,000 square miles in southeastern California and portions of Nevada, Utah, and Arizona. Mountain ranges are primarily Paleozoic and Mesozoic-age igneous and metamorphic basement rocks, and valley fill is Quaternary-age alluvium. In California, its overall topography is dominated by southeast to northwest trending faulting with a secondary east to west trending alignment which is correlateable to Transverse Range faulting.

The proposed PHPP site is located near the western boundary of the Mojave Desert Geomorphic Province where it terminates against the San Andreas Fault. The western edge of the Antelope Valley is sharply delineated by the northwest-southeast trending San Andreas fault system, beyond which rise mountains of the Transverse Ranges geomorphic province including the San Gabriel Range and Sierra Pelona. The San Gabriel Range is composed largely of Mesozoic to Precambrian granitic rocks, and Sierra Pelona is composed of the Pelona schist, a pre-Cretaceous metamorphic unit. Minor intrusive volcanic rocks are also present. Minor exposures of Pelona Schist are present east of the main traces of the San Andreas fault, including Ritter Ridge and Quartz Hill within four miles west of the site. Foothills on both sides of the fault include areas of Oligocene, Miocene, Pliocene, and Pleistocene non-marine sediments.

The Mojave segment of the San Andreas fault zone is the closest major active fault, and is classified by the California Division of Mines and Geology (CDMG 1998) as a Type A

fault, or a fault with displacement of greater than 5 mm/year. The San Andreas fault system is a major transform fault along the Pacific plate/North American Plate boundary. The San Andreas has multiple traces in a fault zone approximately one to two miles wide no closer than 5.5 miles southwest of the plant site, and in close proximity to the southern ends of the transmission line and natural gas pipeline linears. Displacement along this fault is generally accepted to be about 315 km (195 miles) since Miocene time based on exposures at Pinnacles National monument in San Benito County and in Los Angeles County approximately 28 miles west-northwest of the PHPP site (Matthews, 1976). A wide variety of studies on the adjacent Mojave segment indicate average fault slip rates in Holocene time of between ¼ and 1-½ inches per year (7 and 38 mm per year, Bryant and Lundberg, 2002). Earthquakes resulting in surface faulting are estimated to have occurred in the range of every 125 to 150 years over the last 1500 years. Assuming that the maximum slip rate occurs during an earthquake at the estimated 150-year return period, right-lateral slip in the magnitude of 19 feet (5.7 m) is likely to develop on the San Andreas or parallel faults during a local earthquake on the Mojave segment.

The San Andreas Rift Zone includes multiple traces within the most active fault zone, and within the City of Palmdale also includes outlier faults to the northeast and southwest of the main fault zone. Several faults parallel to the main rift zone, including the named Cemetery fault, are mapped near the southern terminus of the natural gas supply linear near Avenue S East and 10th Street East. The Llano fault system, a series of northwest-southeast trending faults within a 2-mile-square area, is located near the Pearblossom substation at the southeast corner of the transmission line system (CDMG 1974).

PROJECT SITE GEOLOGIC DESCRIPTION

The proposed PHPP site lies in the alluvial plain of Antelope Valley, in a broad area mapped as Quaternary alluvium consisting of gravel, sand, and silt (Diblee, 2008 and CDMG 1969). The site has a gentle (1%) gradient towards the north-northwest. Overall, Antelope Valley slopes gently about 20 miles north to Rosamond Lake, a playa lake. Several gently-sloped drainages (cross slopes of 2 to 5%, overall relief of 10 to 15 feet relative to adjacent ridges) traverse the site from southwest to northeast.

The project site is underlain by Quaternary alluvium consisting of poorly-graded sand with silt to silty sand, which based on laboratory testing vary from about 4 to 26% non-plastic to low plasticity fines. Minor sandy silt layers are present in the soil profile based on the boring logs, although no grain size distribution tests were performed on these materials. Soils are estimated to be loose to medium dense to 10 to 15 feet depth based on penetration resistance, and are medium dense to dense below that depth. Ground water was not encountered in borings as deep as 76.5 feet, and the ground water table is reported to be approximately 400 feet below ground surface based on nearby wells (Kleinfelder, 2008).

Kleinfelder (2008) reports that deposits from the ground surface to depths as great as 26 feet exhibit moderate to high potential for hydrocollapse. Eleven collapse tests were performed, where the vertical confining pressure was increased to 2000 pounds per square foot, and then water was introduced to saturate the samples. Eight samples under the power block area to a depth of 11 feet exhibited collapse of 1.6 to 6%, and three samples under the solar collector area to a depth of 26 feet exhibited collapse of 1.6 to 4.1% upon saturation.

EQFAULT™ Version 3.00 was used to model peak ground acceleration that would occur at the project site for seismic sources within 50 miles of the PHPP site (Blake, 2006). EQFAULT™ is a computer program for the deterministic estimation of peak site acceleration using three-dimensional articulated planar elements (faults) to model seismogenic sources (Blake, 2006). Additional information for each fault was derived from the State of California Probablistic Seismic Hazard Assessment website (CGS 2002). The various faults are listed below in **Geology and Paleontology Table 2**, along with the distance from the project site and maximum earthquake magnitude. The peak acceleration, fault type, and fault class for each fault is also given. The fault locations can be found on the Fault Activity Map of California (CDMG 1994) and on the Southern California Earthquake Data Center website (SCEC 2008).

Geology and Paleontology Table 2
Active Faults near the Proposed PHPP Site

Fault Name	Distance From Site (miles)	Maximum Earthquake Magnitude (Mw)	Estimated Peak Site Acceleration (g)	Fault Type and Strike	Fault Class
San Andreas (Whole)	5.5	8.0	0.486	Right-Lateral Strike Slip (Northwest)	A
San Andreas (Choalme-Mojave Segment)	5.5	7.8	0.437	Right-Lateral Strike Slip (Northwest)	A
San Andreas (Mohave Segment)	5.5	7.4	0.354	Right-Lateral Strike Slip (Northwest)	A
Sierra Madre	19.4	7.2	0.164	Reverse (West)	B
Sierra Madre (San Fernando)	19.8	6.7	0.124	Reverse (West)	B
Clamshell-Sawpit	22.6	6.5	0.101	Reverse (Northeast)	B
San Andreas (Carrizo Segment)	23.0	7.4	0.132	Right-Lateral Strike Slip (Northwest)	A
Verdugo	23.4	6.9	0.122	Reverse (Northwest)	A
San Gabriel	23.6	7.2	0.116	Right-Lateral Strike Slip (Northwest)	B

Fault Name	Distance From Site (miles)	Maximum Earthquake Magnitude (Mw)	Estimated Peak Site Acceleration (g)	Fault Type and Strike	Fault Class
Santa Susana	26.6	6.7	0.099	Reverse (West)	B
Holser	29.2	6.5	0.083	Reverse (West)	B
Northridge (East Oak Ridge)	30.1	7.0	0.106	Reverse (West)	B
Raymond	31.4	6.5	0.079	Left-Lateral/Reverse/Oblique Slip (West)	B
Garlock (West Segment)	31.9	7.3	0.097	Left-Lateral Strike-Slip (Northeast)	B
Puente Hills Blind Thrust	32.1	7.1	0.106	Reverse (West)	B
Upper Elysian Park Blind Thrust	33.2	6.4	0.071	Reverse (Northwest)	B
Cucamonga	33.6	6.9	0.092	Reverse (West)	B
Hollywood	33.7	6.4	0.071	Left-Lateral Reverse/Oblique Slip (South)	B
Oak Ridge (Onshore Segment)	38.5	7.0	0.087	Reverse (West)	B
Simi-Santa Rosa	38.8	7.0	0.087	Left-Lateral Reverse/ Oblique Slip (West)	B
San Cayetano	39.6	7.0	0.086	Reverse (West)	B
San Jose	40.7	6.4	0.061	Left-Lateral Reverse/ Oblique Slip (Northeast)	B
San Andreas (SB-Coachella)	42.4	7.7	0.096	Right-Lateral Strike Slip (Northwest)	A
San Andreas (San Bernardino)	42.4	7.5	0.087	Right-Lateral Strike Slip (Northwest)	A
Santa Monica	43.0	6.6	0.065	Left-Lateral Reverse/ Oblique Slip (West)	B
Cleghorn	43.2	6.5	0.051	Left-Lateral Strike Slip (Northwest)	B
Whittier	43.2	6.8	0.059	Reverse/Right-Lateral/Oblique Slip (Northwest)	A
Helendale-South Lockhart	43.3	7.3	0.077	Right-Lateral Strike Slip (Northwest)	B
San Jacinto-San Bernardino	43.7	6.7	0.056	Right-Lateral Strike Slip (Northwest)	A
Newport Inglewood (L.A. Basin)	44.1	7.1	0.068	Right-Lateral Strike Slip	B
Lenwood-Lockhart-Old Woman	44.4	7.5	0.084	Right-Lateral Strike Slip	B
Garlock (East)	44.9	7.5	0.083	Left-Lateral Strike-Slip (Northeast)	B
Santa Ynez (East)	45.0	7.1	0.067	Left-Lateral Strike Slip	B
Pleito Thrust	45.4	7.0	0.077	Reverse (South)	B
White Wolf	45.9	7.3	0.089	Reverse Left-Lateral Oblique Slip (West)	B
Malibu Coast	46.4	6.7	0.065	Reverse/Left-Lateral/Oblique Slip (West)	B
Chino-Central Avenue (Elsinore)	46.7	6.7	0.064	Reverse/Right-Lateral/Oblique Slip (Northwest)	B
Anacapa-Dume	50.6	7.5	0.092	Left-Lateral Reverse/ Oblique Slip (West)	B

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.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

No federal LORS concerning geologic hazards and geologic and mineralogic resources apply to this project. With regard to design of the project to resist geologic hazards, the California Building Standards Code (CBSC) and CBC (2007) provide geotechnical and geological 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 of the proposed facility. Geologic hazards include faulting and seismicity, liquefaction, hydrocompaction, subsidence, expansive soils, landslides, and others as may be dictated by site-specific conditions. The City of Palmdale has specific requirements with regard to addressing geologic hazards for both structures and utilities.

With regard to protecting resources from impacts by the project, 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 paleontological resource or site, or a unique geological 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.

Staff has reviewed geologic and mineral resource maps for the surrounding area, as well as site-specific information provided by the applicant, to determine if geologic and mineralogic resources exist in the area and to determine if plant operations could adversely affect any such resources.

Staff reviewed existing paleontologic information and requested records searches from the San Diego Natural History Museum and the Natural History Museum of Los Angeles for the surrounding area. The University of California (at Berkeley) Museum of Paleontology's website, which gives generalized information for locality records of their collection, was reviewed as well (University of California, Museum of Paleontology [UCMP] 2008). Site-specific information generated by the applicant for the PHPP was also reviewed (SWCA 2008). 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, and proposed as part of the project's approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking, foundation settlement and/or hydrocollapse settlement represents the

main geologic hazards at the proposed PHPP site. Some potential for liquefaction, fault rupture, and landslides has been identified along the alignment proposed for the transmission line. These potential hazards can be effectively mitigated through facility design by incorporating recommendations contained in a project-specific geotechnical report. As required in Condition of Certification **GEO-1**, the preliminary geotechnical report for the site should be updated as a project-specific geotechnical report. The requirements of the proposed **Facility Design** Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section should also aid in mitigating these impacts to a less than significant level. Detailed assessment of geologic hazards along project linears is required in Conditions of Certification **GEO-2** through **GEO-5**.

Numerous historic sand and gravel production pits are present along the length of the Little Rock Wash. However, no viable geologic or mineralogic resources are known to exist within three miles of the proposed PHPP plant site or about ½ mile of project linears.

No important paleontological resources were observed on or within a one-mile radius of the proposed PHPP site or along the off-site linears except as noted by SWCA (2008) for the southern portion of the electrical transmission line. However, at least five fossil bearing stratigraphic units are known to underlie the proposed PHPP site and/or its linear alignments. The Natural History Museum of Los Angeles County considers the most recent latest Pleistocene to Holocene unconsolidated alluvial deposits, which form much of the natural site surface, to hold little potential for preservation of significant fossil remains. However, the potential for significant fossil deposits is considered to increase with depth within the most recent alluvial deposits (McLeod, 2009). In addition to Quaternary younger alluvial deposits, the proposed PHPP site and linear alignments, particularly the southern portion of the proposed electrical transmission line, are underlain by Pleistocene Older alluvium deposits including the Nadeau Gravel and Harold Formation, Pliocene Anaverde Formation, Late Miocene Punchbowl Formation, and Oligocene to Early Miocene Vasquez Formation. Of these, all but the Vasquez Formation have yielded significant vertebrate fossils, in other areas, and are therefore considered to have a high paleontological resource potential.

Since the proposed PHPP site construction would include significant amounts of grading, excavation, and utility trenching, staff considers the probability that paleontological resources would be encountered during such activities to be high anytime excavation activities fully penetrate the recent alluvial deposits and encounter older Quaternary alluvium. Locations where project linears would cross known outcrops of Miocene through latest Pleistocene strata are also considered to have a high potential to encounter significant fossil deposits. Proposed Conditions of Certification **PAL-1** through **PAL-7** are designed to mitigate paleontological resource impacts, as discussed above, to less than significant levels. These conditions essentially require a worker education program in conjunction with the monitoring of earthwork activities by a qualified professional paleontologist (paleontologic resource specialist; PRS).

The proposed conditions of certification allow the Energy Commission's compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

Based on the information below, it is staff's opinion that the potential for significant

adverse direct or indirect impacts to the project from geologic hazards, and to potential geologic, mineralogic, and paleontologic resources, from the proposed project, is low assuming the proposed conditions of certification are adopted and enforced.

GEOLOGICAL HAZARDS

The AFC (PHPP, 2008) provides documentation of potential geologic hazards at the proposed plant site. Review of the AFC, coupled with staff's independent research, indicates that the possibility of geologic hazards at the plant site, during its practical design life, is low. Geologic hazards, such as potential for settlement due to hydrocompaction, or dynamic compaction, are addressed in the project geotechnical report per CBC (2007) requirements (Kleinfelder, 2008). The hydrocollapse evaluation and mitigation recommendations are incomplete, and should be re-evaluated for final plant design.

Staff's independent research included the review of available geologic maps, reports, and related data of the PHPP plant site. Geological information was available from the CGS, CDMG, the United States Geological Survey (USGS), and other government organizations. Since 2002, the CDMG has been known as the CGS.

Faulting and Seismicity

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. Nine Type A faults or fault segments and 29 Type B faults have been identified within 50 miles of the proposed PHPP Site. The fault type, potential magnitude, and distance from the site were summarized previously in **Geology and Paleontology Table 2**.

The Alquist-Priolo Act of 1973 and subsequent California state law (California Code of Regulations 2001) require that all occupied structures be set back 50 feet or more from the surface trace of an active fault. Since no active faults have been documented within the PHPP power plant site, setbacks from occupied structures will not be required.

Energy Commission staff reviewed the CDMG publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions* (1994) and Alquist-Priolo Special Studies Zone mapping and reports (CDMG 2003; CGS 2003a, b, and c; CGS 2005a and b; and Hart and Bryant, 1999). No active faults are shown on published maps as crossing the proposed PHPP power plant site.

The south end of the proposed gas pipeline follows 10th Street East and would intersect the very west edge of the Alquist-Priolo zone for the Cemetery fault. The alignment enters the broad Alquist-Priolo zone for the San Andreas fault system at the intersection of 10th Street East and East Avenue S, closely approaching some unnamed splays of the main San Andreas Rift Zone. The alignment exits the San Andreas zone only a few hundred feet east, along East Avenue S.

There are no California State regulations or national standards that prohibit utilities, natural gas, or transmission lines from crossing faults (American Lifeline Alliance 2005a and b; Robert Anderson Personal Communication 2010). The City of Palmdale general plan requires restricting location of utility lines, whether above or below ground, within an appropriate distance from active fault traces, as determined by geotechnical

investigation and approved by the City. (Policy S1.1.7). We note that Exhibit LU-4, which defines the Fault Hazard Management Zone used by the city, includes more area than the Alquist Priolo maps (CDMG 1979) and includes the southern one mile of the proposed natural gas pipeline alignment. Additional geologic investigation of potential fault rupture hazards crossing the natural gas pipeline is recommended (proposed Condition of Certification **GEO-2**). This condition also requires safety mechanisms to shut off the gas supply if the pipe ruptures, per **Facility Design** proposed Conditions of Certification **GEN-1** and **MECH-1**. While there are no state regulations or national guidelines that recommend natural gas lines be setback from active faults, prudent engineering would be to avoid fault crossings where practical. Often the crossing is unavoidable or the need to obtain easements is the overriding factor determining utility alignment.

The electric transmission line crosses the San Andreas fault zone in the southern segment of the alignment. The Alquist-Priolo map shows the transmission line crossing at least one trace of the Llano fault in the vicinity of the Pearblossom substation within 500 feet east of 116th Street East (CDMG 1974). The Alquist-Priolo map shows the approximate transmission line route crosses approximately 6 fault traces in a mile-long area where it crosses the San Andreas Rift Zone (Township 5 North, Range 11 West, Sections 22 and 23). Since the electrical facility may be a critical facility for post-earthquake recovery, the transmission line towers should not be sited directly on the active fault traces (Condition of Certification **GEO-3**). Provided that towers are not damaged, typical slack in transmission lines is probably enough to accommodate the likely 19 to 20 feet of fault offset during a local earthquake on the San Andreas fault segments crossed by the transmission lines.

Based on the geotechnical investigation, the site soil class is assumed to be seismic Class D. The estimated peak horizontal ground acceleration for the power plant is 0.40 times the acceleration of gravity (0.40g) for bedrock acceleration based on two thirds of the 2% probability of exceedence in 50 years under 2007 CBC criteria (USGS 2007).

Liquefaction

Liquefaction is a condition where in a cohesionless soil may lose shear strength because of sudden increase in pore water pressure caused by an earthquake. Ground water under the project site and most areas of project linears is sufficiently deep that liquefaction is not possible. The seismic hazards zones map for the Lancaster East, Littlerock, Palmdale, and Pacifico Mountain quadrangles where transmission line linear facilities are located indicates the transmission lines cross areas "*…where historic occurrence of liquefaction or local geological, geotechnical, and ground water conditions indicate a potential for permanent ground displacement such that mitigation as defined in Public Resources Code Section 2693(c) would be required*" (CDMG 1999). Based on the materials provided, no geotechnical investigation has been performed for the linears in these areas. Some areas of liquefaction potential may be eliminated by showing that local ground water is considerably deeper than the typical depth of liquefiable materials; other liquefaction hazards may potentially be avoided by spanning select areas with the transmission towers. Some areas may require detailed investigation, or may require actual mitigation. Staff proposes Condition of Certification **GEO-4** to ensure that the proper investigation is performed and additional measures identified if necessary.

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, such as a nearby steep hillside or deeply eroded stream bank, but can also occur on gentle slopes. 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. There is no potential for lateral spread on the project site, but lateral spread and its impact on electric transmission line facilities needs to be determined with the liquefaction assessment.

Hydrocompaction

Hydrocompaction (also commonly known as hydrocollapse) 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 or concentrated infiltration dissolves the weak cementation that is preventing the immediate collapse of the soil structure. The geotechnical report indicates that moderately collapsible soil is present from the ground surface to depths of as much as 26 feet. The proposed mitigation method involves limited depth of over-excavation of soils under foundations and replacement with compacted fill or use of deep foundations (Kleinfelder, 2008; AECOM 2009a). Any necessary mitigation measures for the effects of hydrocompaction of site soils should be addressed as required in the project-specific geotechnical report, per CBC (2007) requirements and proposed Condition of Certification **GEO-1** and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**.

Dynamic Compaction

Dynamic compaction can occur when relatively unconsolidated granular soils experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase in soil density). The decrease in volume can result in settlement of overlying structural improvements. Geotechnical investigation at the proposed PHPP project site indicates the site surface consists of 10 to 15 feet of loose to medium dense granular alluvium which is underlain by generally medium dense to dense granular soils below 10 to 15 feet depth (Kleinfelder, 2008). The possible occurrence of dynamic compaction of site native and fill soils during an earthquake is not addressed in the preliminary geotechnical report and should be addressed in the final project geotechnical report, per Condition of Certification **GEO-1**. Given the seismic history of the area, it seems likely that any potential dynamic compaction has already occurred.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist at a moisture content below their plastic limit. The addition of moisture from irrigation, precipitation, capillary tension, water line breaks, etc. causes the clay soils to absorb water molecules into their structure, which in turn causes an increase in the overall volume of the soil. Kleinfelder (2008) evaluated the potential for soil expansion and determined that soils have low-plasticity fines and are generally not expansive. Expansive soils will not have a significant impact on linears provided that pipelines are buried several feet below ground surface, and transmission towers are not sensitive to minor soil expansion.

Landslides

The proposed PHPP site slopes gently to the south-southwest at a gradient of approximately 1%. The gradual slope of the site coupled with the absence of topographically high ground within or immediately upgradient from the site suggest it is, not susceptible to landslide activity. Transmission tower sites must be investigated to assure they are not located in a potential landslide area (Condition of Certification **GEO-5**).

Flooding

The Federal Emergency Management Agency (FEMA) has identified the proposed PHPP site as lying in Unshaded Zone X, which are "areas determined to be outside the 0.2% annual chance flood plain" (FEMA 2008). Lake Palmdale, a dammed reservoir along the San Andreas fault, is located uphill from the proposed PHPP site, but if it were to fail, flood waters would not be projected to cross the site. The proposed underground linears are not considered highly susceptible to short-term flooding as would be associated with thunderstorm or dam-related flooding. The electric transmission line linears are not considered significantly susceptible to flooding of this nature. Therefore, the potential for PHPP site inundation due to flooding or risk to offsite linears is considered to be low.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff has reviewed applicable geologic maps and reports for this area (CDC 1992; CDC 2001; CDMG 1969; CDMG 1990; CDMG 1994; CDMG 1998; CDMG 1999; Dibblee, 2008). Historically, minor quantities of gold, copper, and other minerals were obtained from the Transverse Ranges to the west (CDMG 1998). Alluvium of Little Rock Creek have yielded primarily aggregate in the form of sand and gravel. Other sources of sand and gravel aggregates are present in older Quaternary deposits in the vicinity of the San Andreas fault near the transmission line linear.

Energy Commission staff has reviewed the Paleontological Resources assessment in Section 5.9 and Paleontological Records Search and Literature Review (Confidential) in Appendix J of the AFC (SWCA 2008). Staff has also reviewed the paleontological literature and records searches conducted by the Natural History Museum of Los Angeles County (NHMLC) (McCleod, 2009) as well as the online records database maintained by the UCMP (2008). The SWCA survey identified a single, previously undocumented vertebrate fossil locality along the southern end of the proposed transmission line. The SWCA report (SWCA 2008) makes appropriate recommendations for their collection and preservation. No other fossil collection localities have been documented within the project boundaries or along project linear alignments.

CONSTRUCTION IMPACTS AND MITIGATION

The design-level geotechnical investigation required for the project by the CBC (2007), proposed Conditions of Certification **GEO-1**, and **GEN-1**, **GEN-5** and **CIVIL-1** (under **Facility Design**) provide standard engineering and design recommendations for mitigation of excessive settlement due to collapsible/compressible soils or dynamic compaction, as appropriate.

As noted above, no viable geologic or mineralogic resources, including oil or gas fields,

are known to exist within the proposed PHPP construction site or linear routes, although historic high-grade aggregate pits are present in the site vicinity. The potential to impact significant paleontological resources in older Quaternary (older Pleistocene) sediments, especially in deeper excavations, is considered to be high. Construction of the proposed project will include grading, excavation, and utility trenching. Staff considers the probability of encountering paleontological resources to be generally high in excavations which penetrate through the recent alluvium and encounter older Quaternary alluvium. The potential for encountering fossils will increase with the depth of cut. Locations where project linears would cross known outcrops of Miocene through latest Pleistocene strata are also considered to have a high potential to encounter significant fossil deposits.

Proposed Conditions of Certification **PAL-1** through **PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level. Essentially, these conditions require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (paleontologic resource specialist; PRS). Earthwork is halted any time potential fossils are recognized by either the paleontologist or the worker. When properly implemented, the conditions of certification 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 paleontological resource specialist is retained for the project by the applicant to produce a monitoring and mitigation plan, conduct the worker training, and provide the on site monitoring. During the monitoring, the PRS can and often does petition the CEC for a change in the monitoring protocol. Most commonly, this is a request for lesser 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.

Based upon the literature and archives search, field surveys, and compliance documentation for the proposed PHPP, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the project. Energy Commission staff believes that the facility can be designed and constructed to minimize the effect of geologic hazards at the site during project design life and that impacts to vertebrate fossils encountered during construction of the power plant and associated linears would be mitigated to a level of insignificance.

OPERATION IMPACTS AND MITIGATION

Operation of the proposed plant facilities should not have any adverse impact on geologic, mineralogic, or paleontologic resources. Potential geologic hazards, including strong ground shaking, foundation settlement due to compressible soils, and hydrocompaction, can be effectively mitigated through facility design (see Proposed Conditions of Certification **GEO-1** and **GEN-1, GEN-5 and CIVIL-1** in the **Facility Design** section) such that these potential hazards should not affect operation of the facility.

CUMULATIVE IMPACTS AND MITIGATION

The proposed PHPP project site is situated in an active geologic environment. Strong ground shaking potential must be mitigated through foundation and structural design as required by the CBC (2007). Soils that may be subject to excessive settlement due to

hydrocollapse or dynamic compaction, must be mitigated in accordance with the design-level geotechnical investigation as required by the CBC (2007), and proposed Conditions of Certification **GEO-1**, and **GEN-1, GEN-5, and CIVIL-1** under **Facility Design**. No paleontological resources have been documented in the general area of the project site, but units with high potential for paleonotological materials and recorded paleontological resources are present along the southern leg of the transmission line alignment. The potential impacts to paleontological resources due to construction activities will be mitigated as required by proposed Conditions of Certification **PAL-1** through **PAL-7**.

Staff believes that the potential for significant adverse cumulative impacts to the proposed project from geologic hazards except ground shaking and hydrocompaction, during the project's design life is low, and that the potential for cummulative impacts to geologic and mineralogic resources is very low. The potential to impact paleontolgoical resources is high and could be cumulative with impacts from other construction projects.

Based upon the literature and archives search, field surveys and compliance documentation for the proposed PHPP project, the applicant proposes monitoring and mitigation measures for construction of the project. Energy Commission staff agrees with the applicant that the project can be designed and constructed to minimize the effects of geologic hazards at the site, and that impacts to scientifically significant vertebrate and invertebrate fossils encountered during construction would be mitigated to levels of less than significant.

The proposed conditions of certification allow the Energy Commission (CPM) and the applicant to adopt a monitoring scheme ensuring compliance with applicable LORS for geologic hazards and geologic, mineralogic, and paleontologic resources.

FACILITY CLOSURE

Facility closure activities are not expected to impact geologic or mineralogic resources since no such resources are known to exist at either the project location or along its proposed linears. In addition, the decommissioning and closure of the project should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received comments regarding geologic hazards from the County of Los Angeles, Department of Public Works in a letter dated January 15, 2009. Comments and staff response are presented below:

<u>Soils/Geotechnical</u>

The site is in an area that may be susceptible to hydroconsolidation. Also, portions of the proposed transmission lines are located within potentially liquefiable areas per the State of California Seismic Hazard Zones Map-Lancaster East, Palmdale, Littlerock, and Pacifico Mountain Quadrangles. Therefore, the soils report must address the amount of total and differential seismically induced settlement due to the potential

liquefaction, conclusively determine the depth of hydrocollapsible soils, and provide mitigation measures as necessary.

Staff Response

Proposed **Geology and Paleontology** Condition of Certification **GEO-1** as well as proposed Conditions of Certification **GEN-1**, **GEN-5**, and **Civil-1** require a design-level geotechnical investigation to address evaluation and mitigation of geological and geotechnical hazards.

Geologic Hazards

1. Based on Figure 5.5-2 of the Application for Certification, Volume I, it appears that the southern leg of the proposed natural gas supply pipeline may be affected by one or more traces of active faults. Provide geologic mapping at an appropriate scale to address this potential hazards and provide conclusions and recommendations as necessary.

Staff Response

Proposed **Geology and Paleontology** Condition of Certification **GEO-2** requires a fault investigation report on the southern end of the proposed natural gas supply line.

2. Based on Figure 5.5-2 of the Application for Certification, Volume I, it appears that the proposed transmission line, Segment 2, crosses the San Andreas Fault zone at an angle that would place the transmission line in tension during and/or following an earthquake along that segment of the fault. Provide recommendations for minimizing impact to this segment of the transmission line.

Staff Response

Proposed **Geology and Paleontology** Condition of Certification **GEO-3** requires a fault investigation report for the transmission line crossing of the San Andreas fault zone. Conditions of certification proposed by **Facility Design** require that the transmission line be designed to current seismic standards.

3. Reference is made in Kelinfelder 27 March 2008, to the 2001 CBC (pages 14 and 32) and to the 1997 UBC (references). Please refer to the 2007 CBC (based on 2006 IBC) for design requirements and correct any recommendations as needed. Note that the seismic zones in the 2001 CBC have been replaced in the 2007 CBC Seismic Design Categories, and the methods of analysis are also modified.

Staff Response

All geological, geotechnical, civil, and structural design work shall be performed in accordance with the 2007 edition of the CBC, per proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5**, **Civil-1**, **STRUC-3**, and **STRUC-4** and **Transmission System Engineering** Condition of Certification **TSE-2**.

CONCLUSIONS

The applicant will be able to comply with applicable LORS, provided that the proposed conditions of certification are adopted and enforced. The design and construction of the project should have no adverse impact with respect to geologic, mineralogic, and paleontologic resources. Staff proposes to ensure compliance with applicable LORS through the adoption of the proposed conditions of certification listed below.

PROPOSED CONDITIONS OF CERTIFICATION

General conditions of certification with respect to engineering geology are proposed under Conditions of Certification **GEN-1, GEN-5, and CIVIL-1** in the **FACILITY DESIGN** section. Proposed geologic conditions of certification follow in **GEO-1** through **GEO-5**. Proposed paleontological conditions of certification follow in **PAL-1** through **PAL-7**. It is staff's opinion that the likelihood of encountering paleontologic resources is moderate on the plant site and most of the project linears, but is high along the transmission lines between Pearblossom substation and Vincent substation. Staff will consider reducing monitoring intensity, at the recommendation of the project PRS, following examination of sufficient, representative, deep excavations to fully detail site stratigraphy.

GEO-1 A project-specific geotechnical report shall be prepared by review of detailed project foundation plans and requirements, and updating the preliminary geotechnical report for the project.

Verification: The design-level geotechnical investigation report for the proposed PHPP site shall be submitted to the CPM at least 60 days prior to start of plant construction.

GEO-2 Additional fault investigation shall be performed for the southern end of the natural gas pipeline, in conjunction with City of Palmdale approval, in accordance with City of Palmdale General Plan S1.1.7, which requires that utility locations be limited in areas with exposure to faulting, and based on the City of Palmdale General Plan faulting hazards map (Figure LU-4). If the natural gas pipeline crosses the San Andreas fault or any of its splays (Cemetery fault), or if it would be in danger of rupture from intense ground shaking, design shall include appropriate safety features. This shall include a mechanism, such as automatic pressure-sensitive shut-off valves, to cut gas supply in event of pipe rupture.

Verification: A fault investigation report for the southern end of the proposed natural gas line shall be submitted to the CPM at least 60 days prior to start of pipeline construction. Recommendations for further mitigation, beyond automatic shut-off valves, shall be included, as appropriate.

GEO-3 Additional fault investigation shall be performed for the southern end of electric transmission line where it crosses the Llano fault Alquist-Priolo Zone and the San Andreas Fault Alquist-Priolo zone. This investigation shall include sufficient geologic mapping and/or fault trenching to verify that towers would not be directly impacted by fault rupture.

Verification: A fault investigation report for the southern end of the proposed

transmission line shall be submitted to the CPM at least 60 days prior to start of transmission line construction. Recommendations for further mitigation, beyond avoiding founding transmission towers directly on fault traces, shall be included, as appropriate.

GEO-4 Additional geotechnical investigation shall be performed for the electric transmission line where it crosses areas of projected liquefaction hazards per the Seismic Hazard Reduction Act. This geotechnical investigation shall be prepared and provided to the City of Palmdale as per the General Plan Safety Element Policy S1.1.1.

Verification: The design-level geotechnical investigation report for the proposed transmission line shall be submitted to the CPM at least 60 days prior to start of transmission line construction.

GEO-5 Additional geologic or geotechnical investigation shall be performed along the southern alignment between the San Andreas Fault and the Vincent substation, to evaluate and mitigate the risk of landslide failure affecting the transmission line towers

Verification: The design-level engineering geological or geotechnical investigation report for the proposed transmission line shall be submitted to the CPM at least 60 days prior to start of transmission line construction.

PAL-1 The project owner shall provide the Compliance Project Manager (CPM) with the resume and qualifications of its Paleontological Resource Specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995. The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;

2. Ability to recognize and collect fossils in the field;

3. Local geological and biostratigraphic expertise;

4. Proficiency in identifying vertebrate and invertebrate fossils; and

5. At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading

paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontologic Resource Monitors (PRMs) shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of experience monitoring in California; or
- AS or AA in geology, paleontology, or biology and four years' experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification: (1) At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.

(2) At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project, stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor's beginning on-site duties.

(3) Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction lay down areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale between 1 inch = 40 feet and 1 inch = 100 feet range. If the footprint of the project or its linear facilities change, the project owner shall provide maps and drawings reflecting those changes to the PRS and CPM.

If construction of the project proceeds in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Before work commences on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked the following week, and until ground disturbance

is completed.

Verification: (1) At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

(2) If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

(3) If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner submits to the CPM for review and approval, a paleontological resources monitoring and mitigation plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities, and may be modified with CPM approval. This document shall be used as the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of Vertebrate Paleontology (SVP 1995) and shall include, but not be limited, to the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to PRMMP procedures;

2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the conditions of certification;

3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;

4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;

5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling;

6. A discussion of procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how

notifications will be performed;

7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meet the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed to receive data and fossil materials collected, requirements or specifications for materials delivered for curation, and how they will be met, and the name and phone number of the contact person at the institution; and

10. A copy of the paleontological conditions of certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for the following workers: project managers, construction supervisors, foremen and general workers involved with or who operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of a CPM-approved video or in-person presentation. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. No ground disturbance shall occur prior to CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;

2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontologic sensitivity;

3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;

4. Instruction that employees are to halt or redirect work in the vicinity of a

find and to contact their supervisor and the PRS or PRM;

5. An informational brochure that identifies reporting procedures in the event of a discovery;

6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification: (1) At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP, including the brochure, with the set of reporting procedures for workers to follow.

(2) At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning to use a video for interim training.

(3) If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to 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 video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring and will be included in the monthly compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keep a daily monitoring

log of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.

3. The project owner shall ensure that the PRS notifies the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the conditions of certification.

4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM within 24 hours, or Monday morning in the case of a weekend event where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities, and general locations of excavations, grading, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during project construction.

Verification: The project owner shall maintain in his/her compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after project completion and approval of the CPM-approved paleontological resource report (see **PAL-7**). The project owner shall be responsible for paying any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources

Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information, and submit it to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
Palmdale Hybrid Power Plant (08-AFC-9)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on cultural, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials. Include this completed form in the Monthly Compliance Report.

No.	Employee Name	Title/Company	Signature
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Cultural Trainer: _____ Signature:_____ Date: ___/___/____

PaleoTrainer: _____ Signature:_____ Date: ___/___/____

Biological Trainer: _____Signature:_____ Date:___/___/__

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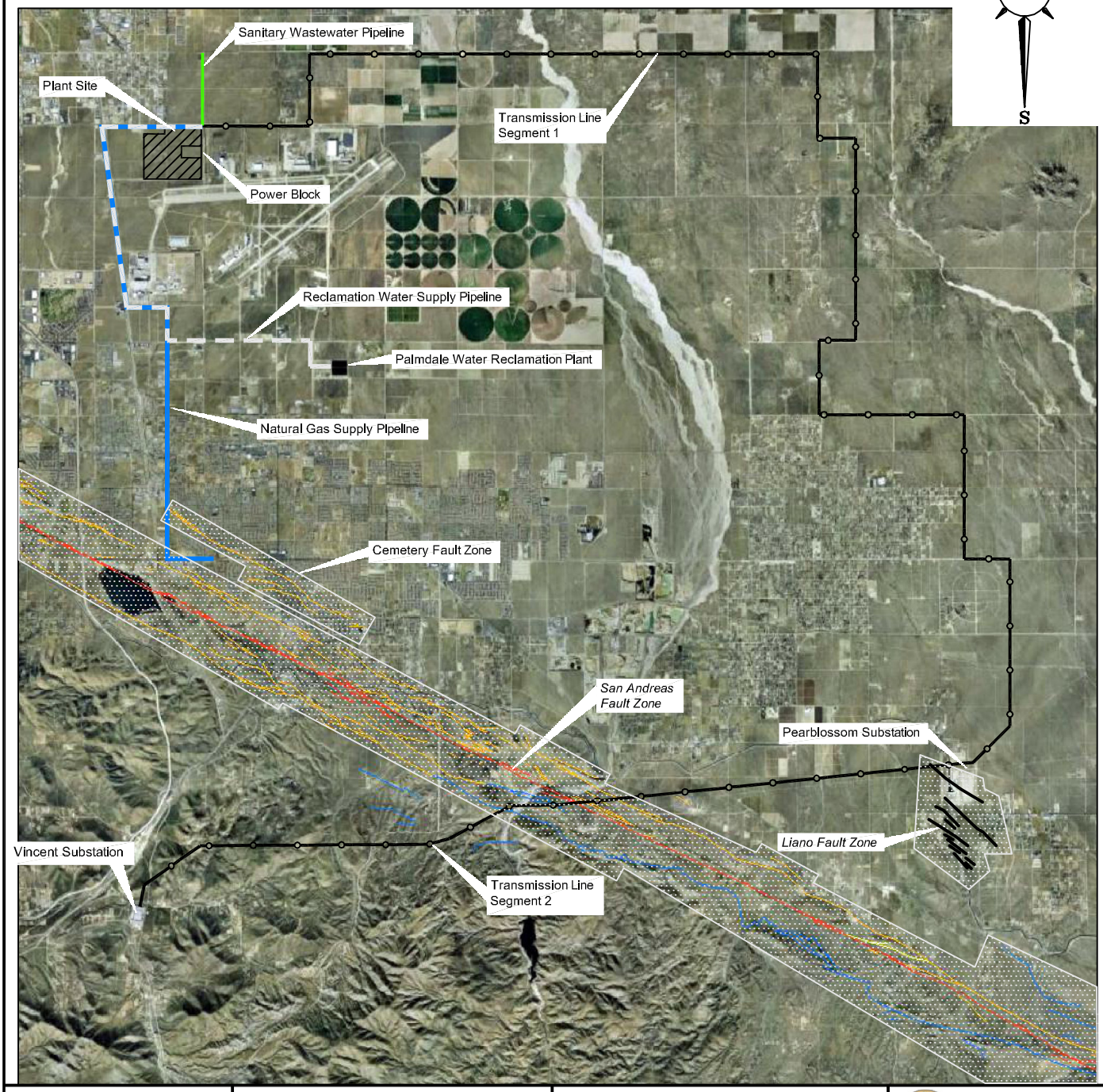
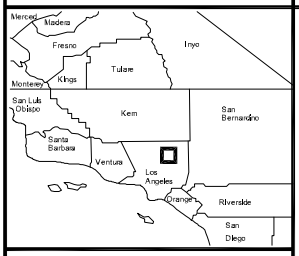


Location Map



Legend

- Plant Site
- Power Block
- Natural Gas Supply Pipeline
- Reclaimed Water Supply Pipeline
- Sanitary Wastewater Pipeline
- Transmission Line
- AP Fault Zones
- AP Fault Lines (various colors)

Palmdale Hybrid Power Project
Alquist-Priolo Fault Zone In the Vicinity of the Proposed Project Site and Linears

1 inch equals 2 miles

0 1 2 3 Miles

The Energy Resources Conservation and Development Commission of the State of California

Figure 5.2-1

POWER PLANT EFFICIENCY

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The Palmdale Hybrid Power Project (PHPP), if constructed and operated as proposed, would generate 590 megawatts (MW) (maximum net output with the duct burners turned down and the solar system turned on at full load) of electricity at an overall project fuel efficiency of 59 percent lower heating value (LHV). While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable and will produce up to 50 MW of electricity using renewable solar energy utilizing parabolic trough solar collectors. The solar technology proposed for this project would enhance the overall project's efficiency while reducing fuel consumption. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to this project. Staff therefore concludes that this project would create no significant adverse impacts on energy resources.

INTRODUCTION

One of the responsibilities of the California Energy Commission (Energy Commission) is to make findings on whether the energy use by a power plant, including the proposed PHPP power plant, will result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that PHPP's energy consumption creates a significant adverse impact, it must further determine if feasible mitigation measures could eliminate or minimize that impact. In this analysis, staff addresses the inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- Examine whether the facility will likely present any adverse impacts upon energy resources;
- Examine whether these adverse impacts are significant; and if so,
- Examine whether feasible mitigation measures or alternatives could eliminate those adverse impacts or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the efficiency of this project.

SETTING

The City of Palmdale, the applicant, proposes to build and operate PHPP, a 590 MW (maximum net output[1]) hybrid combined cycle solar thermal power plant, employing the General Electric's (GE) rapid start combined cycle technology, to serve California's energy needs (COP 2008a, AFC §1.3). The project's combined cycle equipment will consist of two General Electric (GE) Frame 7FA combustion gas turbine generators (combustion turbines) with an evaporative inlet air cooling system (COP 2008a, AFC §§1.1, 2.1, 2.4.2), two multi-pressure heat recovery steam generators (HRSGs) with duct burners, and one three-pressure, reheat, condensing steam turbine generator arranged in a two-on-one combined cycle train. The gas turbines and HRSGs will be equipped with dry low-NOx combustors and selective catalytic reduction to control air emissions (COP 2008a, AFC §§1.4.1, 2.4.2, 2.4.3.1). The solar thermal equipment utilizes arrays of parabolic trough solar collectors that heat a working fluid used to generate steam. At full load solar operation, heat from the solar field can replace the equivalent of approximately 50 MW of duct firing.

Natural gas will be delivered to PHPP via a new 8.7-mile-long gas line that will be designed and constructed by the Southern California Gas Company (SCGC) (COP 2008a, AFC §§1.1, 2.1, 2.4.5.1).

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING THE SIGNIFICANCE OF ENERGY RESOURCES

CEQA guidelines state that the environmental analysis "…shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Title 14 CCR §15126.4[a][1]). Appendix F of the guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce the wasteful, inefficient, and unnecessary consumption of energy (Title 14, CCR §15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- Adverse effects on local and regional energy supplies and energy resources;
- A requirement for additional energy supply capacity;
- Noncompliance with existing energy standards; or
- The wasteful, inefficient, and unnecessary consumption of fuel or energy.

[1] With the duct burners turned down and the solar system turned on at full load

PROJECT ENERGY REQUIREMENTS AND ENERGY USE EFFICIENCY

Any power plant large enough to fall under Energy Commission siting jurisdiction (50 MW or greater) will, by definition, consume large amounts of energy. Under normal conditions (nominal site conditions), PHPP will burn natural gas at a nominal rate of approximately 2,975 million British thermal units (MMBtu) per hour, LHV, during base load operation (COP 2008a, AFC §2.4.5.1, Figure 2-7a). The estimated fuel consumption under normal conditions with full load duct firing and the solar system turned off is approximately 3,768 MMBtu per hour, LHV (COP 2008a, AFC §2.4.5.1, Figure 2-7b). This is a substantial rate of energy consumption that could potentially impact energy supplies. Under expected project conditions, electricity will be generated at a full load efficiency of approximately 59 percent LHV (COP 2008a, AFC, Figure 2-7c). This efficiency level compares very favorably with the average fuel efficiency of a typical base load combined cycle power plant.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of natural gas to operate the project (COP 2008a, AFC §§1.1, 2.1, 2.4.5.1, 2.4.7.1). Natural gas for PHPP will be supplied from ~~a~~ SCGC's main line via a new pipeline connection. The SCGC system is capable of delivering the gas that PHPP will require to operate. This natural gas supply is a reliable source of natural gas for this project. It therefore appears unlikely that the project would create a substantial natural gas demand increase.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel will be supplied to the project by SCGC via a new pipeline connection (COP 2008a, AFC §§2.4.5.1, 2.4.7.1). There appears to be little likelihood that PHPP will require additional capacity since regional supplies are currently plentiful.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of PHPP or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT, AND UNNECESSARY ENERGY CONSUMPTION

PHPP could create significant adverse impacts on energy resources if appropriate alternatives exist that could significantly reduce the project's fuel use while satisfying the project's objectives. 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. Project fuel efficiency, and therefore its rate of energy consumption, is determined by both the configuration of the power producing system and the selection of equipment used to generate its power.

Project Configuration

PHPP will be a combined cycle power plant. Electricity will be generated by two gas turbines and a reheat steam turbine operating on heat energy recovered from the gas turbines' exhaust (COP 2008a, AFC §§1.1, 2.1, 2.4.2, 2.4.3). By recovering this heat, which would otherwise be lost up the exhaust stacks, the efficiency of any combined cycle power plant is increased considerably from that of either gas turbines or a steam

turbine operating alone. This configuration is well suited to the large, steady loads met by a base load plant that generates energy efficiently over long periods of time.

The applicant proposes to install evaporative inlet air coolers, HRSG duct burners (re-heaters), three-pressure HRSGs, a reheat steam turbine unit, a solar thermal field, and a circulating cooling water system (COP 2008a, AFC §§1.1, 2.1, 2.4.2, 2.4.3). Staff believes these features to be meaningful efficiency enhancements to PHPP. The two-train combustion turbine/HRSG configuration is also highly efficient during unit turndown since one gas turbine can be shut down, leaving the other fully loaded. This allows the efficient operation of one gas turbine instead of the operation of two gas turbines operating at a less efficient 50 percent of load.

PHPP also includes HRSG duct burners, which will partially replace heat to the steam turbine cycle during high ambient temperatures when gas turbine capacity drops (resulting in less heat available to the steam turbine cycle), and partially add power. Duct firing provides a number of additional operational benefits including load following and balancing and optimization of the steam cycle operation.

This project also utilizes parabolic solar thermal collector technology. In this technology, solar collectors track the sun and absorb its thermal energy. This heat is then transferred to a heat transfer fluid circulating through a boiler, where the heat is used to generate high-pressure steam for the steam turbine. This system could replace the equivalent of approximately 50 MW of duct firing. The solar technology would enhance the project's overall efficiency by reducing the consumption of natural gas (see below for further explanation).

The PHPP's design will incorporate the GE's rapid start technology, which will allow the combustion turbine to reach base load more quickly while reducing fuel consumption. This technology combines the fast start capability of the simple cycle gas turbine technology and the efficiency of the combined cycle technology. This technology is designed to start quickly, and while in startup phase, to operate at an efficiency rating comparable to a typical simple cycle plant. Within minutes, the steam turbine generator would begin producing power, aided by the small natural gas-fired auxiliary boiler. The PHPP would then operate at a typical combined cycle efficiency rating.

Equipment Selection

The F-class of advanced gas turbines to be installed in PHPP represents one of the most modern and efficient machines available. The applicant will install two GE Frame 7FA combustion gas turbine generators in a two-on-one combined cycle power train nominally rated at 530 MW and 56.5 percent maximum full load efficiency[2] LHV under the International Organization for Standardization (ISO) conditions (GTW 2008). PHPP will also employ GE's rapid start technology that effectively reduces time required for startup and shutdown of the turbine generators, further improving the overall thermal efficiency of the project.

[2] Does not account for the efficiency enhancement offered by the solar system

One possible alternative turbine is the Siemens SCC6-5000F, nominally rated in a two-on-one train combined cycle configuration at 598 MW and 57.3 percent efficiency LHV at ISO conditions (GTW, 2008).

Another alternative is the Alstom Power KA24, nominally rated in a two-on-two configuration at 560 MW with an efficiency rating of 57.3 percent LHV at ISO conditions (GTW 2008).

Any differences among the GE 7FA, SCC6-5000F, and Alstom KA24 in actual operating efficiency will be insignificant. Selecting among these machines is thus based on other factors such as generating capacity, cost, commercial availability, and the ability to meet air pollution limitations.

Efficiency of Alternatives to the Project

PHPP's objectives include the generation of base load electricity and ancillary services at all hours of the day to serve energy needs of the City of Palmdale and surrounding areas (COP 2008a, AFC §§1.3, 2.1, 2.4.2).

Alternative Generating Technologies

Alternative generating technologies for PHPP are considered in the AFC (COP 2008a, AFC §4.4). For purposes of this analysis, combined cycle without solar thermal technology, other fossil fuels, nuclear, biomass, hydroelectric, wind, and geothermal technologies are all considered. Given the project objectives, location, air pollution control requirements, and the commercial availability of the above technologies, staff agrees with the applicant that only natural gas-burning technologies (whether coupled with solar technology or not) are feasible.

Natural Gas-Burning Technologies

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil fuel-fired power plant (Power, 1994). Under a competitive power market system, where operating costs are critical in determining the competitiveness and profitability of a power plant, the plant owner is strongly motivated to purchase fuel-efficient machinery.

Modern gas turbines represent the most fuel-efficient electric generating technology available today. Currently available large combustion turbine models can be grouped into three categories: conventional, advanced, and next generation. Advanced combustion turbines have advantages for PHPP. Their higher firing temperatures offer higher efficiencies than conventional turbines. They offer proven technology with numerous installations and extensive run times in commercial operations.

One possible alternative to an advanced F-class gas turbine is the next generation G-class machine, such as the Siemens-Westinghouse 501G gas turbine generator, which uses partial steam cooling to allow slightly higher temperatures, yielding slightly greater efficiency. In actual operation, one would expect to see the difference in efficiency diminish, since larger-capacity G-class turbines run at less than optimum (full) output more frequently than smaller-capacity F-class turbines. (Gas turbine efficiency drops

rapidly at less than full load.). Given the minor efficiency improvement promised by the G-class turbine, and since this machine would have to operate at less than optimum base load efficiency in order to meet the project load capacity requirements, staff believes the applicant's decision to purchase F-class machines is reasonable.

Another possible alternative to the F-class advanced gas turbine is an H-class next generation machine with a claimed fuel efficiency of 60 percent LHV at ISO conditions. This high efficiency is achieved through a higher pressure ratio and firing temperature, made possible by cooling the initial turbine stages with steam instead of air. The first Frame 7H machine has only recently completed commissioning at the Inland Empire Energy Center in Riverside County, California. Given the lack of commercial experience with this machine and the project load requirements, staff agrees with the applicant's decision to use F-class machines.

Solar Thermal Technology

A combined cycle configuration without solar technology would fail to take advantage of this valuable solar energy resource available in the project area.

With the duct burners turned on at full load and the solar system turned off, the project would generate approximately 617 MW of electricity (maximum net output) at an overall efficiency of approximately 53 percent LHV (COP 2008a, AFC, Figure 2-7b). With the duct burners turned down and the solar system turned on at full load, the project can generate approximately 590 MW of electricity (maximum net output) at an overall efficiency of approximately 59 percent LHV (COP 2008a, AFC, Figure 2-7c). As seen above, the solar system would enhance the project's overall efficiency by six percentage points. Therefore, adding solar thermal technology at PHPP increases efficiency while reducing natural gas consumption.

Inlet Air Cooling

Other alternatives include gas turbine inlet air cooling methods. The two most common techniques are evaporative coolers or foggers, and chillers. Both increase power output by cooling gas turbine inlet air. A mechanical chiller offers greater power output than the evaporative cooler on hot, humid days; however, it consumes electric power to operate its refrigeration process, slightly reducing its overall net power output and overall efficiency. An absorption chiller uses less electricity but necessitates the use of a substantial amount of ammonia. An evaporative cooler or fogger boosts power output most efficiently on dry days; it uses less electricity than a mechanical chiller, possibly producing a slightly higher operating efficiency. Efficiency differences between these alternatives are relatively insignificant.

Given the climate at the project site and the relative lack of clear superiority of one system over another, staff agrees that the applicant's choice of an evaporative gas turbine inlet air cooling system will have no significant adverse energy impacts.

Staff concludes that the selected project configuration (hybrid combined cycle solar thermal) and generating equipment (F-class gas turbines) represent the most efficient feasible combination for satisfying the project's objectives. The two-train combustion turbine/HRSG configuration also allows for high efficiency during unit turndown since

one combustion turbine can be shut down, leaving one fully loaded, efficiently operating combustion turbine instead of having two combustion turbines operate at a less efficient 50 percent of load. This offers an efficiency advantage over the larger machines during unit turndown. The solar technology proposed for this project would enhance the overall project's efficiency while reducing fuel consumption.

Because there are no alternatives that could significantly reduce energy consumption while satisfying the project's objectives of producing base load electricity and ancillary services, and given the project location, air pollution control requirements, and the commercial availability of the technologies evaluated above, staff believes that PHPP will not create a significant adverse impact on energy resources.

CUMULATIVE IMPACTS

The only nearby power plant that could potentially impact cumulative energy consumption, when aggregated with this project, is the High Desert Power Project. As discussed above, the natural gas supply system has enough capacity to supply both projects. Staff knows of no other projects that could produce cumulative energy impacts.

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. Older, less efficient power plants consume more natural gas than new, more efficient plants such as PHPP. Natural gas is burned by the most competitive power plants on the spot market, and the most efficient plants run the most frequently. The high efficiency of the proposed PHPP should allow it to compete favorably, run at high capacity, and replace less efficient power generating plants. The project would therefore not impact the cumulative amount of natural gas consumed for power generation.

NOTEWORTHY PUBLIC BENEFITS

The applicant expects to increase power supply reliability in the California electricity market by both meeting the state's energy needs and contributing to regional electricity reserves. By doing so in a fuel-efficient manner, through installing the most modern fast start F-class gas turbine generator available in a hybrid combined cycle solar thermal configuration, PHPP will benefit electric consumers of California.

CONCLUSIONS AND RECOMMENDATIONS

The project, if constructed and operated as proposed, would generate 590 MW (maximum net output[3]) of electric power at an overall project fuel efficiency of 59 percent LHV. While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to the

[3] With the duct burners turned down and the solar system turned on at full load

project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

No cumulative impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

COP 2008a – City of Palmdale/ S. Williams (tn: 47383). Application for Certification for the Palmdale Hybrid Power Project. Dated on 07/30/08. Submitted to CEC/ Docket Unit on 08/04/08.

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POWER PLANT RELIABILITY

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The City of Palmdale, the applicant, predicts an equivalent availability factor[1] of 90-95 percent, which staff believes is achievable. Based on a review of the proposal, staff concludes that the Palmdale Hybrid Power Project (PHPP) would be built and operated in a manner consistent with industry norms for reliable operation.

INTRODUCTION

In this analysis, California Energy Commission (Energy Commission) staff addresses the reliability issues of the project by determining if the power plant is likely to be built in accordance with typical industry norms for reliable power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would not be likely to degrade the overall reliability of the electric system it serves (see the **SETTING** section, below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliable power generation. While the applicant has predicted an equivalent availability factor of 90-95 percent for the PHPP (see below), staff uses typical industry norms as a benchmark, rather than the applicant's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, or standards (LORS) apply to the reliability of this project.

[1] Equivalent availability factor is the percentage of time a unit is available for dispatch, and reflects the probability of forced (unexpected) outages.

SETTING

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), which purchase, dispatch, and sell electricity throughout the state. How the California ISO and other control area operators ensure system reliability is an evolving process; new protocols are being developed and put in place to ensure sufficient reliability in the competitive market system. "Must-run" power purchase agreements and "participating generator" agreements are two mechanisms that ensure an adequate supply of reliable power.

The California ISO also requires that power plants selling ancillary services, as well as those holding reliability must-run contracts, fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the California ISO.

The California ISO's mechanisms to ensure adequate power plant reliability have apparently been developed with the assumption that individual power plants competing to sell power into the system will exhibit reliability levels similar to those of power plants of past decades. However, there is reason to believe that, with free market competition, financial pressures on power plant owners to minimize their capital outlays and maintenance expenditures may ultimately reduce the reliability of many existing and newly constructed power plants (McGraw-Hill, 1994). Until the state's restructured competitive electricity market has undergone a shakeout period and the effects of varying power plant reliability are thoroughly understood and compensated for, staff recommends that power plant owners continue to build and operate their projects to the industry's current level of reliability.

The 590 megawatt (MW) (maximum net output with the duct burners turned down and the solar system turned on at full load) PHPP, a hybrid combined cycle solar thermal power plant, with operating flexibility (that is, the ability to start up, shut down, turn down, and provide peaking power, when needed) allowing the operator to adapt the plant's output to changing conditions in the energy and ancillary services markets (COP 2008a, AFC §2.4.2). During periods when the solar collectors are in use (when the sun is shining on the site) heat collected by the solar field would generate steam to augment the steam generated in the heat recovery steam generator. At full load solar operation, the heat from the solar field can replace the equivalent of approximately 50 MW of duct firing, which would maintain electrical output while reducing fuel consumption.

The project is expected to achieve an equivalent availability factor in the range of 90 to 95 % (COP 2008a, AFC §2.4.2). The project's capacity factor will depend on provisions

in its bilateral power sales contracts, as well as market prices for electricity, ancillary services, and natural gas (COP 2008a, AFC §2.4.2).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to how the project is designed, sited, and operated in order to ensure its safe and reliable operation (Title 20, CCR §1752[c]). Staff will conclude that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This will be 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. 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 a project and compares them to industry norms. If they compare favorably for this project, staff will then conclude that the PHPP will be as reliable as other power plants on the electric system and will not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will be ensured by adopting appropriate quality assurance/quality control (QA/QC) programs during the design, procurement, construction, and operation of the plant and by providing for the adequate maintenance and repair of the equipment and systems discussed below.

Quality Control Program

The applicant describes a quality assurance/quality control (QA/QC) program (COP 2008a, AFC §2.4) that is typical of the power industry. Equipment will be purchased from qualified suppliers based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA/QC programs and quality history will be evaluated. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects that implementation of this program will result in standard 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**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility operating in base-load service for long periods of time must be capable of being maintained while operating. A typical approach to this is to provide redundant examples of those pieces of equipment that are most likely to require service or repair.

The applicant plans to provide an appropriate redundancy of function for the project (COP 2008a, AFC §§2.4.4.6, 2.4.4.7, 2.4.5.8). Because the project consists of two combustion turbine generators, operating in parallel as independent equipment trains, it is inherently reliable. A single equipment failure cannot disable more than one train, which allows the plant to continue to generate, but at reduced output. All plant ancillary systems are also designed with adequate redundancy to ensure their continued operation if equipment fails. Staff believes that this project's proposed equipment redundancy will be sufficient for its reliable operation.

Maintenance Program

Equipment manufacturers provide maintenance recommendations for their products, and the applicant will base the project's maintenance program on those recommendations (COP 2008a, AFC §2.4). The program would encompass both preventive and predictive maintenance techniques. Maintenance outages would probably be planned for periods of low electricity demand. Staff expects that the project will 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 power plant. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant could be curtailed, threatening both the power supply and the economic viability of the plant.

Fuel Availability

Natural gas will be delivered to PHPP via a new 8.7-mile gas line that will be designed and constructed by the Southern California Gas Company (SCGC) (COP 2008a, AFC §§1.1, 2.1, 2.4.5.1). SCGC's natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas from the Southwest, the Rocky Mountains, and Canada. Staff agrees with the applicant's claim that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The PHPP will use recycled water from the City of Palmdale Water Reclamation Plant via a new 4,700-foot-long, 16-inch-diameter pipeline for cooling tower makeup and other industrial uses. There is a signed agreement between the applicant and the County of Los Angeles to provide the necessary quantities of water (COP 2010a). Therefore, staff believes the source of water supply represents a reliable source for the project. For further discussion of water supply, see the **SOIL AND WATER RESOURCES** section of this document.

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, tsunamis (tidal waves), and seiches (waves in inland bodies of water) are not likely to present hazards for this project, but seismic shaking (earthquakes) and flooding could present credible threats to the project's reliable operation.

Seismic Shaking

The site lies within a seismically active area (COP 2008a, AFC §§1.4.4, 5.5; Appendix B); see the **GEOLOGY AND PALEONTOLOGY** section of this document. The project will be designed and constructed to the latest appropriate LORS (COP 2008a, AFC Appendix C). Compliance with current seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been continually upgraded. Because it will be built to the latest seismic design LORS, this project will 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 seismic events.

Flooding

The project site is largely flat, with elevations ranging from approximately 2,493 to 2,535 feet above mean sea level. The site is not within a 100-year flood plain or a 500-year flood plain (COP 2008a, AFC §§2.3.1, 2.4.6.7, 2.4.6.8, 5.17.2.3). Mass grading of the site will occur at the beginning of the project construction phase. The solar field area, approximately 250 acres, will be graded to slope gently toward the northeast at a rate of 0.5 percent. The power block area, approximately 20 acres, will be on elevated fill area to avoid flooding during any major rainfall event. 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**.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as other related reliability data) are maintained by the North American Electric Reliability Corporation (NERC). 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 [http://www.nerc.com]. The NERC reported the following generating unit statistic for the years 2002 through 2006 (NERC 2007):

For combined cycle units (all MW sizes):

Availability Factor = 89.86 percent

The project's gas turbines have been on the market for several years now and are expected to exhibit typically high availability. The applicant's expectation of an annual availability factor of 90-95 percent (COP 2008a, AFC §2.4.2) appears reasonable when compared with NERC figures for similar plants throughout North America (see above). In fact, these machines can well be expected to outperform the fleet of various (mostly older and smaller) gas turbines that make up NERC statistics. Additionally, because the plant will consist of two parallel gas turbine generating trains, maintenance can be scheduled during times of the year when the full plant output is not required to meet market demand, which is typical of industry standard maintenance procedures. The solar technology employed in the PHPP will be similar to that at the solar power plants at Kramer Junction, which have demonstrated availability factors in the 99 percent range in recent years. The applicant's estimate of plant availability, therefore, appears to be realistic. Stated procedures for assuring the design, procurement, and construction of a reliable power plant appear to be consistent with industry norms, and staff believes they are likely to ultimately produce an adequately reliable plant.

NOTEWORTHY PROJECT BENEFITS

This project would enhance power supply reliability in the California electricity market by meeting the state's growing energy demand, contributing to electricity reserves in the region, and providing operating flexibility (that is, the ability to start up, shut down, turn down, and provide load following and spinning reserve, when needed). The fact that the project consists of two combustion turbine generators, configured as independent equipment trains, provides inherent reliability. A single equipment failure cannot disable more than one train, thereby allowing the plant to continue to generate, though at reduced output.

At full load solar operation, the heat from the solar system can replace the equivalent of approximately 50 MW of duct firing. The solar system would enhance the project's ability to respond to the energy markets by providing peaking power during periods of peak electricity demand (e.g., hot summer afternoons), while reducing the natural gas

consumption required to fire the duct burners at full load. During periods of peak demand, the sun will typically shine on the project site; solar energy should therefore be available when needed. If a malfunction prevented the use of the solar technology, natural gas could be burned in the duct burners to make up for that loss. This provides a reliable source of energy, which enhances both the project's overall reliability and availability.

CONCLUSION

The applicant predicts an equivalent availability factor of 90-95 percent, which staff believes is achievable. Based on a review of the proposal, staff concludes that the plant would be built and operated in a manner consistent with industry norms for reliable operation. No conditions of certification are proposed.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

COP 2008a – City of Palmdale/ S. Williams (tn: 47383). Application for Certification for the Palmdale Hybrid Power Project. Dated on 07/30/08. Submitted to CEC/ Docket Unit on 08/04/08.

COP 2010a – City of Palmdale. Recycled Water Project Agreement between Los Angeles County and the City of Palmdale, Dated March 9, 2010, Submitted to CEC on March 20, 2010.

McGraw-Hill (McGraw-Hill Energy Information Services Group). 1994. Operational Experience in Competitive Electric Generation. Executive Report.

NERC (North American Electric Reliability Council). 2007. 2002–2006 Generating Availability Report.

TRANSMISSION SYSTEM ENGINEERING

Testimony of Laiping Ng and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed Palmdale Hybrid Power Project (PHPP) 230 kV generator tie-line would be 35.6 miles in length, with 23.7 miles (segment 1) being located in new and existing rights-of-way and 11.9 miles (segment 2) being located in an existing right-of-way. In addition, the 11.9 miles of the existing Southern California Edison (SCE) Vincent-Pearblossom 230 kV line would be reconductored and relocated to the new PHPP double circuit poles.

- The SCE Tehachapi Queue Cluster Window System Impact Study (SIS) and the California Independent System Operator (California ISO) Interconnection Facilities Study (FS) analyzed the proposed PHPP interconnection to the Vincent Substation, but possible use of the SCE right-of-way and the replacement and reconductoring of the 11.9 mile segment between the Vincent Substation and Pearblossom pumping station was not included in the SIS and the FS.
- The addition of the PHPP would require expansion and upgrade of the Vincent Substation. The PHPP cannot interconnect to the Vincent Substation until the upgrade is in place.
- SCE will conduct a Right-of-Way (ROW) Study to determine the feasibility of replacing and relocating the existing Vincent-Pearblossom 230 kV transmission line. The SCE ROW Study is required before the start of transmission facilities construction to ensure the possible use of the SCE ROW, and to determine the possible impacts to Los Angeles Department of Water and Power (LADWP), and California Department of Water Resource (CDWR) facilities.
- Because the reconductoring of the existing Pearblossom-Vincent 230 kV line will affect the operations of the CDWR Pearblossom pumping station requiring the suspension of pumping for activities for unspecified amounts of time, Staff proposes the addition of Condition of Certification 5.e.v that requires the submittal of a letter from the CDWR indicating that the outages have been coordinated with CDWR and are acceptable.

The SCE SIS concluded that with both the SCE Antelope Transmission Project (ATP) and the Tehachapi Renewable Transmission Project (TRTP) in service, the addition of the Tehachapi Wind Resource Area (TWRA) queue cluster window generation projects, including the proposed 570 MW PHPP, would not cause any transmission line overloads under normal conditions. Overloads under single and double contingency conditions would be mitigated with the modification of existing special protection systems (SPS), installing new SPS, operating procedures, and by reducing the output from generators in the TWRA queue. Thus, the PHPP would have no adverse downstream impacts to the planned transmission system.

INTRODUCTION

STAFF ANALYSIS

This Transmission System Engineering (TSE) analysis examines whether this project's proposed interconnection conforms to all Laws, Ordinances, Regulations and Standards (LORS) required for safe and reliable electric power transmission. Additionally, under the California Environmental Protection 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 (California Code of Regulations, title 14, §15378). The Energy Commission must therefore identify the system impacts and 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 ISO, for the analysis of impacts on the transmission grid from the proposed interconnection, as well as the identification and approval of new or modified facilities downstream that could be required for mitigation.

The proposed PHPP would connect to the SCE transmission system and require both analysis by SCE and approval by the California ISO.

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 determines both the standards necessary to ensure reliability and whether the proposed transmission modifications conform to existing standards. SCE will provide both the analysis and necessary reports in its System Impact and Facilities studies and its approval for both the facilities and required changes to its transmission system. Also, because of the proposed modification of the Vincent-Pearblossom transmission line, SCE will conduct a ROW Study.

CALIFORNIA ISO'S ROLE

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 is also responsible for developing the standards and procedures necessary for system reliability. The California ISO reviews SCE's studies to ensure the adequacy of the proposed PHPP transmission interconnection. The California ISO also determines 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's tariff, the "need" for transmission additions or upgrades downstream from the interconnection point must be determined in light of overall system reliability. The California ISO reviews the System Impact Study performed by SCE and/or a third party, provides its analysis, conclusions, and recommendations, and ultimately issues a preliminary approval or concurrence letter to SCE. Upon completion of the Facilities Study, the California ISO provides conclusions and recommendations for interconnection of the proposed PHPP. If

necessary, the California ISO provides written and verbal testimony in support of its findings at Energy Commission hearings.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- The North American Electric Reliability Council's (NERC) Reliability Standards for the bulk electric transmission systems of North America provide national policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. The NERC planning standards provide for system performance levels for both normal and contingency conditions. With regard to power flow and stability simulations, while these Standards are similar to NERC/WECC Planning 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's planning standards apply not only to interconnected system operation but to individual service areas as well (NERC 2006).
- NERC/WECC Planning Standards: The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the NERC Reliability Standards to provide the system performance standards used to assess the reliability of the interconnected system. These standards require the uninterrupted continuity of service as their first priority, and the preservation of interconnected operation as their secondary priority. Some aspects of NERC/WECC standards are more stringent or specific than NERC standards alone. 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 upon Section I.A of the standards, *NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table* and on Section I.D, *NERC and WECC Standards for Voltage Support and Reactive Power.* These standards require that the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying allowable variations in thermal loading, voltage and frequency, and the loss of load that could 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 the loss of either multiple 500 kV lines along a common right-of-way, and/or the loss of multiple generators). While controlled loss of generation or load or system separation is permitted under certain circumstances, uncontrolled loss is not permitted (WECC 2002).
- California Public Utilities Commission (CPUC) General Order 95 (GO-95*), Rules for Overhead Electric Line Construction,* sets forth uniform requirements for the construction of overhead lines. Compliance with this order ensures both adequate service and the safety of both the public and the people who build, maintain, and operate overhead electric lines.
- CPUC General Order 128 (GO-128), *Rules for Construction of Underground Electric Supply and Communications Systems*, sets forth uniform requirements and

minimum standards for underground supply systems to ensure adequate service and the safety of both the public and the people who build, maintain, and operate underground electric lines.

- National Electric Safety Code, 1999, provides electrical, mechanical, civil, and structural requirements for overhead electric line construction and operation.
- California ISO Planning Standards also provide standards and guidelines that assure the adequacy, security and reliability during the planning process of the California ISO's electric transmission facilities. The California ISO Planning Standards incorporate both NERC and WECC Planning Standards. With regard to power flow and stability simulations, the California ISO's Planning Standards are similar to those of the NERC and WECC and to the NERC Planning Standards for transmission system contingency performance. However, the California ISO's standards also provide additional requirements that are not found in the NERC, WECC, or NERC planning standards. The California ISO standards apply to all participating transmission owners that interconnect to both the California ISO-controlled transmission grid and to neighboring grids not operated by the California ISO (California ISO 2002a).
- California ISO and Federal Energy Regulatory Commission (FERC) electric tariffs provide guidelines for the construction of all transmission additions and upgrades (projects) within the California ISO-controlled grid. The California ISO also determines the "need" for the proposed project where it will promote economic efficiency and maintain system reliability. The California ISO also determines the cost responsibility of the proposed project and provides operational review for all facilities that are to be connected to the California ISO grid (California ISO 2003a).

PROJECT DESCRIPTION

The applicant has proposed to interconnect the 570 MW PHPP to the SCE Vincent Substation with a proposed commercial operation date of summer 2013. The PHPP would be a natural gas-fired combined-cycle power generating facility located in the City of Palmdale, California. The project would consist of two combustion turbine generators (CTG) each rated at 195.5 MVA with a power factor of 0.85 and one steam turbine generator (STG) rated at 355 MVA with a power factor of 0.85. Each CTG is expected to generate at 154 MW and the STG is expected to generate at 169 MW under average ambient conditions. With the duct burners in-service, the steam turbine generator would generate at its peak at 267 MW. At full load solar operation, solar field can generate heat to replace equivalent of approximately 50 MW of duct firing. The total output of the PHPP would be approximately 570 MW (COP2008a, section 2.1, section 2.4.2, Figure 2.10).

The two combustion turbine generators and the steam turbine generator each would interconnect to the low side of its dedicated 18/230 kV oil-filled, generator step-up transformer through an 8,000-Amp gas insulated circuit breaker and a disconnect switch. The step-up transformers for the combustion turbine generating units would be rated at 18/230 kV and 118/157/196 megavolt ampere (MVA), while the transformer for the steam turbine generating unit would be rated at 18/230 kV and 180/240/300 MVA. The high side of each generator step-up transformer would be connected to the project

switchyard through a 1,200-ampere disconnect switch and overhead conductors (COP2008a, section 2.4.4.3, Figure 2-10).

SWITCHYARDS AND INTERCONNECTION FACILITIES

The proposed project switchyard would be in a breaker and one-half configuration. It would consist of six 2,000-ampere 230 kV circuit breakers. The switchyard would be connected to the SCE Vincent Substation via a new, 35.6 mile long, 230 kV generation tie-line. This single, bundled 1590 ACSR generator tie-line conductor would be constructed in two segments (segment 1 and segment 2).

Segment 1

The proposed 23.7 miles, segment 1, of the generator tie-line, being located in new and existing rights-of-way, would proceed north and east, then south, between the PHPP site to the north of the CDWR Pearblossom Pumping Station. The 230 kV single circuit generator tie-line would be supported by new double circuit steel poles.

Segment 2

The remaining 11.9 miles, segment 2, of the proposed 230 kV generator tie-line would proceed from north of the Pearblossom Pumping Station southwest to the Vincent Substation. In addition to the proposed 230 kV generator tie-line, approximately 11.9 miles of the existing SCE Vincent-Pearblossom 230kV line will be reconductored and relocated to the new PHPP double circuit poles.

Before connecting to the Vincent Substation, the PHPP 230 kV generator tie-line and the Vincent–Pearblossom 230 kV line, supported by the new PHPP double circuit poles, would cross under two 500 kV lines owned by SCE and two 500 kV lines owned by LADWP. The PHPP generation would be distributed to the SCE grid through the Vincent Substation (COP2008a section 2.1, section 2.5, Figure 2-10, Figure 2-10B, AECOM2009 TSE, Figure 2).

The existing Vincent–Pearblossom 230 kV transmission line transmits power to CDWR Pearblossom water pumping plant from the Vincent Substation. This existing 230 kV line, except for the last half-mile before connecting to the Pearblossom Pumping Station, would be reconductored from 1033 MCM ACSR single-conductor to 1590 ACSR bundled conductors, and would be relocated from the existing H-frame supporting structures to the proposed PHPP double circuit steel poles. The existing H-frame structures would be removed. The Vincent-Pearblossom 230 kV line is the sole source of power for the CDWR's Pearblossom Pumping Station and any outage of the line must be carefully coordinated with CDWR. Staff proposes the addition of Condition of Certification 5.e.v that requires the submittal of a letter from the CDWR indicating that the outages have been coordinated with CDWR and are acceptable.

The proposed generator tie-line route has not been approved by SCE. A detailed ROW Study, required by SCE to evaluate the feasibility of using the existing Vincent-Pearblossom corridor, is needed. The ROW Study will evaluate the ground and line clearances for the proposed 230 kV double circuit line which would cross under existing 500 kV lines owned by SCE and the LADWP (SCE2009a, CEC2009v).

As stated in the SCE letter to the Palmdale city mayor, dated November 19, 2009, SCE was able to determine the PHPP "proposed transmission line route is technically feasible, given sufficient resource, time, and money, and, barring any insurmountable legal or regulatory challenges. SCE has not found any fatal flaws to date." The SCE letter further stated that, "SCE is conducting an ongoing dialog with CDWR". "SCE is certain that CDWR concurs with the feasibility of the proposed approach given adequately protective permit conditions" (SCE 2009b). Thus, the details of the impacts of segment on the CDWR and LADWP facilities will be identified by the ROW study.

The California ISO's Interconnection Facilities Study (FS), dated November 23, 2009, stated that the FS intentionally excluded the scope/cost elements associated with building a 35 mile-long generator tie-line. Also, "the Facilities Study does not address potential feasibility, cost, schedule or scope issues associated with any possible use of the existing SCE right-of-way" (California ISO 2010a).

The ROW study is required to assess the viability of using the existing right-of-way. Condition of Certification TSE-5 requires the submittal of the ROW Study and the executed LGIA at least 30 days prior to the start of construction of transmission facilities.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

For the interconnection of either a proposed generating unit or transmission facility to the grid, the interconnecting utility (SCE in this case) and the control area operator (California ISO) are jointly responsible for ensuring the grid's reliability. These entities together determine the project's impact on the transmission system and any needed mitigation measures to ensure system conformance with utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. A SIS and a FS are used to determine the impacts of the proposed project on the transmission grid. Staff relies on the studies and any review conducted by the California ISO to determine the project's effect on the transmission grid and to identify necessary downstream facilities or indirect project impacts required to bring the transmission system into compliance with applicable reliability standards.

The SIS and FS analyze the grid both with and without the proposed project, 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 through which grid reliability is determined. The studies must analyze the impact of the project for the proposed first year of operation, and are thus based upon a forecast of loads, generation, and transmission. Load forecasts are developed by the interconnecting utility and the California ISO. Generation and transmission forecasts are established by an 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), and short circuit duties.

If the studies show that the interconnection of the project could cause the grid to be out of compliance with reliability standards, then the study will identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards.

When a project connects to the California ISO-controlled grid, both the studies and mitigation alternatives must be reviewed and approved by the California ISO. If the mitigation identified by the California ISO or interconnecting utility includes transmission modifications or additions that require CEQA review as the "whole of the action," the Energy Commission must then analyze the environmental impacts of these modifications or additions.

STATUS OF CALIFORNIA ISO AND SCE STUDIES

SCE has performed the Tehachapi Queue Cluster Window SIS which included the proposed PHPP. The SIS studied a 15.7 mile-long generator tie-line connecting directly to the Vincent substation. The route in the SIS is different from the route proposed in the AFC. SCE requires a ROW Study to determine the feasibility of using the proposed route. The California ISO Facilities Study is also required to determine the necessary system upgrades due to the integration of PHPP (SCE2009a).

SCOPE OF SYSTEM IMPACT STUDY

The SIS was performed by SCE at the request of the project owners, to identify transmission system impacts caused by all the projects in TWRA queue cluster window, including the PHPP, on SCE's transmission system. The SIS included a Power Flow study, Transient Stability study, Post-Transient Voltages Stability study, and Short Circuit study. The SIS modeled projects in the TWRA queue cluster window, totaling 4,229 MW, including the proposed 570 MW PHPP.

The base cases included all transmission upgrade projects, including the ATP and the TRTP, in SCE area, major path flow limits of the Southern California import transmission limit, East-Of-River and West-Of-River limits. Generation included planned generating facilities ahead of the TWRA queue cluster window and all regulatory must-take generation units in SCE area. Power Flow studies were conducted both with and without projects in the TWRA queue cluster and the portions of the TRTP project needed to integrate all the projects in the TWRA queue cluster window, including the proposed PHPP connection to the SCE grid, at the Vincent Substation. The Power Flow modeled 2014 heavy summer conditions and a sensitivity case modeled localized light load conditions. Detailed study assumptions are described in the SIS. The Power Flow study assessed the project's impact on the thermal loading of the transmission lines and equipment. The Transient Stability study and the Post-Transient Voltages Stability study were conducted using the 2014 heavy summer base cases to determine whether all the projects in TWRA queue cluster window, including the PHPP, the ATP, and the TRTP would create instability in the system following certain selected outages. The Short Circuit study was conducted with all the transmission upgrades and generation projects ahead of the TWRA, and generation projects in the TWRA queue cluster window. The Short Circuit study is to determine if its interconnection could overstress the existing substation facilities (COP2008a**,** Appendix F).

<u>Power Flow Study Results and Mitigations</u>

Base Case Study

The initial base case study modeled the transmission system, excluded generation projects in the TWRA queue cluster and the TRTP transmission upgrade project, but

included the ATP transmission upgrade project segment 1 (new 500 kV line between the Antelope and the Pardee Substations), and segment 2 (new 500 kV line between the Antelope and the Vincent Substations). The initial power flow study identified no pre-project transmission line overloads in either the 2014 heavy summer or the 2014 local area light load cases.

With the addition of the generation projects in the TWRA queue cluster, including the PHPP and a portion of the TRTP transmission upgrade project as shown in Figure 2-1 of the SIS, transmission line overloads appear in both study cases under normal conditions. The Antelope-Mesa 230 kV line is loaded to 137% and 152% of its normal rating, and the Vincent-Mesa 230 kV line is loaded to 104% and 107% of its normal rating, for the 2014 heavy summer and 2014 local area light load cases, respectively. Table 2-5 of the SIS listed base case power flow study results (COP2008a Appendix F).

Revised Base Case Study – Normal Conditions

A revised base case was used to model the transmission system with all required transmission upgrades, as shown in Figure 2-6, including the ATP and TRTP in service.

- Power Flow Study identified no normal transmission line overloads that are triggered by the TWRA. The TWRA, including the PHPP, can be integrated to the SCE system.

Revised Base Case Study – Contingency Conditions

The SIS identified transmission line overloads under N-1and N-2 contingency conditions for both the 2014 heavy summer and 2014 local area light load cases. The study results are shown in Table 2-10, Table 2-11, and Table 2-12 of the SIS.

- The N-1 overloads can be mitigated by operating procedures, installing new Special Protection Systems (SPS), wave trap replacements, and by modifying existing SPS.
- The N-2 overloads can be mitigated with modification of the existing SPS, installation of new SPS, and by tripping portions of the TWRA generation.

Since this SIS is a cluster study which analyzed a large scale of transmission system and the necessary system upgrades required for integration of a total of 4,229 MW new generation, including the proposed 570 MW PHPP, no specific downstream impacts due to any specific generation project were identified. The SIS as a whole analyzes impacts to the SCE system and proposed mitigation measures which are required for resolving the problems. Thus, no downstream facilities are required for the reliable interconnect the PHPP (COP2008a Appendix F).

<u>Dynamic Stability Study Results</u>

Dynamic Stability studies (Transient Stability and Post-Transient Voltage Stability Studies) for projects in the TWRA queue cluster window, including the PHPP were conducted using 2014 heavy summer base cases to determine if the projects would create any adverse impact on the stable operation of the transmission grid in the event of selected N-1 and N-2 outages. The results indicate with both of the ATP and TRTP transmission projects in service, the PHPP will not cause adverse impacts on the stable

operation of the transmission system following these selected disturbances, as shown in the SIS for integration of the project (COP2008a Appendix F).

Short Circuit Study Results and Mitigations

Short Circuit studies were conducted to determine the degree to which the addition of all of the projects in the TWRA queue cluster window, including the PHPP, and all necessary transmission upgrades including ATP and TRTP, increases fault duties at SCE's substations, adjacent utility substations, and other 230 kV and 500 kV busses within the study area. The busses at locations where faults were simulated, the maximum three phase and single line-to-ground fault currents at these busses, both with and without the ATP and TRTP transmission upgrade projects, and information on the breaker duties at each location are summarized in Table 2-1 (Three Phase (3PH) Short Circuit Duty Study Results) and Table 2-2 (Single-Line-to-Ground (1PH) Short Circuit Duty Study Results). The three phase short circuit duty study shows that the addition of all the generation projects in the TWRA queue cluster, and the addition of ATP and TRTP transmission upgrade projects would increase short circuit duties by 0.1 kA or more at four 500 kV and thirty nine 230 substation breakers. The single-line-to-ground short circuit duty study shows that three 500 kV and twenty-seven 230 kV substation breakers would increase short circuit duties by 0.1 kA or more. The FS will determine the specific details of breaker replacement (COP2008a Appendix F).

COMPLIANCE WITH LORS

The proposed interconnecting facilities including the PHPP 230 kV switchyard, the single circuit 230 kV overhead generator tie-lines, and termination to the Vincent Substation are adequate in accordance with industry standards and good utility practices, and are acceptable to staff. Staff proposed conditions of certification TSE-1 through TSE-7 would help ensure that construction and operation of the transmission facilities for the proposed PHPP would comply with applicable LORS.

The SIS indicates that the project interconnection would comply with all NERC/WECC planning standards and California ISO reliability criteria.

CONCLUSIONS AND RECOMMENDATIONS

The addition of the PHPP would require expansion and modification of the Vincent Substation. Since the Vincent Substation upgrade is also part of the TRTP, the proposed PHPP cannot be connected to the Vincent Substation until the expansion and modification is in place.

The TWRA Queue Cluster Window SIS concluded that with both of the ATP and TRTP transmission upgrade projects in service, all of the generation projects in the TWRA, totaling 4,229 MW, including the proposed 570 MW PHPP, can be integrated to the SCE system. The addition of the PHPP would not cause any overloads under normal conditions. Overloads under single and double contingency conditions would be mitigated by modifying existing SPS, installing new SPS, by operating procedures, and by reducing generation.

The proposed interconnection for the PHPP includes reconductoring 11.9 miles of the existing SCE Vincent–Pearblossom 230 kV line and relocating this line to the new PHPP double circuit poles. The Vincent-Pearblossom 230 kV line is the only source of power for the CDWR Pearblossom Pumping Station and the proposed interconnection would take this line out of service for an unspecified amount of time and would require close coordination with the CDWR. SCE is in contact with the CDWR to ensure that proposed modification to the transmission line is feasible and the service interruption to the pumping plant is minimal. Staff proposes the addition of Condition of Certification 5.e.v that requires the submittal of a letter from the CDWR indicating that the outages have been coordinated with CDWR and are acceptable.

The ROW study is required to assess the viability of using the existing right-of-way, possible impacts to LADWP, and CDWR facilities.

Condition of Certification TSE-5 requires the submittal of the SCE ROW Study and the executed LGIA at least 30 days prior to the start of construction of transmission facilities.

CONDITIONS OF CERTIFICATION FOR TSE

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

Verification: Prior to the start of construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1**: Major Equipment List below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

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 **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO, for review and approval, the names, qualifications, and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earth work and require changes; if site conditions are unsafe or do not

conform with the predicted conditions used as the basis for design of earth work or foundations.

The electrical engineer shall:

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

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

Verification: Prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

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

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action (2001 California Building Code, Chapter 1, section 108.4, approval required; Chapter 17, section 1701.3, *Duties and Responsibilities of the Special Inspector;* Appendix Chapter 33, section 3317.7, *Notification of Noncompliance*). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and refer to this condition of certification.

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

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

a) receipt or delay of major electrical equipment;

b) testing or energization of major electrical equipment; and

c) the number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: Prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, and outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer verifying compliance with all applicable LORS, and send the CPM a copy of the transmittal letter in the next monthly compliance report.

TSE-5 The project owner shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS, and the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations, as determined by the CBO. Once approved, the project owner shall inform the CPM and CBO of any anticipated changes to the design, and shall submit a detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change to the CPM and CBO for review and approval.

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

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

b) 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.

c) The project conductors shall be sized to accommodate the full output of the project.

d) Termination facilities shall comply with applicable PG&E interconnection standards.

e) 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,

   iii) The final SCE Right-of-Way Study, and

iv) A copy of the Federal Energy Regulatory Commission executed LGIA signed by the California ISO, SCE and the project owner.

v) A letter from the DWR indicating that DWR has been consulted with has coordinated the planned outages associated with the replacement and reconductoring of the Pearblossom-Vincent 230 kV line to have no adverse impact to DWR's operations, and determined the outages to be acceptable.

Verification: Prior to the start of construction or start of modification of transmission facilities, the project owner shall submit to the CBO for approval:

a) Design drawings, specifications, and calculations conforming with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, 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;

b) 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] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC), and related industry standards;

c) 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 e);

d) The Special Protection System (SPS) sequencing and timing if applicable shall be provided concurrently to the CPM.

e) 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,

f) The final SCE Right-of-Way Study, and

g) A copy of the Federal Energy Regulatory Commission executed LGIA signed by the California ISO, SCE and the project owner.

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

h) A signed letter from the CDWR indicating that the planned outages associated with the replacement and reconductoring of the Pearblossom to Vincent 230 kV line are acceptable.

Prior to the start of construction of or modification of transmission facilities, the project owner shall inform the CBO and the CPM of any anticipated changes to the design that are different from the design previously submitted and approved and shall submit a detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change to the CPM and CBO for review and approval.

TSE-6 The project owner shall provide the following Notice to the California Independent System Operator (California ISO) prior to synchronizing the facility with the California Transmission system:

1. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and

2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. The project owner shall contact the California ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

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

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

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

b) 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”.

REFERENCES

AECOM 2009l – AECOM/ S. Head (tn: 52528). Supplemental Responses from July Committee Conference. Dated 7/22/09. Submitted to CEC/Docket Unit on 7/23/09.

California ISO 1998a – California ISO tariff scheduling protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated

California ISO 1998b – California ISO dispatch protocol posted April 1998

California ISO 2002a – California ISO Grid Planning Standards, February 2002

California ISO 2003a - California ISO, FERC Electric Tariff, First Replacement Vol. No. 1, March 11, 2003.

California ISO 2010a – California ISO Interconnection Facilities Study. Dated 11/23/09. Submitted to CEC/Docket Unit on 1/7/10.

CEC 2009v – CEC/ F. Miller (tn: 53631). Response to Committee Order. Dated 10/14/09. Submitted to CEC/Docket Unit on 10/14/09.

COP 2008a – City of Palmdale/ S. Williams (tn: 47383). Application for Certification for the Palmdale Hybrid Power Project. Dated on 07/30/08. Submitted to CEC/ Docket Unit on 08/04/08.

DWR 2009a – Department of Water Resources/ R. Buckingham (tn: 51776). DWR Comments on PHPP Transmission Upgrades. Dated on 6/1/09. Submitted to CEC/ Docket Unit on 6/2/09.

NERC (North American Electric Reliability Council) 2006. Reliability Standards for the Bulk Electric Systems of North America, May 2 2006

SCE 2009a – Sothern California Edison/ M. Alvarez (tn: 52185). SCE Letter in Response to CEC June 10th Requesting Additional Information for Proposed Project. Dated 6/29/09. Submitted to CEC/ Docket Unit on 6/29/09.

SCE 2009b - Southern California Edison/ J. Kelly (tn: 54366). SCE Letter to Mayor Ledford. Dated 11/19/09. Submitted to CEC/ Docket Unit on 12/7/09.

WECC (Western Electricity Coordinating Council) 2002. NERC/WECC Planning Standards, August 2002

DEFINITION OF TERMS

AAC — All aluminum conductor

ACSR — Aluminum conductor steel-reinforced

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

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 — A scheduling protocol that ensures dispatched generation and transmission loading (imports) will not violate criteria

Double Contingency — Also known as emergency or N-2 condition, occurs when a forced outage of two system elements occurs -- usually (but not exclusively) caused by one single event. Examples of an N-2 contingency include loss of two transmission circuits on single tower line or loss of two elements connected by a common circuit breaker due to the failure of that common breaker

Emergency Overload — See Single Contingency condition. This is also called an N-1.

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

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

Megavar — One megavolt ampere reactive

Megavars — Mega-volt-ampere-reactive. One million volt-ampere-reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system

Megavolt Ampere (MVA) — A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, divided by 1,000

Megawatt (MW) — A unit of power equivalent to 1,341 horsepower

N-0 Condition
: See Normal Operation/Normal Overload, below

Normal Operation/ Normal Overload (N-0)
: 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, below

N-2 Condition
: See Double Contingency, above

Outlet
: Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities with 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 motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system

Remedial Action Scheme
: A remedial action scheme is an automatic control provision that, as one example, will trip a selected generating unit when a circuit overloads

SF6
: Sulfur hexafluoride is 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

Special Protection Scheme/System
: Detects a transmission outage (either a single or credible multiple contingency) or an overloaded transmission facility and then trips or runs back generation output to avoid potential overloaded facilities or other criteria violations

Switchyard
: A power plant switchyard is an integral part of a power plant that is used as an outlet for one or more electric generators

Thermal Rating
: See ampacity.

TSE
: Transmission System Engineering

Tap
: A transmission configuration that creates an interconnection through a short single circuit to a small or medium-sized load or generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.

Undercrossing
: A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild
: A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

ALTERNATIVES

Testimony of Hedy Born Koczwara

SUMMARY OF CONCLUSIONS

In the analysis of the Palmdale Hybrid Power Project (PHPP), three alternative project sites and three alternative transmission routes were examined, as well as several alternative energy producing technologies. Appendix A of this Final Staff Assessment (FSA) includes staff's analysis of two modified transmission line routes, one overhead and one partially underground.

The proposed PHPP site has been analyzed by staff and determined to be environmentally superior to the alternative sites and generation technologies. Staff has analyzed the applicant's proposed transmission line and determined that an interconnection agreement for the 35.6-mile transmission line connection from the PHPP site to Vincent 500/230 kV Substation would be required. In addition, a detailed Right-of-Way (ROW) Study, required by SCE to evaluate the feasibility of using the existing Vincent-Pearblossom corridor, is needed prior to use of the corridor by the applicant. The ROW Study has not yet been completed. SCE has stated that the ROW Study would be performed after the Energy Commission has certified the project. However, as stated in the SCE letter to the Palmdale city mayor, dated November 19, 2009, SCE was able to determine that the PHPP "proposed transmission line route is technically feasible, given sufficient resource, time, and money, and, barring any insurmountable legal or regulatory challenges. SCE has not found any fatal flaws to date." As a result, the proposed 230 kV transmission route appears feasible at this time.

For the purposes of a final analysis, this section compares three alternative routes with the applicant's proposed transmission line route. However, definitive information regarding the proposed route location and its feasibility following the ROW Study is needed in order to confirm final comparative conclusions. In order to determine the feasibility of using the applicant's proposed route, Condition of Certification TSE-5 in the **TRANSMISSION SYSTEM ENGINEERING** section of this FSA, requires the applicant to submit a completed ROW study before start of construction.

ALTERNATIVE SITES

Three alternative sites that are similar to the proposed project in location and land characteristics were analyzed. All alternative sites are located within similar or closer proximity to infrastructure connections compared with the proposed PHPP site (i.e., transmission lines, gas lines, and water lines. None of the alternative sites are considered to be superior to the applicant's proposed site. While all three alternative sites are in land use areas zoned industrial, the alternative sites themselves have greater disadvantages than advantages when compared to the proposed project.

Alternative Site 1, located three miles southeast of the proposed site, would not be large enough to include the 250-acre solar array field, and thus the site was eliminated from consideration. Alternative Site 2, located one mile west of the PHPP site, would be less desirable because the land acquisition process would be more complex with multiple privately-owned parcels, and the site is bisected by a major intermittent streambed,

which would require greater landform modifications and could lead to increased erosion and problems for the solar troughs. Alternative Site 3, located to the east of U.S. Air Force Plant 42, would eliminate construction of 14 miles of new 230 kV transmission line, but it would create greater environmental impacts namely to biological resources, visual resources and traffic due to its remote location and lack of existing infrastructure in the area.

ALTERNATIVE TRANSMISSION ROUTES

Three alternative transmission routes included in the Application for Certification (AFC) and recommended by the applicant were considered to reduce the length of the 35.6-mile 230 kV transmission interconnection. Alternative Route 1 is the 10th Street W. Route, which would shorten the length of the currently-proposed transmission interconnection by 20.6 miles. The route would avoid potential impacts associated with airspace for U.S. Air Force Plant 42, but would travel through a busy commercial district, creating a temporary increase in traffic impacts due to construction and visual impacts. In addition, the existing SCE easement would not be wide enough to support a 230 kV line and sufficient land is not available to widen the easement.

Alternative Route 2, the Division Street Route would be located in an undeveloped corridor with existing low-voltage transmission lines as well as a developed area, and would require several crossings of Division Street to avoid a housing subdivision and other homes in the area. However, even with the crossings, the route would potentially create conflicts with existing residences south of East Avenue O where a 60-foot ROW would not be feasible without the take of several residences. The route would be located more than 150 feet from the Palmdale Learning Plaza, which is permitted under the “School Site Selection and Approval Guide” by the School Facilities Planning Division of the California Department of Education.

Alternative Route 3, the Underground Route, would run along Sierra Highway, and would also be considerably shorter than the proposed route. This route would reduce impacts to biological resources because it would be located primarily in a developed area, and would eliminate visual impacts for the 5.5-mile underground segment. Costs for maintenance would be higher and maintenance response times would increase, but maintenance for this underground route would be less frequent than an overhead route exposed to severe weather conditions, such as lightening, wind and freezing, in the high desert around Palmdale. Assuming the route described in the AFC would not be substantially altered, the Underground Along Sierra Highway alternative is considered to be feasible compared to the applicant’s proposed route in the AFC and it would reduce some environmental impacts as well (see **ALTERNATIVES TABLE 1**).

Summary of Alternatives Appendix A Transmission Routes

Appendix A of this FSA analyzes a revised overhead Alternative Route 2 (called Alternative Transmission Route 5 - Division Street Route), which would modify the original alternative transmission line route such that it would be further from the Palmdale Learning Plaza and reduce impacts to sensitive receptors, avoiding the existing subdivision. Appendix A also evaluates a Partial Underground Transmission Line Alternative, which is a modification to Alternative Route 3 (called Alternative Transmission Route 4 – Underground/Overhead Along Sierra Highway). This route is

revised to follow the water pipeline and gas line consolidating impacts along one roadway. Detailed descriptions and conclusions regarding environmental preference of these routes are included in the appendix and summarized below.

Alternative Route 4, the Partial Underground/Overhead Transmission Route would run along the proposed gas pipeline and proposed water line and would be considerably shorter than the proposed route. This route would reduce direct and indirect impacts to biological resources because it would be located primarily in a developed area, and it would eliminate visual impacts and air safety concerns at U.S. Air Force Plant 42 for the 6.75-mile underground segment. Although no significant impacts to cultural resources are anticipated, it would run alongside a greater number of historic-period archaeological and built-environment resources than the proposed route potentially increasing the risk of unanticipated impacts to cultural resources. It would reduce impacts to air quality, hazardous materials, agriculture, public health, soils and water, transmission line safety and nuisance, waste management, and worker safety. However, costs for maintenance would be higher, and maintenance response times would increase. On the other hand, maintenance for this underground route would be less frequent than an overhead route exposed to severe weather conditions, such as lightning, wind and freezing, common in the high desert around Palmdale. Impacts to traffic congestion from the undergrounding of transmission lines would be temporary in nature and Alternative 4 would have the fewest number of roadway crossings.

Assuming the route described in the AFC would not be substantially altered, Alternative Route 4 - Partial Underground Transmission Line alternative is considered to be feasible compared to the applicant's proposed route in the AFC. Although there would be no significant impacts with the proposed route, Alternative Route 4 would require less mitigation and would be overall environmentally superior to the proposed route and all other alternative routes (see **ALTERNATIVES TABLE 1**). It would be slightly preferred to Alternative Route 3, because it would consolidate impacts of the transmission, water and gas lines along one roadway.

Alternative Route 5, the Overhead Division Street Route, would be located in an undeveloped corridor with existing low-voltage transmission lines and underground utilities, as well as a developed area, and would jog around Division Street to avoid a housing subdivision south of East Avenue O. The route would be located more than 150 feet from the Palmdale Learning Plaza, which is permitted under the "School Site Selection and Approval Guide" by the School Facilities Planning Division of the California Department of Education. It would also create LORS consistency issues, because this alternative would not comply with the city's Public Facilities designation within the Trade and Commerce Center Specific Plan, the city's Community Design Element which require utilities to be underground, and Open Space designation within the county's Antelope Valley Areawide General Plan. The route would be considerably shorter than the proposed route, but would be located in a more developed area and would create significant visual impacts on Division Street. In the Socioeconomics section of Appendix A, staff presents census information that shows that there are minority populations within one mile and six miles of the project.

Given that significant visual impacts occur along a section of Alternative Route 5, staff concludes that there would be a significant impact from construction or operation of this alternative transmission line on minority populations.

By constructing in disturbed environments this alternative reduces both direct and indirect impacts to all biological resources. Although no significant impacts to cultural resources are anticipated, it would run alongside a greater number of historic-period archaeological and built-environment cultural resources than the proposed route potentially increasing the risk of unanticipated impacts to cultural resources. Alternative Route 5 would require fewer roadway crossings than the proposed route (18 versus 20), but eight of them would be major arterials and there would be a greater presence of commercial and residential uses along Division Street than with the proposed route located in a more rural area. Alternative Route 5 would reduce impacts to air quality, hazardous materials, agriculture, public health, soils and water, transmission line safety and nuisance, waste management, and worker safety. In addition, this alternative route would be preferred for transmission system engineering, because the line would be much shorter and would follow a more direct route to Vincent Substation.

Assuming the route described in the AFC would not be substantially altered, Alternative Route 5 is considered to be feasible compared to the applicant's proposed route in the AFC and it would reduce some environmental impacts, namely to biological resources. However, Alternative Route 5 would create a new significant operational visual impact along Division Street, would create land use LORS inconsistencies, and would impact minority populations.

Comparison of Alternative Transmission Routes

ALTERNATIVES TABLE 1 provides a comparison of the feasible alternative routes considered for the PHPP. The alternatives analysis concluded that Alternative Route 1: 10th Street W. Route and Alternative Route 2: Division Street Route are infeasible. As such, they are not included in the comparison of transmission route alternatives in **ALTERNATIVES TABLE 1**.

ALTERNATIVES TABLE 1
Comparison of Transmission Route Alternatives

Issue Area	Applicant's Alternative Route 3: Underground Along Sierra Highway	Staff's Alternative Route 4: Partial Underground Transmission Line	Staff's Alternative Route 5: Overhead Division Street Route
ENVIRONMENTAL ASSESSMENT			
Air Quality	Reduced impacts to proposed route	Reduced impacts to proposed route	Reduced impacts to proposed route
Biological Resources	Reduced impacts to proposed route	Reduced impacts to proposed route	Reduced impacts to proposed route

Issue Area	Applicant's Alternative Route 3: Underground Along Sierra Highway	Staff's Alternative Route 4: Partial Underground Transmission Line	Staff's Alternative Route 5: Overhead Division Street Route
Cultural Resources	Similar to proposed route, would not result in significant impacts. Would be adjacent to more historic-period archaeological and built-environment resources. Proposed route would be adjacent to more prehistoric archaeological resources.[1]	Similar to proposed route, would not result in significant impacts. Would be adjacent to more historic-period archaeological and built-environment resources. Proposed route would be adjacent to more prehistoric archaeological resources	Similar to proposed route, would not result in significant impacts. Would be adjacent to more historic-period archaeological and built-environment resources. Proposed route would be adjacent to more prehistoric archaeological resources
Hazardous Materials	Slightly reduced impacts to proposed route	Reduced impacts to proposed route	Slightly reduced impacts to proposed route
Land Use and Agriculture	Similar for land use and LORS; reduced impacts for agriculture	Similar for land use and LORS; reduced impacts for agriculture	Greater impacts for LORS; similar for land use; reduced impacts for agriculture
Noise and Vibration	Similar to proposed route	Similar to proposed route	Similar to proposed route
Public Health	Slightly reduced impacts to proposed route	Reduced impacts to proposed route	Slightly reduced impacts to proposed route
Socioeconomics	Similar to proposed route for socioeconomic impacts, reduces employment and income benefits of proposed route	Similar to proposed route for socioeconomic impacts, reduces employment and income benefits of proposed route	Similar to proposed route for socioeconomic impacts, reduces employment and income benefits of proposed route; creates significant visual impacts on minority populations
Soil and Water Resources	Slightly reduced impacts to proposed route	Slightly reduced impacts to proposed route	Reduced impacts to proposed route
Traffic and Transportation	Fewer roadway crossings, but impacts from trenching and maintenance in roadways	Fewer roadway crossings, but impacts from trenching and maintenance in roadways	Shorter and fewer roadway crossings, but slightly greater to proposed route, because major arterial crossings and located in more developed area
Transmission Line Safety and Nuisance	Reduced to proposed route	Reduced to proposed route	Slightly reduced impacts to proposed route
Visual Resources	Similar to proposed route; eliminates impacts with underground segment but overhead route would be closer to residences	Similar to proposed route; eliminates impacts with underground segment but overhead route would be closer to residences	Increased to proposed route; significant visual impact for residences on Division Street north of East Ave R, including minority populations
Waste Management	Slightly greater impacts than proposed route	Slightly greater impacts than proposed route	Reduced impacts to proposed route

[1] Underground portion of applicant's Alternative Route 3: Underground Along Sierra Highway was not surveyed along Sierra Highway between Lockheed Way and East Avenue R where the Alternative Route 3 would overlap with the Staff's Alternative Route 5: Overhead Division Street Route. As such, additional cultural resources may be present between these two points.

Issue Area	Applicant's Alternative Route 3: Underground Along Sierra Highway	Staff's Alternative Route 4: Partial Underground Transmission Line	Staff's Alternative Route 5: Overhead Division Street Route
Worker Safety	Slightly reduced impacts to proposed route	Reduced impacts to proposed route	Slightly reduced impacts to proposed route
ENGINEERING ASSESSMENT			
Geology, Mineral Resources, and Paleontology	Similar as proposed route for geologic hazards and geologic resources,	Similar as proposed route for geologic hazards and geologic resources,	Similar to proposed route for geologic hazards and geologic resources,
Transmission System Engineering	Reduced impacts to proposed route	Reduced impacts to proposed route	Reduced impacts to proposed route

GENERATION TECHNOLOGY ALTERNATIVES

Eight renewable and non-renewable alternative technologies were examined as possible alternatives to the project. Geothermal and hydroelectric alternatives were determined not to be viable options, as there are no adequate geothermal or hydrological resources located near the City of Palmdale. Fuel cells are not yet a commercially viable technology and California law currently prohibits the construction of any new nuclear power plants in California. Wind power is not considered a feasible alternative as the area around City of Palmdale is not identified as a productive area for development of commercial wind power, and wind turbines may interfere with operations at U.S. Air Force Plant 42. Feedstock for biomass power would likely have to be transported over long distances from agricultural residues in California's Central Valley, and lacking sufficient feedstock in the greater Palmdale area, biomass is not a practical alternative.

Staff considered the use of solar PV on existing rooftops to replace the solar thermal component and to reduce land disturbance, however, if the solar component is not located at the proposed PHPP, then it would not be able to offset the natural gas-fired component to increase project efficiency and reduce the need for duct burning, which is an important element of the project. While an all-solar energy project would utilize an available renewable natural resource within a region of California where its potential for power production is among the highest in the state, an all-solar energy project would not fully meet the project objectives to provide a reliable source of power generation that would supply electrical energy night and day.

On the other hand, a natural gas-only plant (without the solar thermal component of the project) would provide reliable power and would reduce land disturbance as well, but its air emissions would be greater and it would not meet project objectives nor contribute towards the development of renewable energy for the state and region as a whole. Since an objective of the project is to provide 570 MW of electricity with minimal impacts to the environment and provide the public with an efficient, reliable source of electrical power, staff concludes the alternative technologies examined are not feasible and/or do not meet project objectives.

NO PROJECT ALTERNATIVE AND COMPARISON OF ALTERNATIVES

Staff also believes that the "No Project Alternative" is not superior to the proposed

project. The No Project scenario would likely delay development of reliable electrical resources required for the region and could impact electrical supply reliability throughout California. Therefore, at this time staff does not recommend alternative generation technologies or alternative sites over the technology and site proposed by the City of Palmdale.

Alternative Routes 1 and 2 would not be feasible to construct. Alternative Route 3: Underground Along Sierra Highway would be feasible and would increase some impacts, but would lessen other impacts in comparison to the proposed route in the AFC. Alternative Route 5 (described in **ALTERNATIVES APPENDIX A**) would be shorter and would reduce some environmental impacts of the proposed route. However, it would create a new significant operational visual impact along Division Street, would be inconsistent with land use LORS, and it would impact minority populations. Alternative Route 4 (described in **ALTERNATIVES APPENDIX A**) would be slightly preferred to Alternative Route 3, because it would consolidate impacts of the transmission, water and gas lines along one roadway. Although there would be no significant impacts with the proposed route, Alternative Route 4 would require the least mitigation and would be overall environmentally superior to the proposed route and all other alternative routes. A final conclusion regarding the alternative transmission line routes will be made following completion of a ROW Study by the applicant.

INTRODUCTION

The purpose of staff's alternatives analyses is to describe a range of reasonable project alternatives that could feasibly attain the objectives of the proposed PHPP, and avoid or substantially lessen one or more of the significant effects of the project. This will comply with state environmental laws by providing an analysis of a reasonable range of feasible alternative which could substantially reduce or avoid any potentially significant adverse impacts of the proposed project (Cal. Code Regs., tit. 14, § 15126.6; Cal. Code Regs., tit. 20, § 1765). If the Energy Commission determines that the proposed project will result in significant adverse impacts that cannot be mitigated, it cannot license the project unless it finds that alternatives are infeasible and that the benefits of the project outweigh the impacts. However, the Energy Commission does not have the authority to require alternative configurations, require alternative technology designs, or to require the applicant to move the proposed project to another location. If the applicant moves its proposed project to one of the alternative sites, Energy Commission staff will analyze any new proposed site at the same level of detail as the original proposed site.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

ENERGY COMMISSION SITING REGULATIONS

Energy Commission siting regulations require the examination of the "feasibility of available site and facility alternatives to the applicant's proposal which substantially lessen the significant adverse impacts of the proposal on the environment" (Title 20, California Code of Regulations, §1765).

CEQA *Guidelines* Section 15126.6(a) (Title 14, California Code of Regulation) requires

an evaluation of “a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project.” In addition, the analysis must address the “no project” alternative (Title 14, California Code of Regulation, §15126.6(e)).

The range of alternatives is governed by the “rule of reason,” which requires consideration only of those alternatives necessary to permit informed decision-making and public participation. CEQA *Guidelines* state that an environmental document does not have to consider an alternative of which the effect cannot be reasonably ascertained and of which the implementation is remote and speculative (Title 14, California Code of Regulation, §15126.6(f)(3)).

SCOPE AND METHODOLOGY OF THE ALTERNATIVES ANALYSIS

In order to provide a reasonable range of feasible alternatives that could substantially reduce or avoid any potentially significant adverse impacts of the proposed project, staff must first determine the appropriate scope of analysis. It is necessary to identify and determine the potentially significant impacts of the proposed project and then focus on alternatives that are capable of reducing or avoiding significant impacts.

To prepare this alternative analysis, the staff used the following methodology:

- Describe the basic objectives of the project;
- Identify the potential significant environmental impacts of the project;
- Identify and evaluate alternative sites for the project to determine whether these sites could reduce or eliminate project impacts;
- Identify and evaluate alternative routes for the transmission line to determine whether these routes could reduce or eliminate project impacts;
- Identify and evaluate technology alternatives to the project that could mitigate project impacts; and
- Evaluate the “No Project” alternative to determine whether this alternative would be superior to the project as proposed.

Alternatives to the proposed project include three general types: (1) other sites where the proposed project (a hybrid of natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment) could be utilized, (2) alternative routes along which the transmission line could be cited, and (3) different power generation technologies. These alternatives are discussed and evaluated below.

PROJECT OBJECTIVES

After studying the applicant’s AFC, Energy Commission staff has determined City of Palmdale’s project objectives to be:

- Provide an efficient, reliable, and environmentally sound power generating facility to meet future electrical power needs of the rapidly growing City of Palmdale and

surrounding area, as well as provide additional generating capacity for the region and California;

- Locate the facility within the boundaries of the City of Palmdale and under City ownership and control. The City can, thereby, increase its level of assurance that residential, commercial, and industrial power needs in the City can be met, while at the same time supplying power to the regional grid;
- Use solar technology to generate a portion of the facility's power output and thereby support the State of California's goal of increasing the percentage of renewable energy in the state's electricity mix;
- Integrate the solar component of the project and its combined-cycle component in a way that maximizes the synergies between the two technologies to increase project efficiency; and
- Site the facility in a location zoned and planned for industrial use in an industrial area and with ready access both to adequate supplies of non-potable water to meet the facility's process water needs and to a natural gas pipeline that can supply the Project without requiring significant modifications to the regional gas supply system. (Palmdale 2008a)

SUMMARY DESCRIPTION OF PROPOSED PROJECT

The proposed PHPP would have a nominal electrical output of 570 megawatts (MW), with construction planned to take approximately 27 months and commercial operation planned by summer of 2013. Primary equipment for the generating facility would include two natural gas-fired combustion turbine-generators (CTGs) rated at 172 MW each, two heat recovery steam generators (HRSGs), one steam turbine-generator (STG) rated at 292 MW, and 250 acres of parabolic solar-thermal collectors with associated heat transfer equipment. The solar-thermal collectors would contribute up to 10% of the peak power generated by the facility.

The PHPP plant site is located south of East Avenue M1 (E. Avenue M) in the northernmost areas of the City of Palmdale. The 377-acre plant site is part of an approximately 600-acre City-owned property that is bounded by Sierra Highway to the west, E. Avenue M to the north, and U.S. Air Force Plant 42 on the south and east. The main access to the site during construction and operation would be via a new street and signalized intersection at 10th Street, which would be developed by the City.

The current condition of the site is vacant and undisturbed and it is surrounded by vacant, undisturbed land. The site is largely flat, with elevations ranging from approximately 2,493 to 2,535 feet above mean sea level. Existing site topography shows an average slope of 1% toward the north to northeast.

Including the land required for the solar collectors, the footprint of the power plant would require grading of approximately 327 acres to achieve a project footprint for the power block and solar field, and construction laydown would require the use of one separate temporary area of 50 acres, adjacent to the site to the west. The power plant site would require 250 acres for the solar field, 26 acres for the power block, and 51 acres combined for the access road, setbacks and drainage facilities.

The PHPP transmission line would be approximately 35.6 miles long and would consist of two segments. Segment 1 would begin on the PHPP onsite switchyard and extend approximately 23.7 miles through new and existing right-of-ways (ROWs) to Southern California Edison's (SCE) existing Pearblossom Substation and would involve stringing conductors on new steel poles. Average pole spacing would be approximately 750 feet; pole heights would range from 100 feet to 135 feet. Segment 2 would be approximately 11.9 miles long and the conductors would be strung on new steel poles in the existing SCE ROW between Pearblossom and the Vincent Substation. The route would travel through and near a mixture of disturbed and undisturbed areas, which includes desert areas, agricultural properties, industrial and residential areas (Palmdale 2008a).

Reclaimed water for the proposed project's cooling tower makeup and other industrial uses would be supplied from the City of Palmdale Water Reclamation Plant located south of the plant site through a new 7.4-mile 14-inch pipeline. Southern California (SoCal) Gas would construct an 8.7-mile, 20-inch fuel gas supply line to serve the project as well. The pipeline would originate at the SoCal Gas facility on E. Ave S and would terminate at the PHPP plant site.

The plant site and most linear facilities routes would be entirely within the City of Palmdale. However, a portion of the Segment 1 transmission line and all of Segment 2 would be in unincorporated Los Angeles County. Similarly, a small portion of the reclaimed water supply pipeline in the immediate area of the PWRP would be in unincorporated Los Angeles County with the remainder within the City of Palmdale. The gas pipeline would be entirely within the City of Palmdale in existing street ROWs. The transmission line and various pipeline easements would be either along City-controlled parcels, land owned by the applicable utility (e.g., SoCal Gas and SCE), or would be on land that the City intends to purchase. The City has the power to condemn any necessary easements within the City of Palmdale if purchase cannot be arranged.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS

Staff's assessments of environmental impacts associated with the proposed PHPP are presented in detail in the individual sections of this FSA. The issues of most concern for the Palmdale project are summarized below and discussed in detail in the appropriate technical sections in the FSA.

- **Air Quality:** The proposed PHPP currently does not meet LORS. The project is located in the Antelope Valley Air Quality Management District and because of availability of ozone precursor Emissions Reduction Credits (ERCS), the applicant will rely on ERCs from the San Joaquin Valley Air Pollution Control District. To date, the applicant has not demonstrated to staff a complete set of offset credits which mitigate the impacts of the PHPP to less-than-significant. A thorough discussion of air quality impacts and mitigation measures is presented in the **AIR QUALITY** section of the FSA.
- **Land Use:** The PHPP transmission line would be approximately 35.6 miles long and would consist of two segments. The need for ROW acquisition for a new, lengthy transmission line proposal could be complex and factor into the overall project schedule considering numerous small parcels are involved in the Palmdale region.

In addition, construction of the proposed transmission line would disrupt existing agricultural activities.

Staff concluded that approval of the portion of the proposed transmission line within the City of Palmdale (approximately 18.2 miles) and the natural gas pipeline would be contingent upon a Condition of Certification that includes a Site Plan Review. Approximately 17.4 miles of the proposed transmission line ROW would be within unincorporated areas of Los Angeles County and the proposed transmission line would not be inconsistent with the county's applicable LORS. A thorough discussion of land use impacts and mitigation measures is presented in the **LAND USE** section.

- **Traffic and Transportation (Aviation Safety):** The PHPP would be located adjacent to U.S. Air Force Plant 42, which includes the operation of a passenger terminal on the Plant 42 site known as the Palmdale Regional Airport. The proximity of the project to these facilities could cause aviation safety impacts related to airport operations. Staff's analysis includes consideration of project effects from thermal and visible plumes, possible glare from the solar collectors, as well as the proximity of the project to the traffic pattern of the airport. A thorough discussion of traffic and transportation impacts and mitigation measures is presented in the **TRAFFIC AND TRANSPORTATION** section. In addition, the **HAZARDOUS MATERIALS MANAGEMENT** section concludes that the risk of a plane crashing into the solar array is less than significant.
- **Transmission System Engineering**: The 35.6-mile transmission line corridor from the PHPP site to Vincent 500/230 kV Substation has not been approved by SCE and a ROW Study has not yet been completed. As a result, the feasibility of the proposed 230 kV transmission route is unknown at this time. A ROW Study to be completed prior to the start of construction of transmission facilities has been requested in the **TRANSMISSION SYSTEM ENGINEERING** section of this Final Staff Assessment.

SCREENING CRITERIA USED TO SELECT ALTERNATIVE SITES

The purpose of this section is to evaluate alternative project sites. The evaluation criteria for each site are the following: (1) Will the alternative fulfill the project objectives and siting criteria? (2) Will it reduce the potential significant impacts identified for the proposed project? (3) Will it cause other significant environmental impacts?

In considering site alternatives, staff defined a geographic area within which alternative sites were evaluated. Since alternatives must consider the underlying objectives of the proposed project, staff confined the geographic area for location alternatives to the area within close proximity to the City of Palmdale which would allow for City ownership and control and increase the City's level of assurance that residential, commercial, and industrial power needs in the City can be met. These site location alternatives are consistent with the applicant's project objectives and siting criteria. Potential impacts that would affect all alternative sites are air emissions and loss of habitat for biological resources. Land use compatibility was also evaluated for each alternative site. In addition, for each alternative site, the advantages and disadvantages of each site are compared to the proposed project site.

Using well-defined criteria, the applicant considered potential alternatives sites. Staff evaluated and considered these criteria, found them sound, and used them as a rationale for alternative site consideration. The criteria identified by the applicant in the AFC Alternatives section are as follows:

- Within the City of Palmdale boundaries in an area with existing and planned industrial development and where the power plant is a compatible land use;
- Within the City of Palmdale in order to maximize benefits to the City as the Project owner in terms of tax base, jobs; local purchases of materials, supplies, services and control of electrical generation;
- Sufficiently large (approximately 350 to 400 acres) and largely flat land, so that the site can accommodate a 250-acre solar array field capable of generating approximately 50 MW along with combined–cycle generating equipment, support facilities, and access road yielding an overall 570 MW generating facility;
- Within an area with a high level of insolation (amount of solar energy potentially available), allowing for a high renewable energy contribution per acre and thus reducing the amount of acreage needed and associated impacts;
- Largely undeveloped to minimize the need to relocate residents or disrupt other current land uses;
- In reasonable proximity to a natural gas supply pipeline with adequate capacity to supply the facility;
- In reasonable proximity to high voltage transmission lines that connect to the southern California grid;
- In reasonable proximity to a source (wastewater treatment plant) with available non-potable water of adequate quantity and quality that can be used to meet power plant cooling and process water needs.
- In reasonable proximity to available reliable backup cooling source in case of outages in the primary cooling water supply system (Palmdale, 2008a).

Note the criteria that would require the PHPP to be located within the City limits of Palmdale could also be satisfied by locating the power project on the City limits and annexing the power plant site into the City of Palmdale.

ALTERNATIVE SITES ANALYZED

Using the criteria listed above, three alternative site locations were identified and analyzed. All three sites would be within the city limits of Palmdale and they are shown on **Alternatives Figure 1**. The following three alternative sites were examined:

- **Alternative Site 1**: located adjacent to the Palmdale Water Reclamation Plant on E. Avenue P.
- **Alternative Site 2**: located on the south side of W. Avenue M, a short distance west of Sierra Highway (Palmdale, 2008a).
- **Alternative Site 3**: located east of the Los Angeles World Airport (LAWA); bordered

on the west by 100th Street, on the north by E. Avenue O, on the east by 110th St, and on the south by E. Avenue P. The proposed transmission line would bisect the site.

ALTERNATIVE SITE 1

Description

Alternative Site 1 is located three miles southeast of the proposed site and south of U.S. Air Force Plant 42. The site would be adjacent to the Palmdale Water Reclamation Plant (PWRP) on E. Avenue P and 30th Street E., as is shown on **Alternatives Figure 1**.

With use of Alternative Site 1 the reclaimed water pipeline to the PWRP would be much shorter than the proposed 7.4-mile pipeline from the PHPP site, and the gas pipeline would be approximately two miles shorter as well. In addition, if the transmission line route follows E. Avenue P to rejoin the proposed route at 100 Street E., then the transmission component would be approximately six miles shorter as well.

Advantages

Alternative Site 1 is flat and undeveloped and largely similar to the proposed site. The site is located within the City of Palmdale and is zoned airport industrial, and as such the land use is compatible with existing industrial development, such as the adjacent PWRP. It is also owned by a public agency.

Alternative Site 1 has the advantages that it would be closer to the SoCal Gas gas line tie-in at the SoCal Gas facility on E. Avenue S, and it would be adjacent to the cooling water supply source. Construction impacts associated with trenching and pipeline installation in roadways, such as Sierra Highway and 10th Street E, would be greatly reduced. The site would also be closer to Vincent Substation, therefore, requiring a six-mile shorter transmission interconnection.

Disadvantages

The available acreage at Alternative Site 1 would be too small to include the 50 MW solar component. The 150 acres available for solar facilities at Alternative Site 1 would yield a maximum of only 30 MW of solar, which would be insufficient to meet the project objective of maximum synergy (the applicant has stated that the proposed 50 MW of solar would be the optimum fit from the standpoint of project design). As such, Alternative Site 1 would not achieve the project objective of a sufficiently large (approximately 350 to 400 acres for a 250-acre solar array field) site that could accommodate a solar array field capable of generating approximately 50 MW of power. Due to failure to meet project objectives given the size of the site and the acreage required for the 50 MW solar component, Alternative Site 1 is not being further considered.

ALTERNATIVE SITE 2

Description

As shown in **Alternatives Figure 1**, this alternative site is located approximately one

mile west of the proposed project site, to the south side of E. Avenue M (Columbia Way) between Division Street and 10th Street W. in the City of Palmdale. The associated water and gas pipelines in Sierra Highway would be slightly shorter; however, the transmission line would be about one mile longer. The site is large enough to accommodate the 50 MW solar field, which requires a minimum of 250 acres.

Advantages

The alternative site is similar to the proposed site; flat and undeveloped, large enough to accommodate the proposed combined-cycle and solar facilities and within reasonable proximity to access natural gas, primary and backup cooling water supply sources and transmission system interconnection locations. The associated water and gas pipelines would be shorter than from the proposed PHPP site. The site is zoned Planned Industrial (M-4), and as such the land use is compatible with existing industrial development.

Disadvantages

The alternative site has the disadvantage of being composed of multiple, privately-owned parcels and the land acquisition process would likely prove problematic. Additionally, the site is bisected by a major intermittent streambed, which regularly fills with water during rainstorms, and could lead to increased erosion and problems for the solar troughs. Landform modifications and grading would be needed, and the associated engineering and environmental issues would potentially be greater at Alternative Site 2 than at the proposed site. For these reasons, and that Alternative Site 2 would not avoid or substantially lessen the environmental effects of the proposed project, this site would be less environmentally preferable.

ALTERNATIVE SITE 3

Description

In order to shorten the proposed transmission route and reduce potential land use impacts caused by the transmission line, staff considered an alternative site east of LAWA near the proposed transmission line corridor (see **Alternatives Figure 1**). A sufficiently-sized site was sought that would be within the City of Palmdale limits, would be located in an area zoned for industrial use, and would consist of relatively few privately-owned parcels.

Alternative Site 3 is located approximately 9.5 miles east-southeast of the proposed site. It is bordered by E. Avenue P to the south, 110th Street E. to the east, E. Avenue O to the north, and roughly 105th Street E. to the west. The proposed transmission line ROW would intersect Alternative Site 3 at 105th Street E. and E. Avenue O, thereby eliminating approximately 14 miles of new 230 kV transmission line. The reclaimed water supply pipeline from Alternative Site 3 to PWRP would be 8.5 miles long and the natural gas pipeline would require 6.5 additional miles of new pipeline to the SoCal Gas facility on E. Avenue S (Palmdale 2009a).

Advantages

Alternative Site 3 is similar to the proposed site, is flat and undeveloped, and is large enough to accommodate the proposed combined-cycle and solar facilities. The site is

zoned Planned Industrial (M-4), and as such the land use would be compatible with industrial development.

The site is closer to the SCE Vincent Substation, which would eliminate approximately 14 miles of a transmission interconnection. A shorter transmission route would affect the length and intensity of short-term construction impacts and ground disturbance, decreasing impacts in air quality, noise, transportation and traffic, hazardous materials related to environmental contamination, and geologic resources related to soil erosion. The potential to disturb unknown cultural resources and impact vegetation and wildlife is also decreased with less ground disturbance. Decreased disturbance and less removal of vegetation could decrease the chance of noxious weed introduction as well as the removal of less native desert vegetation. It would also reduce the length of permanent visual impacts of the overhead transmission line.

Disadvantages

Alternative Site 3 has the disadvantage of being composed of up to eight different parcels, and the land acquisition process could prove problematic. In addition, the visual impacts of the alternative site would be greater, because it would be located in an undeveloped rural area and would not be located nearby to existing industrial development.

According to Supplemental Responses to CEC Data Requests Set 1 (dated February 13, 2009), the site would require construction on previously undisturbed areas to connect with the natural gas, potable water, reclaimed water and sanitary sewer pipelines (Palmdale 2009a). However, it should be noted that in Supplemental Responses to CEC Data Requests Set 1 (dated March 2, 2009), the City of Palmdale states that an additional goal of the City in siting the transmission line east of LAWA would be to support the development in the transmission deficient eastern parts of the city (Palmdale 2009b). In order to support development in the eastern part of the City of Palmdale, connection with natural gas, potable water, reclaimed water, and sanitary sewer pipelines through previously undisturbed land would be necessary.

Alternative Site 3 would require 6.5 additional miles of gas pipeline, resulting in increased costs and potential impacts. Use of Alternative Site 3 would also require construction of new reclaimed water pipeline. On the other hand, the reclaimed water pipeline to the proposed PHPP site would be located along the already-planned Antelope Valley water supply backbone that is going to connect the Lancaster Water Reclamation Plant with the PWRP.

The pipeline required for Alternative Site 3 would cross the Little Rock Wash Significant Ecological Area for approximately one mile. In addition, the site would be located near the Alpine Butte Significant Ecological Area. It would be difficult for the water pipeline to reach any site located east of LAWA without crossing the Little Rock Wash, potentially causing greater impacts to biological resources than would be created at the proposed site. If the pipeline were to stay in existing paved roadways, such as E. Palmdale Boulevard, then the route would become substantially longer. As such, this site is considered less suitable, and would not avoid or substantially lessen the environmental effects of the proposed project without creating additional impacts namely to biological

resources, visual resources and traffic due to its remote location and lack of existing infrastructure in the area. Therefore, assuming feasibility of the proposed transmission line, Alternative Site 3 is found to be less environmentally preferable.

ALTERNATIVE TRANSMISSION LINE ROUTES ANALYZED

The Vincent 500/230 kV Substation was chosen as the interconnection of the PHPP with the regional transmission system. According to Supplemental Responses to CEC Data Requests Set 2 (dated May 1, 2009), the applicant considered an interconnection to the Antelope Substation at the initial stages of project development; however, SCE recommended the interconnection with the Vincent Substation to avoid operating constraints (Palmdale 2009c). SCE identified the Vincent Substation, approximately 11 miles south of PHPP site, as the primary point of interconnection to the California Independent System Operator system, and this substation was the subject of the System Impact Study for the PHPP project.

The most direct route from the PHPP to the Vincent Substation would be to follow Sierra Highway; however, an overhead line along this route would have conflicted with U.S. Air Force Plant 42's operation. As such, the most direct route was not considered for an overhead line. In a comment letter dated May 24, 2010, U.S. Air Force Plant 42 lists the distances of the proposed transmission line route and notes that each of the alternative routes along with the proposed route would be within U.S. Air Force Plant 42's military airport airspace and would require restricted pole heights. The applicant did consider three transmission line routes west of the project before concluding that an eastern route that would avoid the restricted use areas would be most appropriate, and this is the route that was proposed in the PHPP AFC (08-AFC-9).

Although SCE has stated that the proposed route is technically feasible, a ROW Study has not yet been completed for the proposed 35.6-mile transmission line corridor from the PHPP site to Vincent 500/230 kV Substation (SCE 2009b). As a result, the feasibility of the proposed 230 kV transmission route is unknown at this time. For the purposes of a final analysis, this Alternatives section compares the following three alternative routes with the applicant's proposed transmission line route:

- Alternative Route 1: 10th Street W. Route
- Alternative Route 2: Division Street Route
- Alternative Route 3: Underground along Sierra Highway

In addition, Appendix A of this FSA analyzes a revised overhead Alternative Route 2 (Alternative Transmission Route 5 - Overhead Division Street Route), which would modify the original alternative transmission line route such that it would be further from the Palmdale Learning Plaza and reduce impacts to sensitive receptors, avoiding the existing subdivision. Appendix A also evaluates a Partial Underground Transmission Line Alternative, which is a modification to Alternative Route 3 (Alternative Transmission Route 4 - Underground/Overhead Along Sierra Highway). This route is revised to follow the water pipeline and gas line consolidating impacts along one roadway. Detailed descriptions, analyses, and conclusions regarding environmental preference of these routes are included in Appendix A in this section.

If the PHPP is certified by the Energy Commission, the applicant has stated that it would work with SCE as appropriate to obtain any additional permitting approvals that would be required by the California Public Utilities Commission for the siting of a transmission line.

ALTERNATIVE ROUTE 1: 10TH STREET W. ROUTE

Description

The applicant considered a route along 10th Street W. This route would exit the project site west on East Avenue M before heading south on 10th Street W. for four miles to W. Palmdale Boulevard. At W. Palmdale Boulevard, the transmission route would turn southeast and follow W. Palmdale Boulevard for 1.2 miles until Division Street.

At Division Street the alternative route could either turn east along E. Palmdale Boulevard for 0.75 mile until reaching Sierra Highway or turn south along Division Street to E. Avenue R. At E. Avenue R, the line would turn east for 0.75 mile to its intersection with Sierra Highway. At Sierra Highway the line would turn south and follow Sierra Highway for approximately 5.5 miles until shortly before the Vincent Substation where the line would follow the Angeles Forest Highway until reaching the Vincent Substation (see **Alternatives Figure 1**).

Along 10th Street W., near Avenue N, the transmission poles would be approximately 10,100 feet from the end of Plant 42 Runway 07 (Approach End - west end of Runway 07-25) within Plant 42 Accident Potential Zone II (APZ ll). Pursuant to Figure 3-15 of UFC 3-26-01, these poles would be within Plant 42's military airport airspace (USAF 2010d).

Advantages

The 10th Street W. Route would be approximately 15 miles in length. This route would be approximately 20 miles shorter than the proposed route, which will affect the length and intensity of short-term construction impacts and ground disturbance, decreasing impacts in air quality, noise, hazardous materials related to environmental contamination, and geologic resources related to soil erosion. The potential to disturb unknown cultural resources and impact vegetation and wildlife is also decreased with less ground disturbance. Decreased disturbance and less removal of vegetation could decrease the chance of noxious weed introduction as well as the removal of less native desert vegetation. Additionally it would help consolidate existing transmission infrastructure as this street has a SCE subtransmission 66 kV line with 12 kV distribution line underbuild and two multi-circuit phone cables (Palmdale 2009c). However, because the width of the existing easement is 15 feet behind curb face (bcf), incorporating an additional 230 kV transmission line would not be possible without widening the ROW. A 230 kV transmission line would require at least a 60-foot ROW in addition to the existing 15-foot ROW. Portions of 10th Street W. could potentially support a wider ROW, notably the area immediately south of Avenue M. However, 10th Street W. between Antelope Freeway and Avenue P-8 is highly congested with businesses on both the east and west sides of the roadway.

Overhead poles at the most critical locations within Plant 42's military airport airspace along this alternative route would be restricted to a height of 198 feet above the runway surface elevation of 2543 MSL (USAF 2010d). Because the applicant has stated that all poles within Plant 42's military airport airspace would be single pole structures no greater than 120 feet in height, the 10th Street W. Route would meet aviation requirements and avoid conflicts with Air Force Plant 42's flight operations.

Disadvantages

The City of Palmdale was concerned with the duration of construction of the transmission line because 10 Street W. is a busy retail area in Palmdale and a prolonged disruption to City residences and businesses could result in a potential loss of revenue due to construction outages. Because 10th Street W. hosts a variety of shopping and retail centers, traffic impacts of the route would likely be greater than along the proposed route, which follows less travelled streets and undisturbed land. A route along 10th Street W. would also result in a high viewer exposure because transmission line structures would be in the primary cone of vision for both northbound and southbound travelers along the heavily travelled 10th Street W. However, consolidating transmission lines within common utility corridors would diminish additional visual impacts that typically result from separate transmission line corridors.

The applicant stated in Data Response Set 1 (dated March 2, 2009), that siting a 230 kV upgrade along the existing SCE ROW would be difficult because it would have to cross the Antelope Valley freeway (I-14) as well as the local shopping mall parking lot. Staff disagrees with this statement; stringing transmission lines across a freeway is a relatively common occurrence. The existing SCE easement and 66 kV subtransmission line crosses the freeway and runs alongside the mall parking lot and could be used for the 230 kV upgrade.

The ROW along 10th Street W. is owned by the City of Palmdale, the SCE existing easement within this ROW is a standard 15-foot bcf easement (Palmdale 2009c). The existing transmission poles along 10th Street W. hold an SCE 66 kV three-wire circuit, an existing 12 kV four wire circuit, and two multi-circuit phone cables (Palmdale 2009c). While placing the 230 kV transmission line along the existing poles on 10th Street W. would consolidate the existing transmission infrastructure in Palmdale, as the applicant states, the existing SCE easement is only 15 feet bcf wide and SCE has stated that underbuilding low voltage/high voltage on one pole would not be feasible. As such, the 230 kV transmission line would require new poles and a larger ROW. The ROW requirements for a 230 kV vary, but would likely be at least 60 to 80 feet wide. This ROW requirement would not fit in the 15-foot bcf easement SCE currently has for the existing 66 kV and 12 kV circuits along 10th Street W. As such, using the existing easement would not be a viable option. Widening the existing easement would not be possible due to the existing structures both east and west of 10th Street W, as stated above. As such, this alternative route is not considered feasible.

ALTERNATIVE ROUTE 2: DIVISION STREET ROUTE

Description

The applicant considered a western route along Division Street, located between 10th

Street W. and Sierra Highway. As shown in **Alternatives Figure 1**, this route would exit the proposed site west along East Avenue M for less than one mile until reaching Division Street at which point the line would turn south. The line would follow Division Street for 4.5 miles until reaching either E. Palmdale Boulevard or E. Avenue R. This alternative would be the same as Alternative Route 1: 10th Street W. Route from this point to Vincent Substation. At either E. Palmdale Boulevard or E. Avenue R, the line would turn east for 0.75 mile until reaching Sierra Highway. At Sierra Highway the line would turn south and follow Sierra Highway for 5.5 miles until shortly before the Vincent Substation where the line would follow the Angeles Forest Highway to Vincent Substation.

Along Division Street, near Avenue N, the transmission poles would be approximately 4,900 feet from the end of Plant 42 Runway 07 (Approach End - west end of Runway 07-25) within Plant 42 Accident Potential Zone I (APZ l). Pursuant to Figure 3-15 of UFC 3-26-01, these poles would be within Plant 42's military airport airspace. Overhead poles within Plant 42's military airport airspace along this alternative route would be restricted to a height of 94 feet above the runway surface elevation of 2543 MSL at the most critical locations (USAF 2010d).

For the proposed route, the applicant has stated that all poles within Plant 42's military airport airspace would be single pole structures no greater than 120 feet in height. Therefore, use of this alternative route would shorten pole heights within Plant 42’s critical airspace to 94 feet. Use of shorter pole heights would likely shorten span lengths in this area, which in turn may require the construction of additional poles. However, because of the shorter length of this alternative, the number of poles would still be substantially fewer than what would be required for the proposed route.

The route would be located less than 250 feet from the Palmdale Learning Plaza at the corner of Rayburn and Division Street. The California Department of Education has established a 150-foot “setback” limit for locating any part of a school site property line near the edge of the easements for a 220 kV to 230 kV transmission line (CDE 2009). Assuming the transmission line were located on the eastern side of Division Street, the route would adhere to the California Department of Education regulations.

Advantages

The Division Street Route would be approximately 13.5 miles in length, approximately 21.5 miles shorter than the proposed route. The shorter transmission line will affect the length and intensity of short-term construction impacts and ground disturbance, decreasing impacts in air quality, noise, transportation and traffic, hazardous materials related to environmental contamination, and geologic resources related to soil erosion. The potential to disturb unknown cultural resources and impact vegetation and wildlife is also decreased with less ground disturbance. Decreased disturbance and less removal of vegetation could decrease the chance of noxious weed introduction as well as the removal of less native desert vegetation.

Assuming that pole heights would adhere to Plant 42’s height restrictions (94 feet) at the most critical locations, the Division Street Route would meet aviation requirements and would avoid conflicts with Air Force Plant 42’s flight operations.

From East Avenue M to East Avenue O, Division Street is undeveloped. The alternative would follow existing underground utilities and be located adjacent to an existing low voltage transmission line. Locating the transmission line alternative within the disturbed right-of-way would reduce ground disturbance and reduce environmental impacts associated with ground disturbance such as increased soil erosion, loss of habitat, and the potential to impact cultural resources.

Because Division Road is unpaved from East Avenue M to East Avenue O, impacts to traffic would be minimal along this portion of the route. No existing homes or businesses are located along this portion reducing impacts to sensitive receptors.

Disadvantages

The Division Street Route would have greater visual impacts than the proposed route along the developed portions of Division Street (i.e. south of Avenue O). This is because it would not be located adjacent to an existing SCE transmission ROW and because it would require several crossings of Division Street to avoid a housing subdivision and other homes in the area.

Although Division Street is surrounded by undeveloped land north of E. Avenue O, an existing subdivision is located immediately south of E. Avenue O on both the east and west sides of Division Street. Houses are located immediately adjacent to Division Street curb on both sides. The Division Street ROW does not have sufficient easement between the street curb line and the existing residences for a 60 to 80 foot ROW required for a 230 kV transmission line. As such the alternative would require that the applicant purchase additional ROW. Due to the proximity between the residences and Division Street, the purchase of additional ROW could require the displacement of a number of residences. As such, this alternative is not considered feasible.

ALTERNATIVE ROUTE 3: UNDERGROUND ALONG SIERRA HIGHWAY

Description

The applicant discussed the possibility of undergrounding the route along the Sierra Highway in the vicinity of the airport runway, thereby avoiding aviation concerns and reducing the length of the transmission line. The applicant dismissed this option in the AFC because SCE stated it would not accept ownership of underground lines primarily for the reasons of high maintenance cost, seismic concerns, technical challenges, and safety concerns (Palmdale 2008a; Palmdale 2009c). However, the applicant states in Data Request 2 that SCE would not be the owner of the 230 kV interconnection line and that PHPP would retain ownership of the line (Palmdale 2009c). An underground transmission line in Sierra Highway would require approximately 12.75 miles of transmission line, of which approximately 5.5 miles would be undergrounded.

The most direct route between the proposed PHPP site and the Vincent Substation would be to exit the PHPP as an overhead line west along E. Avenue M (Columbia Way) until reaching Sierra Highway. As shown in **Alternatives Figure 1**, the route would then transition underground and travel south within Sierra Highway. The line would remain underground along Sierra Highway for approximately 5.5 miles until just past East Avenue R (approximately Garnet Avenue), at which point the line would

transition from underground to overhead again.

At this point, the line would be approximately 0.86 miles (4,500 feet) from the Palmdale Learning Center mentioned under Alternative Route 2: Division Street Route above. The line would follow Sierra Highway above ground from East Avenue R until Angeles Forest Highway. Because SCE stated that it would not allow the PHPP line to enter from the north, the line would follow Sierra Highway past the Vincent Substation and west along Hillside Drive to enter the substation from the south (Palmdale 2009b). The entire route would be approximately 12.75 miles (22.85 miles shorter than the proposed route).

In order to avoid interference with the aviation requirement for Plant 42, the route would be underground in Sierra Highway from the intersection of E. Avenue M (Columbia Way) and Sierra Highway until Garnet Avenue. The underground segment would transition to overhead north of the San Andreas Fault and so the line would cross the fault as an overhead transmission line.

The applicant stated that the width of the road ROW in Sierra Highway is between 120 and 160 feet (Palmdale 2009c). The existing ROW has a number of existing utilities, which are listed in Alternatives Table 1. Additionally, the proposed PHPP would locate both the 20-inch natural gas supply and 14-inch reclaimed water supply pipelines in Sierra Highway for 2.5 miles, as are shown in Alternatives Table 2.

Alternatives Table 1
Existing Utilities in Sierra Highway ROW

Type of Utility	Owner	Pipeline Diameter
Distribution Lines	SCE	12 kV (overhead)
Water Main	LADWP	12-inch
Sewer Line	LADWP	10-inch
Gas Line	SCG&E	10-inch
C.A.T.V.	Time Warner Communication	3-inch cable bundle
Telephone line	Verizon	3-inch cable bundle
Railroad	Union Pacific	50-foot ROW

Source: Palmdale 2009c.

Alternatives Table 2
Planned PHPP Utilities in Sierra Highway ROW

Type of Utility	Location	Pipeline Diameter
Fuel Gas Supply	On Sierra Avenue from East Avenue M to Lockheed Way before turning east on Blackbird Lane (approximately 2.5 miles)	20-inch
Reclaimed Water Supply	On Sierra Avenue from East Avenue M to Lockheed Way before turning east on Blackbird Land (approximately 2.5 miles)	14-inch

Source: Palmdale 2009c.

While a number of existing and planned utilities are located in the Sierra Highway, there is still available space that could be used to underground a 230 kV line. The trench for an underground 230 kV transmission line would be approximately seven feet wide and six feet deep. As the trench for the underground transmission line is completed, installation of the cable conduit, reinforcement bar, ground wire, and concrete conduit encasement, which collectively comprise the duct bank, would begin. The duct bank for the 230 kV underground transmission lines would typically measure approximately 3.5 feet by 3.5 feet. Ducts for communication cables, which are required for system protection and communication purposes, would be installed in the same duct bank as the transmission cables. Where the electrical transmission duct bank would cross or run parallel to other substructures that operate at normal soil temperature (gas lines, telephone lines, water mains, storm drains, sewer lines), a minimal radial clearance of 12 inches (for crossing) and 24 inches (for paralleling) would be required. Ideal clearances would be 2 to 5 feet. Clearances and depths would meet requirements set forth with Rule 33.4 of CPUC General Order 128.

Advantages

Along Sierra Highway, near Avenue N, the route would be approximately 3,600 feet from the end of Plant 42 Runway 07 (Approach End - west end of Runway 07-25) within Plant 42 Accident Potential Zone I (APZ I). Pursuant to Figure 3-15 of UFC 3-26-01, these poles would be within U.S. Air Force Plant 42's military airport airspace. Overhead poles within Plant 42's military airport airspace along this alternative route would be restricted to a height of 68 feet above the runway surface elevation of 2543 MSL at the most critical locations (USAF 2010d). However, because the route would be underground in this area, Alternative Route 3: Underground along Sierra Highway Route would meet aviation requirements and would avoid conflicts with U.S. Air Force Plant 42’s flight operations.

The route would be approximately 12.75 miles in length, approximately 22.85 miles shorter than the proposed route. Approximately 5.5 miles of underground 230 kV line would be required for the route. Once the installation is complete, the operational visual impacts of the underground segment through the City would be eliminated and the shorter line length would reduce impacts of the proposed 35.6-mile overhead line.

The Underground along Sierra Highway would be located in public ROW which is

already proposed to be disturbed for the fuel gas supply and reclaimed water supply pipelines for approximately 2.5 miles, thereby lessening the additional undergrounding trench requirements by disturbing the same roadway. While the alternative would be approximately 22.85 miles shorter than the proposed route in the AFC, it would require 5.5 miles of continuous trenching within a roadway. Because construction would occur in a paved roadway, which is in good condition, vegetation and wildlife habitat, especially to the Mohave ground squirrel, which is assumed to be present along the proposed transmission corridor, would not be disturbed and the potential to impact known or unknown cultural or archaeological resources is less. Less removal of vegetation along the roadways and from the shorter route could decrease the chance of noxious weed introduction as well as the removal of less native desert vegetation.

Due to public concern and because a partial underground route would substantially reduce some environmental impacts while also offering benefits compared to the proposed route, an expanded detailed analysis of a slightly-modified partial underground route (Alternative Route 4 – Partial Underground Transmission Line) is included in **ALTERNATIVES APPENDIX A**.

Disadvantages

Undergrounding a 230 kV line along Sierra Highway would require continuous trenching for 5.5 miles, which would involve much greater ground disturbance along this portion of the route and construction-related impacts, especially to traffic, air quality and dust, and noise. However, because the overall construction required for this alternative would be substantially shorter than the proposed route, the total ground disturbance along the route would be less than for the proposed route.

There is a greater potential to encounter contaminated soils due to the greater ground disturbance along the underground portion of the alternative; however, the route mostly follows existing public streets and highways, where there is a reduced likelihood for significant contamination. Additionally, because the alternative would require a 5.5-mile trench, it is likely that some of the soil excavated would require disposal in a Class III landfill (or Class I if contaminated). There may also be concrete and asphalt waste from underground vault construction. However, with 118.8 million cubic yards remaining capacity in Los Angeles County, either alternative transmission route would have a less than significant impact on landfill capacity.

While approximately 2.5 miles of the underground trenching along Sierra Highway would be required for the fuel gas and water pipelines, a 230 kV underground trench would require a substantially larger trench along the route than those for the pipelines. Therefore, this alternative would result in increased temporary impacts to local traffic and circulation, because of increased reliance on burial in heavily traveled roadways, especially during trenching for construction.

The route would transition to overhead to cross the San Andreas Fault zone north of Lake Palmdale. A seismic event could result in the rupture of multiple sections of duct bank and a much slower recovery time in the event of an outage. However, the transition point is sufficiently distant to the fault and engineering/construction standards would be such that the underground alternative would not result in a substantial increase in seismic concerns compared with the proposed route.

The applicant states that a primary concern regarding undergrounding the 230 kV transmission line is the additional cost the City of Palmdale would incur; as a public agency the City of Palmdale is charged with ensuring its Project use the most cost effective means of interconnection that does not incur significant impacts (Palmdale 2009c). The applicant states that SCE estimates that an underground 230 kV transmission line would cost approximately $100 million per mile to construct compared with approximately $5 to $10 million per mile for an overhead 230 kV transmission line (Palmdale 2009c). However, Staff was not able to verify this underground cost information from SCE. The PG&E Jefferson-Martin 27-mile 230 kV Transmission Line (24 miles of which were underground) was constructed at a cost of $221 million (PGE 2006). The cost for the 3.12 miles of overhead lines averaged $3.8 million per mile, which included replacing a 60 kV tower line; the underground costs for the five segments averaged between $5.4 million and $6.8 million per mile.

In general, the cost differential between underground versus overhead construction of a given transmission line is so project specific that generic ratios are rarely of much value. The reported cost ratios for overhead versus underground construction range from a low of 2 to 3 times up to a high of 10 times. An example of a project which would be expected to have a lower underground to overhead cost ratio would be one where the ability and/or cost of acquiring overhead ROW is a major expense factor. Projects where the terrain is a significant issue would typically be associated with higher cost ratios. The most common, and apparent, cost differential is the relative expense of constructing continuous underground conduits versus building overhead transmission towers at regular intervals. Over fairly level, easily excavated, and readily accessible terrain, which is the case for both the underground and overhead transmission routes for the PHPP, the typical cost differential is about four to five times for underground versus overhead transmission.

An underground route along Sierra Highway would significantly shorten the proposed transmission route and associated impacts. However, this route may be contrary to the City of Palmdale's purpose. The applicant states that "none of the proposed westerly routes met the City's goal of supporting future development in the transmission deficient eastern parts of the City" (Palmdale 2009b).

The installation of an underground transmission line would require more time than construction of an equivalent length of overhead line because of the time required for excavating trenches, constructing the duct banks, fluid reservoirs, and/or stop joints. However, because the underground route would be over 20 miles shorter than the proposed route, the overall construction time for the underground route would likely be less than the proposed route, as seen for Alternative Route 4 – Partial Underground Transmission Line (see **ALTERNATIVES APPENDIX A**). Maintenance and restoration time in the event of an outage would be more difficult and could result in longer outages and repair times. Accessing manholes or performing duct repair would require traffic control and lane closures. Underground lines are also more susceptible to third party dig-in accidents and outages due to other underground utilities in the same roadway. Although electric fields are reduced with increasing burial depth, magnetic fields above underground conductors are generally higher than from overhead lines due to closer proximity to the conductors to the ground/street.

Based on the discussion above, the underground alternative is considered feasible; however, it would result in increased short-term impacts in a more populated and heavily-traveled area, costs of maintenance would be higher, and maintenance response times would be, on average, longer. Alternative Route 3: Underground Along Sierra Highway Route would increase some impacts but would lessen other impacts in comparison to the proposed route in the AFC.

GENERATION TECHNOLOGY ALTERNATIVES

Staff considered various alternative generation technologies and evaluated which of these would meet the project's objectives. Technologies examined were those which do not burn fossil fuels: wind, biomass, geothermal, fuel cell, and hydropower. Staff also considered construction of a natural gas-fired power plant without the solar component and nuclear power.

WIND GENERATION

Modern wind turbines can represent viable alternatives to large bulk power fossil power plants as well as small-scale distributed systems. Wind turbines currently being manufactured have power ratings ranging from 250 watts to 5 MW, and units larger than 7 MW in capacity are now under development (AWEA 2008). The average capacity of wind turbines installed in the United States in 2007 was 1.65 MW (EERE 2008).

Although air emissions would be significantly reduced or eliminated for wind facilities, they can have significant visual effects and wind turbines also cause bird mortality (especially for raptors) resulting from collision with rotating blades. Additionally, erosion can be a concern in certain habitats such as the desert or mountain ridgelines. Standard engineering practices can be used to reduce erosion potential.

Wind resources would require large land areas in order to generate 570 MW of electricity. Depending on the size of the wind turbines and the wind conditions of the region, wind energy generation requires between 5 and 17 acres per MW of energy created (between 2,850 to 9,690 acres for 570 MW). Comparatively, the proposed project would be contained within approximately 377 acres.

Even if adequate land were available, wind generation technology is not a feasible alternative as the area immediately around Palmdale is not considered a productive resource area for development of commercial wind energy because it has a wind speed of less than 6.7 meters/second (RETI 2008). It should be noted that a region with high wind energy potential is located west of Palmdale (RETI 2008a). Because Plant 42's aviation concerns, siting wind turbines such that they would be within or adjacent to the City of Palmdale and would not interfere with the Plant 42's operation would potentially be a concern. Wind energy would also disturb significantly more acres of habitat for desert tortoise, and would not fully meet the objectives of the project to provide a reliable source of power generation for supplying electrical energy night and day. With these considerations, wind energy generation is neither feasible nor environmentally preferable in this location.

BIOMASS GENERATION

Biomass generation typically uses a feedstock consisting of waste vegetation such as wood chips (the preferred source) or agricultural waste. The feedstock is most commonly burned to generate steam in a boiler, and the steam is harnessed in a steam turbine-generator to produce electricity. Currently, nearly 19% of the state's renewable electricity derives from biomass and waste-to-energy sources (CEC 2007). Most biomass plant capacities are in the 3- to 10-MW range and typically operate as baseload capacity. The average size of a sales generation biomass plant is 21 MW (CBEA 2008). Unlike other renewables, the locational flexibility of biomass facilities would reduce the need for significant transmission and/or pipeline investments.

The emissions due to biomass fuel-fired power plant operation are generally unavoidable. Direct impacts of criteria pollutants could cause or contribute to a violation of the ambient air quality standards. Significant impacts can potentially occur for PM10 and ozone because emissions of particulate matter and precursors and ozone precursors would contribute to existing violations of the PM10 and ozone standards. Biomass/biogas facility emissions could also adversely affect visibility, air quality and vegetation. Toxic air contaminants from routine operation would also cause health risks that could locally adversely affect sensitive receptors. In addition, biomass plants in California are typically sized to generate less than 50 MW, substantially less than the capacity of the proposed 570 MW PHPP. Numerous biomass units would be required to meet the project goal of generating 570 MW. Generally, small amounts of land are required for biomass power facilities; however, a biomass facility should be sited near a relatively large source of biomass in order to minimize the cost of bringing the biomass waste to the facility. While a small biomass facility may be feasible in the Palmdale region using the existing urban wood waste in the region, significant biomass waste would likely have to be transported over long distances from agricultural residues such as in the Central Valley of the state to reach the project goal of 570 MW. Lacking sufficient feedstock in the greater Palmdale area, biomass is not a practical alternative.

GEOTHERMAL

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

Geothermal plants account for approximately 5% of California’s power and range in size from under 1 MW to 110 MW. Geothermal plants typically operate as baseload facilities and require 0.2 to 0.5 acre per MW, so a 570-MW facility would require up to 285 acres. California is the largest geothermal power producer in the United States, with about 1,800 installed capacity; in 2007, 13,000 gigawatt hours of electricity were produced in California (CEC 2008). Geothermal plants provide highly reliable baseload power, with capacity factors from 90 to 98%.

Concerns regarding geothermal power plants include land use, water use, visibility, and hazardous materials, specifically gaseous emission. Geothermal power projects use less land than almost any other energy source; however, geothermal plants must be built where the resource is since the steam cannot be piped long distances without significant

heat loss. This results in a predictable fuel supply but inflexibility in siting. It may also result in a long interconnection requirement to reach a transmission system. Because there are no viable geothermal resources in the Palmdale region and attaining 570 MW of geothermal energy would require importing energy from numerous geothermal units, geothermal energy is not a practical alternative.

HYDROPOWER

Hydropower facilities require large quantities of water diverted from streams and rivers that must be sustained during dry seasons by either the presence of adequate natural flows or by impounding water in a reservoir during wet seasons for use during dry seasons. The energy potential of using water to generate power is also a function of having sufficient topography to allow water to drop in elevation and pressurize before flowing through a turbine. Neither the water resources nor the topographic conditions are present in the project region.

FUEL CELL

Various types of fuel cell technologies, such as those that use hydrogen and oxygen, are available, but have not been proven to work on a commercial scale, such as for 570 MW proposed by the PHPP. Using fuel cells as an alternative power generation technology was therefore ruled out as a project alternative.

SOLAR ENERGY

Power plants using all solar technology, whether solar-thermal or photovoltaic (PV), would require large areas of land for siting equipment. Solar power plants use between 4 acres per MW for the Linear Fresnel Technology to 10 acres per MW. The average land required for a solar power plant is 8 acres per MW. Approximately 2,280 to 5,700 acres of land would be required to create a source of power generation equivalent to the proposed project capacity of 570 MW. If a larger area could be acquired and dedicated for a solar project, one of its most significant benefits would include eliminating air emissions during project operations, although some air emissions would occur during the maintenance of the power plants because of the cleaning of the mirrors.

Additionally, some technologies, such as the solar power tower, include a gas turbine component and therefore do have some air emissions. Among the negative effects would be the greater loss of habitat for desert tortoise and other species of concern. Impacts to soil erosion may occur due to the large amount of grading required and it may be difficult to acquire sufficient land for the plant with appropriate conditions.

Rooftop PV installations by their nature would reduce the amount of new or disturbed land required. In fact, SCE plans to install 250 MW of solar panels on two square miles of commercial rooftop (in 150 installations) in the next five years. In December 2008, SCE dedicated its first rooftop solar installation, 33,700 solar panels on a 600,000 square-foot rooftop in Fontana (SCE 2008). However, if the solar PV rooftop component is not located in the area of the proposed PHPP, then it would not maximize the synergies between the solar and natural gas technologies to increase project efficiency and reduce the need for duct burning. Although California's investor-owned utilities, such as SCE, have announced major small-scale solar projects throughout the state, rooftop solar alone in the vicinity of the PHPP (e.g., Palmdale and Lancaster) would

provide significantly less energy than the proposed PHPP and would not be feasible.

In addition, solar power plants alone do not produce reliable energy generation night and day. Energy production would either have to be supplemented by a storage facility to produce during the evening and night hours or would be available only throughout the daylight hours. Because of the limited energy during night hours, Palmdale would not increase its level of assurance that residential, commercial, and industrial power needs in the City would be met, which is one of the PHPP project objectives.

NATURAL GAS-FIRED COMBINED-CYCLE COMPONENT ONLY

This generation alternative would consist of only the natural gas combined-cycle component of the PHPP project, and it would not include construction of the 250-acre solar thermal array field. Although land disturbance would be reduced, the solar thermal input is proposed to provide approximately 10% of the peak power generated by the PHPP during the daily periods of highest energy demand, and so this additional output would not be available. At full load solar operation, the heat from the solar field is proposed to replace the equivalent of approximately 50 MW of duct firing, thereby improving PHPP's overall heat rate and reducing air emissions.

A stated project objective is to integrate the solar component of the project and its combined-cycle component in a way that maximizes the synergies between the two technologies to increase project efficiency. In addition, the solar steam addition would reduce the need for duct burning to meet peak power demands and would support the State of California's goal of increasing the percentage of renewable energy in the state's electricity mix. Without the solar thermal component of the project, two of the five project objectives would not be met, air emissions would be greater, and PHPP would not contribute towards providing development of renewable energy for the state and region as a whole.

NUCLEAR

California law currently prohibits the construction of any new nuclear power plants in California until the California Energy Commission finds that there exists a demonstrated and federally-approved technology for the permanent disposal of spent fuel from these facilities.

THE "NO PROJECT" ALTERNATIVE

CEQA *Guidelines* and Energy Commission regulations require consideration of the "No Project" alternative. This alternative assumes that the project is not constructed, and the impacts of that scenario are compared to those of the proposed project.

The "No Project" Alternative would not provide an efficient and reliable power generating facility to meet future electrical power needs of the rapidly growing City of Palmdale and surrounding area, as well as provide additional generating capacity contributing towards development of renewable energy for the state and region as a whole.

Also, the “No Project” Alternative would eliminate the expected economic benefits the proposed project would bring to the City of Palmdale, including increased property taxes, employment, sales taxes, and sales of services, manufactured goods, and equipment.

In the absence of the PHPP, however, other power plants, both renewable, nonrenewable, and hybrid would have to be constructed to serve the demand for electricity. It is also likely that existing gas-fired plants could operate longer.

The “No Project” Alternative would eliminate all impacts to the environment that would result from the construction and operation of the plant at the proposed site and the associated linear facilities.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comments were provided in writing on the contents of the PSA from the County of Los Angeles, Department of Parks and Recreation (LCD 2010a), U.S. Air Force, Plant 42 (USAF 2010d), and the City of Palmdale (L&W 2010b; AECOM 2010b; L&W 2010m). Comments related to issues presented in the **ALTERNATIVES** section of the PSA are summarized below and are followed by a response.

AGENCY COMMENTS ON THE PSA

Comment 1: County of Los Angeles (02/25/10). In its comment letter, the County of Los Angeles stated that it “supports the adoption of Alternative Route 3 as the preferred route for construction of the proposed transmission line.” The letter states that it would shorten the route by almost 23 miles, would be constructed entirely within existing ROW, would avoid conflicts with U.S. Air Force Plant 42, and only 3 miles of additional trenching would be required. In addition, Alternative Route 3 would reduce impacts to desert vegetation and wildlife, cultural or archaeological resources, and visual resources.

Response. The commenter’s preference for Alternative Route 3 is noted. As discussed under “Advantages” of Alternative Route 3 (Underground Along Sierra Highway), Staff agrees that the shorter underground route would reduce impacts to biological, cultural and visual resources and would also avoid conflicts to U.S. Air Force Plant 42.

The underground alternative is considered feasible; however, it would result in increased short-term impacts in a more populated and heavily-traveled area, costs of maintenance would be higher, and maintenance response times would be, on average, longer. Alternative Route 3: Underground Along Sierra Highway Route would increase some impacts but would lessen other impacts in comparison to the proposed overhead route and was found to be environmentally preferable. Due to this comment letter and because Alternative Route 3 was found to substantially reduce some environmental impacts of the proposed route, a modified partially underground transmission route (Alternative Route 4 – Partial Underground Transmission Line) has been described in detail and analyzed under each issue area in Appendix A of this FSA. Although the proposed route would not create any significant and unmitigable impacts, based on the analysis in Alternatives Appendix A, Alternative Route 4 would be environmentally superior to the proposed route.

It should also be noted that although a portion of the underground transmission line length would be located in the same roadway as the reclaimed water and natural gas supply lines, the lines would not be placed in the same trench.

Comment 2: U.S. Air Force, Plant 42 (05/24/10). In its comment letter, U.S. Air Force Plant 42 lists the distances of the proposed transmission line route and each of the three alternative routes from the closest airport runway and states that each of the routes would be within Plant 42's military airport airspace. Plant 42's Class B military airport airspace is governed by Air Force Runway Airspace and Imaginary Surfaces standards, found in Figure 3-15 of Unified Facilities Criteria (UFC) 3-26-01, which limit the maximum height of structures within military airport airspace through several different horizontal and sloped imaginary surfaces.

The letter states that proposed route and Alternative Route 1 would be within Plant 42 Accident Potential Zone II (APZ II) and Alternative Routes 2 and 3 would be within Plant 42 Accident Potential Zone I (APZ I).

The City of Palmdale intends to restrict all poles, within Plant 42's military airport airspace, to single pole structures no greater than 120 feet in height, but the letter states that the pole heights would need to be further restricted. The letter also ranks each of the alternative routes with respect to airport safety; the ranking assumes that all lines are above ground.

Response. The commenter's preferences and ranking of the alternative routes with respect to safety within the military airport airspace are noted. The information provided on distances from the runways, Accident Potential Zones, and pole height restrictions has been added to the description of each overhead alternative route.

The commenter states that Alternative Route 2 would be undergrounded along Division Street, however, this alternative would be an overhead line. Therefore, information has been added that states that pole heights would be restricted to 94 feet above the runway surface elevation of 2543 MSL along Division Street, near Avenue N. Alternative Route 3 would be underground within Plant 42's military airport airspace along Sierra Highway, and would thus eliminate potential conflicts to the airport.

APPLICANT COMMENTS ON THE PSA

Comment 1: City of Palmdale (02/08/10). The applicant commented that SCE has determined that Segment 2 is technically feasible, and it has provided adequate information about the scope and design of the transmission line to satisfy CEQA and Staff's environmental review. As such, the ROW Study should no longer be needed to complete the FSA.

Response. Text has been added that references SCE's letter (dated 11/19/09) and says that SCE has stated that the proposed route is technically feasible. This section has also been revised to state that Condition of Certification TSE-5 in the **TRANSMISSION SYSTEM ENGINEERING** section requires the submittal of the SCE ROW Study prior to the start of construction of transmission facilities, not prior to issuance of the FSA.

However, the **TRANSMISSION SYSTEM ENGINEERING** section further says that SCE's ROW Study is required to assess the viability of using the existing right-of-way, as well as possible impacts to Los Angeles Department of Water and Power (LADWP) and California Department of Water Resources (CDWR) facilities.

Therefore, the ultimate feasibility of the proposed 230 kV transmission route is still unknown at this time. This section assumes that the route would be feasible and not be substantially altered. Alternative Routes 1 and 2 were not found to be feasible. However, Alternative Route 3: Underground Along Sierra Highway would be feasible. Although it would increase some impacts, it would lessen other impacts in comparison to the proposed overhead route. In addition, two additional modified alternative transmission routes are also analyzed in Alternatives Appendix A of this FSA.

Comment 2: City of Palmdale (03/20/10). Based on discussions with SCE, the applicant provided the following clarifications related to the proposed transmission line as comments on the **TRANSMISSION SYSTEMS ENGINEERING** section:

- SCE points out that the design for the Segment 2 (the 12-mile segment from Pearblossom to Vincent) transmission line has not been finalized and will not be finalized until the detailed ROW study is performed after the CEC Certificate to Construct is issued; therefore, the design shown in the PSA is subject to modification.
- SCE points out that only Segment 2 will be owned by SCE and it does not anticipate transferring ownership of the segment; furthermore it notes that, since SCE does not anticipate owning Segment 1, any reference to transfer of ownership of Segment 1 to SCE is inappropriate at this time.
- SCE further clarifies that language currently in the PSA is confusing regarding how Segment 2 will be designed and owned; as noted earlier, regardless of final design, SCE will own all of this 12-mile segment; both the circuits that serve CDWR and the circuits that serve PHPP.

These comments also pertain to the **ALTERNATIVES** section

Response. As the above comments relate to the discussion of alternative transmission routes, all reference to transfer of ownership to SCE has been removed.

The description of Alternative Route 3 was based on the applicant's response to Data Request 2, which states that SCE would not be the owner of the 230 kV interconnection line and that PHPP would retain ownership of the line at this time (Palmdale 2009c). Therefore, no text changes have been made to this statement.

Comment 3: City of Palmdale (10/28/10). The applicant provided comments in response to Staff's proposed alternative transmission line analysis. The applicant believes that all legal requirements related to the analysis of project alternatives have been satisfied. The letter declares that transmission alternatives proposed by Staff are not technically or economically feasible and it individually describes these potential constraints.

Response. The applicant states that various alternatives have been exhaustively analyzed in the AFC, in responses to data requests and in the Preliminary Staff Assessment. Therefore, the comments do not result in changes to this section. Appendix A of this FSA includes additional detailed analysis of two modified transmission line routes, one overhead and one partially underground. Appendix A discusses the technical and economic feasibility of the two alternatives and addresses legal, feasibility and cost concerns raised by the applicant.

CONCLUSIONS AND RECOMMENDATION

In the analysis of the PHPP, three alternative project sites were examined, as well as three alternative transmission line routes, and several alternative energy producing technologies. The alternative sites discussed in this section offer some advantages, but no substantial reduction of environmental impacts without creating other environmental impacts or feasibility issues of their own. The alternative sites and generation technologies would not be environmentally superior to the proposed PHPP site.

Although the proposed PHPP site itself has preliminarily been determined to be environmentally superior to the alternative sites, the 35.6-mile transmission line corridor from the PHPP site to Vincent 500/230 kV Substation has not been approved by SCE and a ROW Study has not yet been completed. SCE has stated that the ROW Study would be performed after the Energy Commission has certified the project. However, as stated in the SCE letter to the Palmdale city mayor, dated November 19, 2009, SCE was able to determine that the PHPP “proposed transmission line route is technically feasible, given sufficient resource, time, and money, and, barring any insurmountable legal or regulatory challenges. SCE has not found any fatal flaws to date.” As a result, the proposed 230 kV transmission route appears feasible at this time.

For the purposes of this analysis, the Alternatives section compares three alternative routes with the applicant’s proposed transmission line route and two additional route alternatives which are proposed by staff (see **Alternatives Appendix A).** Staff finds that Alternative Routes 1 and 2 would not be feasible; Alternative Route 1 would be difficult to construct, as widening the existing ROW would not be possible due to existing structures, and Alternative Route 2 traverses through a residential area, where it is not possible to relocate or establish a ROW corridor. Alternative Route 3 would be feasible and because it would be shorter and constructed in already-disturbed areas, it would lessen some impacts of the proposed route and would not create any significant impacts Staff’s Alternative underground/overhead Route 4 would also be feasible and it would not create any significant impacts. In addition, it would consolidate impacts of the transmission, water and gas lines along one roadway. Alternative Route 4 would require the least mitigation, and would cost substantially less than the applicant’s proposed route. Staff’s Alternative overhead Route 5 is feasible, would be shorter and would reduce some environmental impacts of the applicant’s proposed route. However, it would create visual impacts along Division Street, would be inconsistent with land use LORS, and it would impact minority populations. A ROW study would need to be completed before the start of construction for the any of the transmission routes associated with this project.

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ALTERNATIVES APPENDIX A

1.0 INTRODUCTION

On March 8, 2010, staff received a comment letter from Los Angeles County Department of Regional Planning which provided substantive comments regarding a shorter alternative transmission line route and encouraged staff to take a closer look at alternative routes proposed by the applicant (LCD 2010a). Staff also identified new information that altered statements made in the Alternatives PSA section regarding feasibility of alternative transmission line routes (AECOM 2009i).

As a result, staff has expanded its analysis of the project's alternative routes for transmission. Staff investigated the feasibility of a number of alternative transmission routes, including those identified by the applicant. Staff indentified an additional route that would follow W. Avenue M and then proceed south along Highway 14 and another route that would follow the Union Pacific railway corridor south along Sierra Highway. These routes were eliminated from consideration given that it would be difficult and potentially costly to negotiate right-of-ways with CalTrans and the railroad.

Staff considered the applicant's underground route and modified it to follow the proposed underground gas and recycled water line route (Alternative Route 4). Locating gas, water and transmission in one right-of-way (ROW) provides efficiencies of scale and scope. Staff also considered an overhead route similar to one of the routes identified by the applicant; this route would parallel existing transmission corridors (Alternative Route 5). An engineering feasibility assessment was conducted for both lines and is presented in Attachment 1 - Feasibility Review of Alternative Transmission Line Routes. Both routes were determined to be feasible.

The alternative routes being considered by staff are substantially shorter (12.8 miles and 14 miles) as compared to the 35.6-mile length of the applicant's proposed transmission line route. While the applicant's proposed transmission line route has no unmitigable significant impacts, these alternative routes would reduce impacts to air quality, biological resources, hazardous materials, public health, soil and water resources, transmission line safety and nuisance and worker safety. In addition, the alternative routes avoid potential impacts to the California Department of Water Resources (CDWR) Pearblossom Pumping Station associated with transmission upgrades between Southern California Edison's (SCE) Pearblossom and Vincent substations.

The Guidelines for Implementation of the California Environmental Quality Act, Title 14, California Code of Regulations, section 15002(a)(3) provide direction to staff for completing a comprehensive alternatives analysis and state, "The basic purposes of CEQA are to: prevent significant, avoidable damage to the environment by requiring changes in projects through use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible."

"The fact that an alternative may be more expensive or less profitable is not sufficient to show that the alternative is financially infeasible. What is required is evidence that the additional costs or lost profitability are sufficiently severe as to render it impractical to

proceed with the project." (Citizens of Goleta Valley v. Board of Supervisors, 197 Cal.App.3d at p. 1181, 243 Cal.Rptr. 339, italics added.)

In addition, sections 15126.6(a) and(b) provide direction for scoping the alternatives analysis by requiring an evaluation of alternatives based upon the comparative merits of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project"; "…even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly."

The range of alternatives required to be evaluated is governed by the "rule of reason" which requires consideration only of those alternatives necessary to permit a reasoned choice. Potentially feasible alternatives are selected and discussed to foster informed decision making and public participation. The California Environmental Quality Act (CEQA) guidelines state that an environmental document does not have to consider an alternative where the effect cannot be reasonably ascertained and whose implementation is remote and speculative (Cal. Code Regs., tit. 14, §15126.6[f][3]).

The following sections describe Alternative Route 4 and Alternative Route 5 (Section 2.1 and 2.2), address feasibility issues pertaining to the two routes (Section 2.3), identify construction actions (Section 2.4), and describe the environmental impacts of the two alternative routes (Section 3). Authors for each section and environmental issue area are identified in Section 4.

2.0 ALTERNATIVE TRANSMISSION LINE ROUTES

2.1 ALTERNATIVE ROUTE 4: PARTIAL UNDERGROUND TRANSMISSION LINE

Description

The applicant discussed the possibility of undergrounding the transmission line route along the Sierra Highway in the vicinity of the airport runway, thereby avoiding aviation concerns and reducing the length of the transmission line. The applicant dismissed this option in the AFC because Southern California Edison (SCE) stated that it would not accept ownership of underground lines (AECOM 2009aa). However, the applicant states in response to Data Request 2 that SCE would not be the owner of the 230 kV interconnection line and that the Palmdale Hybrid Power Project (PHPP) would retain ownership of the line at this time (AECOM 2009i).

A partial underground transmission line route would follow the PHPP underground fuel gas supply line route for 6.75 miles and then would proceed approximately 6.05 miles as an overhead route, for a total route length of approximately 12.8 miles. The gas line and transmission line would be spaced apart to meet all regulatory requirements.

The most direct route between the proposed PHPP site and the Vincent Substation would be to exit the PHPP as an underground line west along E. Avenue M-12 for approximately 0.75 miles until reaching Sierra Highway. At Sierra Highway the route

would turn south within Sierra Highway. The underground alternative would run parallel to the natural gas and reclaimed water pipelines proposed for the PHPP within Sierra Highway for approximately 1.75 miles until reaching Lockheed Way. It could run on either the east or west side of Sierra Highway. If the pipeline ran along the west side of Sierra Highway, this would require the line boring under Sierra Highway and the railroad right-of-way (ROW) at E. Avenue M-12 to reach the west side. The east side of Sierra Highway has the existing railroad right-of-way, which is approximately 50 feet wide. It would also likely be the location of the proposed natural gas and reclaimed water pipeline although the final engineering for these elements has not yet been provided. The west side of Sierra Highway has an existing LADWP right-of-way (Palmdale 2010).

There appears to be adequate room for an underground line within Sierra Highway (see Right-of-Way discussion below). There is also sufficient room east of the railroad tracks on the east side of Sierra Highway to route the underground 230 kV transmission line, as well as the underground gas line and water line. This would avoid boring under the railroad tracks and building under Sierra Highway (see Attachment 1).

This section of the route would be along Sierra Highway adjacent to U.S. Air Force (USAF) Plant 42. The USAF has stated that a route along Sierra Highway would be considered less desirable if it is not underground: “While there are inherent risks with any above ground structures located within airport flight paths, this alternative route, if not undergrounded, would pose a greater risk than Alternative Route 2” (USAF 2010d). However, since the line adjacent to Plant 42 is underground, the comparison to Alternative Route 2 is not relevant.

At Lockheed Way, the line would turn east for approximately 0.5 miles until reaching 10th Street East, following the natural gas supply pipeline route. At 10th Street East, the line would turn south, still following the natural gas supply pipeline route. The line would head south along 10th Street East for approximately 3.5 miles until reaching East Avenue S. The area along 10th Street East is developed with residential, commercial, industrial, and mixed use developments. At approximately 0.25 miles past East Avenue R-4, the line would cross a railroad line which would likely require boring under the railroad line.

At East Avenue S, the line would separate from the natural gas supply pipeline, turning west for approximately 0.15 miles. It would transition to an overhead line at approximately East Avenue S and Sierra Highway to avoid crossing the San Andreas Rift Zone as an underground line. The underground line would connect to the overhead lines by means of a “riser,” which is fastened to above ground structures. Three spread arms (the “spreaderhead”) carry the underground line aboveground and separate the three conductors so that they meet electric code requirements for the spacing of overhead conductors. A typical riser is shown in **Alternatives Appendix A Figure 1**.

Once overhead, the line would cross to the east side of Sierra Highway to avoid co-locating along existing distribution line right-of-way, and would proceed south along Sierra Highway. The line would continue overhead on the east side of the highway past Una Lake and would follow Sierra Highway above ground for a total of approximately 3.6 miles.

Approximately 300 feet north of the intersection of E. Barrel Springs Road, (there are two E. Barrel Springs Road – this is the northern intersection), the line would cross to the west of Sierra Highway and proceed for approximately 0.45 miles between the railroad right-of-way and Sierra Highway to remain further from residential housing. Just before the community of Alpine, the transmission line would cross Sierra Highway until reaching the intersection of Sierra Highway and Pearblossom Highway.

As noted in Attachment 1, Alternative Route 4 could require burial of 12 kV distribution and communication facilities.

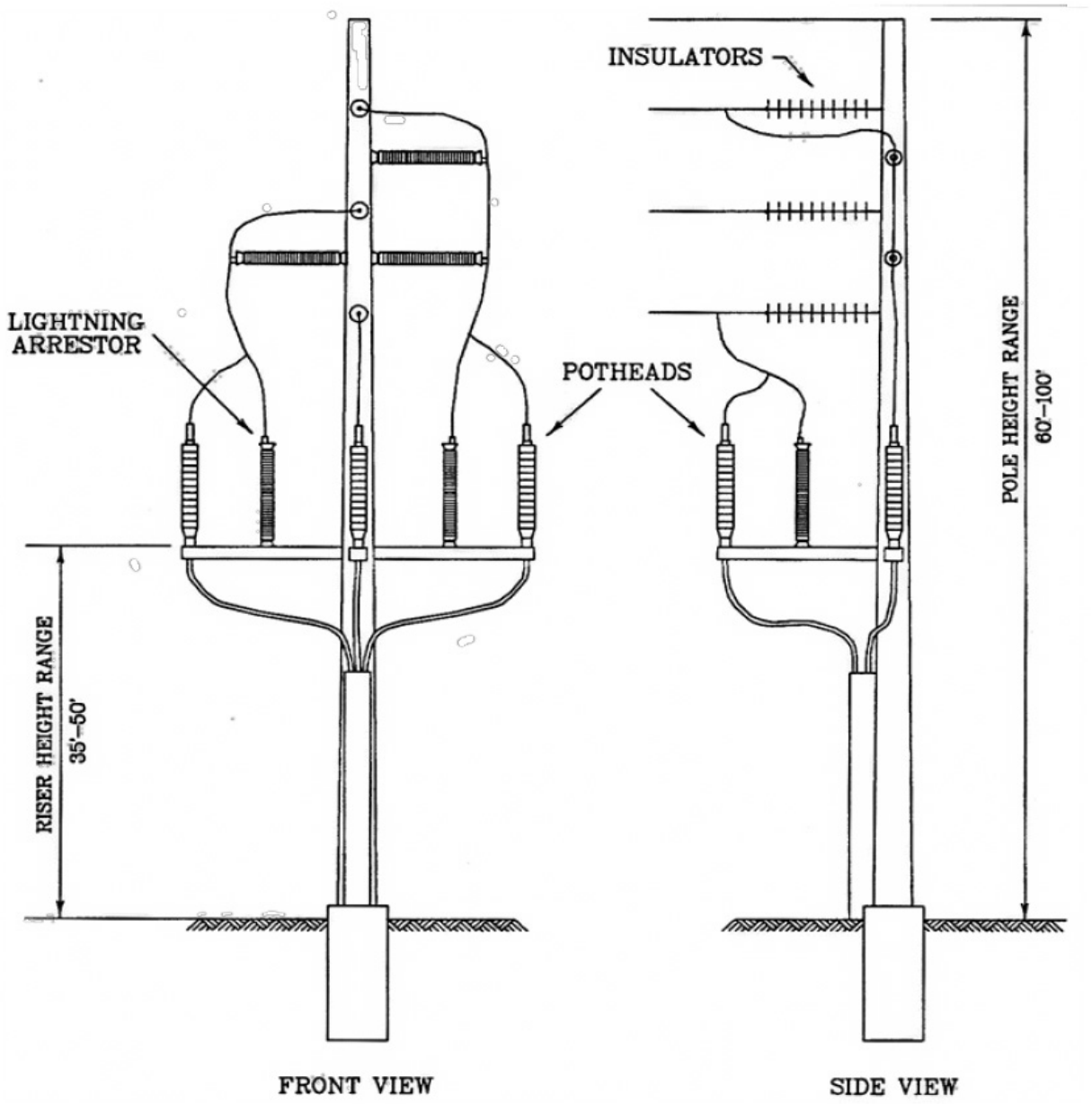
The transmission line route would cross the intersection and proceed to the southwest on the southeastern side of Sierra Highway for approximately 1.15 miles to the intersection of Sierra Highway and Highway 14 (Antelope Valley Freeway). The transmission line would then diverge from Sierra Highway and proceed overland to the southeast for approximately 0.8 miles to intersect with the applicant's proposed transmission line route, crossing the railroad right-of-way and East Carson Mesa Road. The line would either need to be lowered to 90 feet or be configured horizontally to more easily go under two 500 kV lines; the applicant has stated that it would lower tower height to 90 feet when crossing under existing 500 kV lines for the proposed transmission line route (Data Response 145) (AECOM 2009i).

At this point the alternative route would follow the proposed route south until reaching the Vincent Substation, approximately 1 mile. Because SCE stated that it would not allow the PHPP line to enter from the north, the line would follow the proposed route past the Vincent Substation and west along Hillside Drive to enter the substation from the south (AECOM 2009i). It is expected that the two 230 kV lines would be rebuilt for about 1 mile to the Vincent Substation using the double circuit towers proposed by the applicant in Segment 2 of the proposed transmission line route.

The entire route would be approximately 12.8 miles (22.8 miles shorter than the proposed route). The route is shown in **Alternatives Appendix A Figure 2**.

ALTERNATIVES APPENDIX A - FIGURE 1

Diagram of a Typical Transmission Riser Structure - Palmdale Hybrid Power Plant

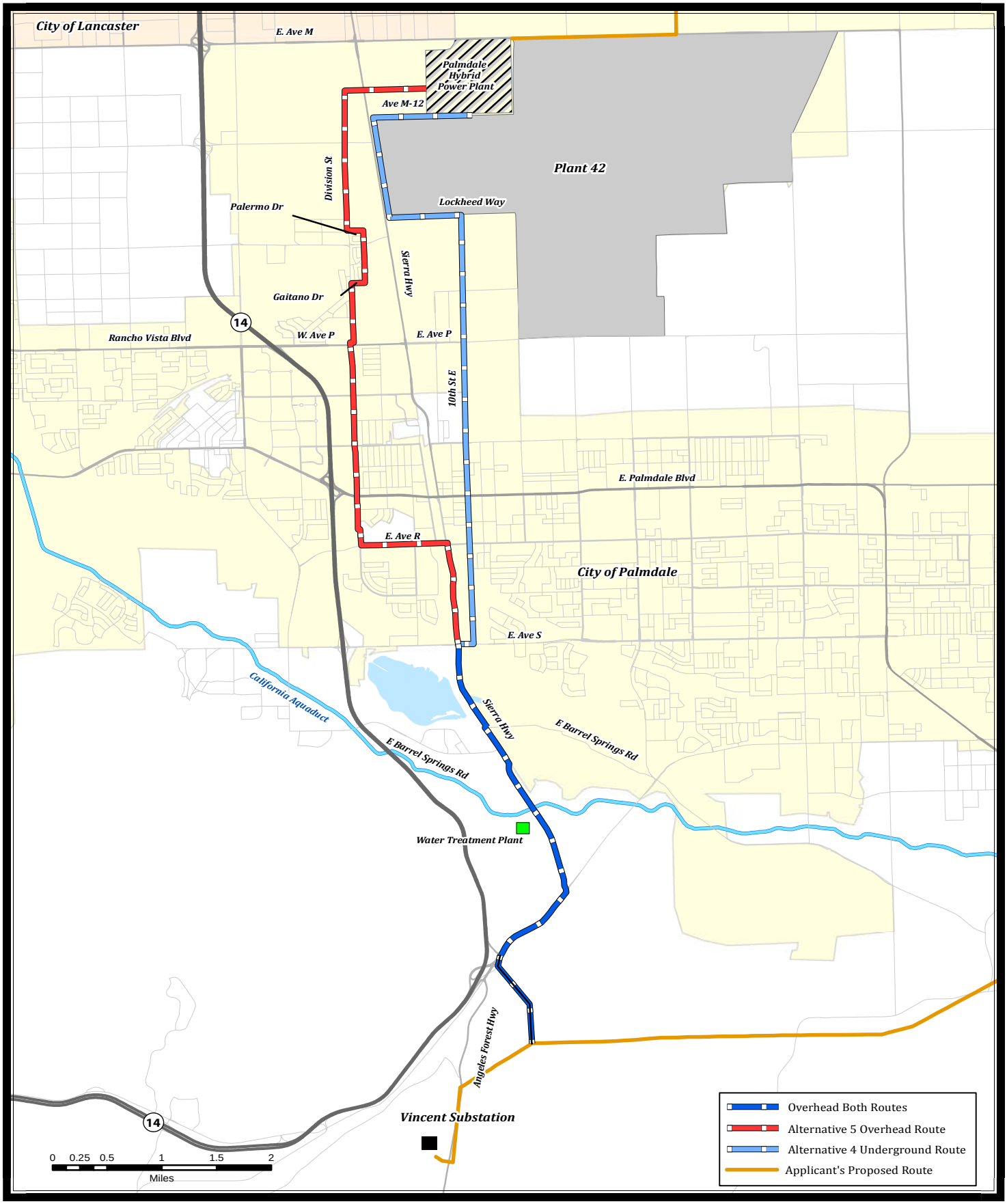


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission

ALTERNATIVES APPENDIX A - FIGURE 2

Proposed Transmission Line Route - Palmdale Hybrid Power Plant



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission

2.2 ALTERNATIVE ROUTE 5: OVERHEAD DIVISION STREET TRANSMISSION LINE

Description

The applicant considered a western route along Division Street, located between 10th Street W. and Sierra Highway. The route would have followed Division Street until East Avenue R. The applicant rejected the route because it would be nearer to a school (Palmdale Learning Center at the intersection of Division Street and Rayburn Street (East Avenue R). Staff has redesigned the route to avoid the Learning Center.

The route would exit the proposed site west along East Avenue M for approximately one mile until reaching Division Street. At Division Street, the route would turn south. Division Street is unpaved for approximately 2 miles between East Avenue M and East Avenue O, and again for approximately 0.5 miles between East Avenue P and Technology Drive. The eastern side of the unpaved road in these areas has been impacted by the construction of underground utilities, and the transmission line would be located in the disturbed right-of-way to avoid additional environmental impacts. Both the western and eastern sides of Division Street are generally undeveloped except for an area between Avenue O and Avenue P and some development at E. Palmdale Boulevard and at Avenue R, as noted above. There is adequate open land in the vicinity of Division Street to avoid these developments. The Applicant has indicated in DR 124 that the minimum ROW for a 230-kV transmission line is 60 feet, which would allow for the 38 foot width of the double circuit steel pole and a 10-foot freeboard on either side for maintenance access (AECOM 2009i).

Along Division Street, near Avenue N, the transmission poles would be approximately 4,900 feet from the end of Plant 42 Runway 07 (Approach End - west end of Runway 07-25) within Plant 42 Accident Potential Zone I (APZ I). Pursuant to Figure 3-15 of UFC 3-26-01, these poles would be within Plant 42's military airport airspace. Overhead poles within Plant 42's military airport airspace would be restricted to a height of 94 feet above the runway surface elevation of 2543 MSL (USAF 2010d). The ground elevation along Division Street directly west of the runway is about 20-25 feet higher than the elevation of the runway surface. This would require that the poles be restricted to about 74 feet or less or that a horizontal configuration using tubular pole H-frame structures be used. Once outside the military airspace, the height of the transmission poles could be increased and the configuration reverted to tubular steel pole.

To avoid running through a subdivision at Division Street and Avenue O, the route would turn east for 0.15 miles, then south for 0.5 miles, and then west for 0.15 miles to meet up again with Division Street. Although this jog would bring the line closer to AF Plant 42, it would remain further from the runway than the line would be at the nearest point along Division Street.

Prior to reaching East Avenue R, the line would cross to the east side of Division Street to avoid the Palmdale Learning Center and proceed on the eastern side of Division Street on vacant land (a minimum of 150 feet from the Learning Center) until reaching East Avenue R (approximately 0.8 miles) and then would remain on the northern side of

East Avenue R until reaching Sierra Highway. This section of the route could require removal of two buildings (see Attachment 1).

At Sierra Highway, the line would follow the east side of Sierra Highway to avoid co-locating with the existing distribution line right-of-way. Sierra Highway is largely undeveloped south of East Avenue R.

The remainder of the route would be the same as described above for Alternative Route 4. The line would continue overhead on the east side of the highway past Una Lake and would follow Sierra Highway above ground for a total of approximately 3.6 miles. Approximately 300 feet north of the northern intersection of E. Barrel Springs Road, the line would cross to the west of Sierra Highway and would proceed for approximately 0.45 miles between the railroad right-of-way and Sierra Highway to remain further from residential housing. Just before the community of Alpine, the transmission line would cross Sierra Highway and the railroad right-of-way and remain on the east side of Sierra Highway until reaching the intersection of Sierra Highway and Pear Blossom Highway.

The transmission line route would cross the intersection and proceed to the southwest on the southeastern side of Sierra Highway for approximately 1.15 miles to the intersection of Sierra Highway and Highway 14 (Antelope Valley Freeway). The transmission line would then diverge from Sierra Highway and proceed overland to the southeast for approximately 0.80 miles to intersect with the applicant's proposed transmission line route, crossing the railroad right-of-way and East Carson Mesa Road. Alternative Route 5 would then follow the applicant's proposed route into the Vincent Substation.

The total length of this route would be approximately 14.0 miles. The route is shown in **Alternatives Appendix A Figure 2**.

2.3 FEASIBILITY

The applicant stated that it did not consider an underground 230 kV alternative a feasible alternative because 1) it is significantly more expensive; 2) the ROW would be difficult to acquire in a reasonable period of time; and 3) maintenance and safety concerns (AECOM 2009i). Under CEQA, feasibility may take into account site suitability, economic viability, and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (CEQA Guidelines 15126.6(f)(1)). However, CEQA also requires consideration of an alternative even if the alternative would impede to some degree the attainment of the project objectives, or would be more costly (CEQA Guidelines 15126.6 (b)).

Cost

The applicant stated that underground transmission lines are significantly more expensive than overhead line and quotes a cost of approximately $100 million per mile compared with approximately $5 million to $10 million per mile for overhead lines (AECOM 2009i). It is generally maintained that the cost of undergrounding transmission lines is more expensive than overhead lines and can range from a low of two times as much to a high of up to 10 times as much, depending primarily on the cost of right-of-

way.. However, it is difficult to estimate the exact cost of an underground transmission line along Sierra Highway as the cost of undergrounding a transmission line is site specific.

The cost estimates that the Applicant provides are outside the range of recent underground transmission line costs. For example, recent underground 230 kV transmission line costs in California include:

- Jefferson-Martin 230 kV line (2006): The cost for the 3.12 miles of overhead lines averaged $3.8 million per mile, which included replacing a 60 kV tower line; the underground costs for the five segments averaged between $5.4 million and $6.8 million per mile. Variables included easement costs, traffic, and environmental and restoration expenses (Naiman 2009).
- Miguel-Mission 230 kV#2 line (2004): The cost of 3.5 miles of an underground 230 kV circuit was estimated at $12.3 million or approximately $3.5 million per mile (CAI 2004)
- Toluca-Van Nuys 230 kV Line D (2004): The cost of 5.5 miles of underground 230 kV in the San Fernando Valley was $27 million or approximately $4.9 million per mile (LADWP no date).

Based on information from the California Independent System Operator (CAISO 2010) for San Diego Gas and Electric (SDG&E) costs for overhead poles average $4.9M per mile for a 230 kV single-circuit, anchor-bolted steel pole. SCE costs for a similar pole are in the range of $2.8M. Pacific Gas and Electric (PG&E) estimates are $1.1M per mile.

For the case of Alternative Route 4 (the Partial Underground Alternative), the cost of 6.75 miles of underground transmission line, while more expensive per mile, would be partially offset by the reduced length of the transmission line, approximately 23.7 miles shorter than the proposed route. The applicant's proposed transmission line route would require additional costs for reconductoring and upgrades associated with Segment 2; Section 3.19 indicates that this could be on the order of $40 million. Finally, there may be cost savings associated with equipment and trenching for both the underground transmission line and the natural gas line.

Alternatives Appendix A Table 1 compares construction costs of the applicant's proposed route with Alternative Routes 4 and 5. The table indicates that Routes 4 and 5 would be less costly than the applicant's proposed transmission line route; however, Staff notes that the table assumes the same right-of-way cost for all of the alternative routes which may not be the case. Staff believes that the $2 million per mile figure would not be appropriate for Segment 2 of the applicant's proposed route given the additional expenses associated with reconductoring the 11.9 miles of existing SCE Vincent-Pearblossom Pumping Station 230 kV line; staff has used a value of $40 M for this segment. If costs are broken down by segment, the applicant's proposed route could cost $89.2 million ($49.2 M for 24.6 miles of Segment 1; $40 M for 11.9 miles of Segment 2). This is substantially greater than the $59.35 M and $28 M costs for Alternative Routes 4 and 5, respectively.

Alternatives Appendix A Table 1
Comparison of Construction Costs

Miles	Applicant's Proposed Route	Alternative Route 4	Alternative Route 5
Underground Line ($7M/mile)	N/A	6.75 miles	N/A
Overhead Line ($2M/mile)	36.5 miles	6.05 miles	14 miles
Cost	$89.2 M	$59.35 M	$28 M

Right-Of-Way

The proposed generator tie-line route has not been approved by SCE. A detailed ROW Study, required by SCE to evaluate the feasibility of using the existing Vincent-Pearblossom corridor, is needed. The ROW Study will evaluate the ground and line clearances for the proposed 230 kV double circuit line which would cross under existing 500 kV lines owned by SCE and the Los Angeles Department of Water and Power (LADWP) (SCE2009a, CEC2009v).

As stated in a SCE letter to the mayor of Palmdale, dated November 19, 2009, SCE was able to determine that the PHPP "proposed transmission line route is technically feasible, given sufficient resource, time, and money, and, barring any insurmountable legal or regulatory challenges. SCE has not found any fatal flaws to date." The SCE letter further stated that "SCE is conducting an ongoing dialog with CDWR [California Department of Water Resources]". "SCE is certain that CDWR concurs with the feasibility of the proposed approach given adequately protective permit conditions" (SCE 2009b). Thus, the details of the impacts of segment on the CDWR and LADWP facilities are not currently available until a ROW study is conducted.

Alternative Route 4. Most of the proposed underground transmission line would be installed in city streets in existing City street rights-of-way and would share the route with the proposed fuel gas supply line and reclaimed water supply line. The City may need to acquire ROW from other ROW owners for the overhead portion of the route.

The City has expressed concern regarding its ability to reasonably gain access to the ROW required for an underground option because of the many owners along the proposed route (AECOM 2009i). Approximately 2.5 miles of the underground ROW would be along Avenue M-12 and along Sierra Highway within city roadways and the ROW would be under the city's jurisdiction. An additional 4 miles would be along Lockheed Way and 10th Street East also within city roadways. Because a ROW along Sierra Highway, Lockheed Way, and 10th Street East would be required for the gas pipeline, negotiations for the ROW could also include the 230 kV transmission line. Since the ROW would be primarily within city streets, ROW concerns would be lessened.

Approximately 0.4 miles of the underground ROW would be located adjacent to Los Angeles County jurisdiction, from just past East Avenue P-8 to East Avenue Q; however, depending on the placement of the 230 kV transmission line, L. A. County

jurisdiction could potentially be avoided (Palmdale 2010). To avoid county jurisdiction, the 230 kV transmission line would be required to remain on the eastern half of 10th Street East from East Avenue P-8 to Avenue Q.

The Applicant has stated that the two proposed pipelines (natural gas and reclaimed water) would be located either underneath the centerline or near the eastern edge of Sierra Highway, approximately 50 to 75 feet from the Southern Pacific/Union Pacific Railroad berm (AECOM 2010b). Given the distance between the proposed pipelines and the railroad, it would appear that sufficient space (between 20 to 30 feet) would be available on the eastern side of Sierra Highway in addition to potential available ROW on the western side of Sierra Highway.

The Applicant stated that the width of the road ROW in Sierra Highway is between 120 and 160 feet (AECOM 2009i). The existing ROW has a number of existing utilities, which are listed in **Alternatives Appendix A Table 2**. Additionally, the proposed PHPP would locate both the 20-inch natural gas supply and 14-inch reclaimed water supply pipelines in Sierra Highway for 2.5 miles, as shown in **Alternatives Appendix A Table 3**. While a number of existing and planned utilities are located in the Sierra Highway, there is still available space that could be used to underground a 230 kV line.

The 10th Street East ROW is between 60 to 80 feet (Palmdale 2010). Additionally, an existing LADWP ROW runs along 10th Street East (Palmdale 2010). A transmission engineer has reviewed this segment and determined that placement within 10th Street East is feasible (see Attachment 1).

Alternatives Appendix A Table 2
Existing Utilities in Sierra Highway ROW

Type of Utility	Owner	Pipeline Diameter
Distribution Lines	SCE	12 kV (overhead)
Water Main	LADWP	12-inch
Sewer Line	LADWP	10-inch
Gas Line	SCGC	10-inch
C.A.T.V.	Time Warner Communication	3-inch cable bundle
Telephone line	Verizon	3-inch cable bundle
Railroad	Union Pacific	50-foot ROW

Source: AECOM 2009i.

Alternatives Appendix A Table 3
Planned PHPP Utilities in Sierra Highway ROW

Type of Utility	Location	Pipeline Diameter

Type of Utility	Location	Pipeline Diameter
Fuel Gas Supply	On Sierra Avenue from East Avenue M to Lockheed Way before turning east on Blackbird Lane (approximately 2.5 miles for the proposed route, approximately 1.8 miles from East Avenue M-12 to Lockheed Way)	20-inch
Reclaimed Water Supply	On Sierra Avenue from East Avenue M to Lockheed Way before turning east on Blackbird Land (approximately 2.5 miles for the proposed route, approximately 1.8 miles from East Avenue M-12 to Lockheed Way)	14-inch

Source: AECOM 2009i.

Obtaining ROW for the overhead portion of the route, along Sierra Highway to the Vincent Substation, would be similar to obtaining ROW for the applicant's proposed route.

Alternative Route 5. Alternative Route 5 would be placed along city street rights-of-way for approximately one half of the route. The northern portion of Alternative Route 5 would be located within undeveloped land, where existing underground utilities and low voltage transmission lines exist. Because of this, sufficient land would be available to run the 230 kV line along the disturbed ROW in order to reduce ground disturbance. Between Avenue O and Avenue P existing development along Division Street would require a jog to the east to avoid the development and ensure sufficient ROW. As with the Alternative Route 4 (and the applicant's proposed route), the City may need to acquire ROW from other ROW owners for the portion of Alternative Route 5 along Sierra Highway.

Based on the information presented above, staff believes that ROW would not serve as an impediment to Alternative Routes 4 and 5.

Schedule

Alternatives Appendix A Table 4 compares the proposed schedules for Alternative Routes 4 and 5 with the schedule identified by the applicant for its proposed transmission line route. Details on how these schedules were derived are discussed below in Section 2.4. Both Route 4 and Route 5 could be constructed in a shorter timeframe than the applicant's proposed route. Staff notes that the applicant does not have control over much of the defined corridor for its route and negotiating leases or purchases of the corridor and/or completing eminent domain procedures can be time-consuming. Similarly, the applicant also does not have control of portions of the ROW required for Alternative Routes 4 and 5, particularly once the routes are outside of the city limits along Sierra Highway. Negotiating leases along Sierra Highway may also be time-consuming.

Alternatives Appendix A Table 4
Comparison of Construction Schedules

Miles	Applicant's Proposed Route	Alternative Route 4	Alternative Route 5
Underground Line		18-20 months**	
Overhead Line	26 months*		13 months

*Assumes that Segment 2 is constructed concurrently with Segment 1.
**Assumes that overhead line is constructed concurrently with the underground portion of the route.

Maintenance and Safety

Overhead transmission lines can be downed or damaged by machinery, lightning, and storms. However, most damage to overhead lines occurs at the distribution, rather than transmission level. Underground transmission lines, meanwhile, are mostly damaged by excavation/dig-ins and by splice failure. Although there are less outages with underground transmission lines than with overhead lines, repair time can be significantly longer. American Electric Power (AEP) – in **Alternatives Appendix A Table 5** below – has calculated overall greater unavailability for underground than overhead lines.

Alternatives Appendix A Table 5
Typical Reliability Statistics for 138 kV HPFF Cable and 138 kV Overhead Lines

	Overhead	Underground
Forced outage rate (outages/year/mile)	0.005	0.00165
Mean repair time (days)	0.375	21
Mean time between failure (year)	200	606
Unavailability (hours/year)	0.045	0.832

Source: AEP No date.

Due to lengthier repair times, many underground lines have been built with two parallel circuits for backup capacity.

Electromagnetic Fields

Electric fields are produced by voltage and increase in strength as the voltage increases. The electric field strength is measured in units of volts per meter (V/m). Magnetic fields result from the flow of current through wires or electrical devices and increase in strength as the current increases. Magnetic fields are measured in units of gauss (G) or tesla (T) (NIEHS 2002).

Overhead transmission lines produce both electric fields and magnetic fields. Underground lines do not produce electric fields because of shielding from the earth (WAPA 2005). Magnetic fields, however, can continue to pass through the ground, and are often higher for a person standing directly above an underground line than under an overhead line. This is due to the shorter vertical distance to the underground line. However, as the horizontal distance from the line increases, the electromagnetic fields (EMF) from the underground line decay more quickly. This phenomenon is illustrated in the EMF profiles for a 500 kV transmission line – presented below in **Alternatives Appendix A Table 6**. A similar drop-off would be expected for a 230 kV transmission line. EMF is also discussed in Section 3.11.

Alternatives Appendix A Table 6
EMF profiles for a 500 kV Transmission Line

	Underground	Overhead
Maximum directly over cables or under lines	80.9 mG	54.7 mG
50m from the center of the right-of-way	0.3 mG	11.1 mG
75m from the center of the right-of-way	0.1 mG	4.9 mG
100m from the center of the right-of-way	0 mG	2.7 mG
150m from the center of the right-of-way	0 mG	1.2 mG
250m from the center of the right-of-way	0 mG	0.4 mG
500m from the center of the right-of-way	0 mG	0.1 mG
800m from the center of the right-of-way	0 mG	0 mG

Source: Altalink and EPCOR (2010)

Seismicity

For overhead and underground transmission lines in areas with the potential for fault surface rupture, standard engineering practices and site-specific geotechnical investigations can reduce the risk of earthquake damage. Crossings of active faults are often as close as perpendicular to the fault, for the shortest distance within the fault zone. For overhead lines, tower locations are adjusted as possible. In addition, the towers and interconnecting wire are inherently flexible, designed for variable wind conditions that generally exceed earthquake loads. For underground lines, mitigation measures can include adding extra slack in the cables to allow for offset in the fault. Vaults and splice boxes (where wire segments are joined) are typically located outside of fault zones; the underground portion of Alternative Route 4 would be located at a distance from the San Andreas fault. It may, however, be located near the Cemetery fault (see Section 3.16).

2.4 CONSTRUCTION

Construction actions are discussed generally below and are derived from descriptions of other underground lines constructed in California city streets, and the applicant's description of the proposed overhead line. Information provided for the underground route, while more detailed than information provided by the applicant for the proposed route, serves as an indicator of types of activities that would be associated with construction of such a line. More detailed and exact construction information for the applicant's proposed route or an alternative route would be determined during final engineering.

Alternative Route 4 - Partial Underground Transmission Line

The trench for an underground 230 kV transmission line would be approximately seven to ten feet wide and six feet deep. As the trench for the underground transmission line is completed, installation of the cable conduit, reinforcement bar, ground wire, and concrete conduit encasement, which collectively comprise the duct bank, would begin. The duct bank for the 230 kV underground transmission lines would typically measure approximately 3.5 feet by 3.5 feet. Ducts for communication cables, which are required for system protection and communication purposes, would be installed in the same duct bank as the transmission cables. Where the electrical transmission duct bank would cross or run parallel to other substructures that operate at normal soil temperature (gas lines, telephone lines, water mains, storm drains, sewer lines), a minimal radial clearance

of 12 inches (for crossing) and 24 inches (for paralleling) would be required. Ideal clearances would be 2 to 5 feet. Clearances and depths would meet requirements set forth with Rule 33.4 of California Public Utilities Commission (CPUC) General Order 128.

A permanent easement of at least 20 feet would be required for the 230 kV underground transmission line (PSCW 2007). The final easement width would be determined through consultation with ROW owners. Final engineering would determine whether additional permanent or temporary ROWs would need to be acquired from other private property owners.

The city of Palmdale would be required to restrict installation of any aboveground structure or foundation to within the predefined easement areas. Deep-rooted vegetation that could compromise the integrity of the electric system would not be permitted within the easement areas. Conditions of the easement would require the property owner to notify the city of Palmdale should any change in the overburden depth be contemplated.

Temporary lane closures along streets as required for underground construction would be coordinated with the local jurisdictions. The city of Palmdale would likely coordinate work along Sierra Highway and 10th Street East to limit lane closures and the timing of the construction. Provisions for safe access of police, fire, and other rescue vehicles would be required. In addition, the City would obtain roadway encroachment permits from the County jurisdictions and would submit a traffic management plan subject to agency review and approval. See additional information regarding construction activities below.

The following description of underground transmission line construction was based on actions that were undertaken to construct underground portions of the Jefferson-Martin 230 kV Transmission Line within city streets (CPUC 2004). Typical construction of an underground line is shown in **Alternatives Appendix A Figure 3.**

Trenching/Duct Bank Installation

Prior to trenching, the applicant would notify other utility companies (via the Underground Service Alert [USA]) to locate and mark existing underground structures along the proposed alignment.

After the trench route is marked and encroachment permits are obtained, the roadway pavement above the trench would be broken into manageable pieces for removal. The typical trench for duct bank installation would be approximately 2 feet wide, with a depth of 6-7 feet. Given the 6.75 mile (35,640 feet) length of the underground route, approximately 427,680 cubic feet of soil could be excavated by trenching although some amount may be used as backfill. This figure includes the area that would be excavated for vault placement and is therefore conservative.

The maximum open trench length would depend on local permit requirements (see **Alternatives Appendix A Table 7** for an example). Provisions for emergency vehicle and local access would be provided. The width of the workspace would be set by the encroachment permit to be issued by the city of Palmdale.

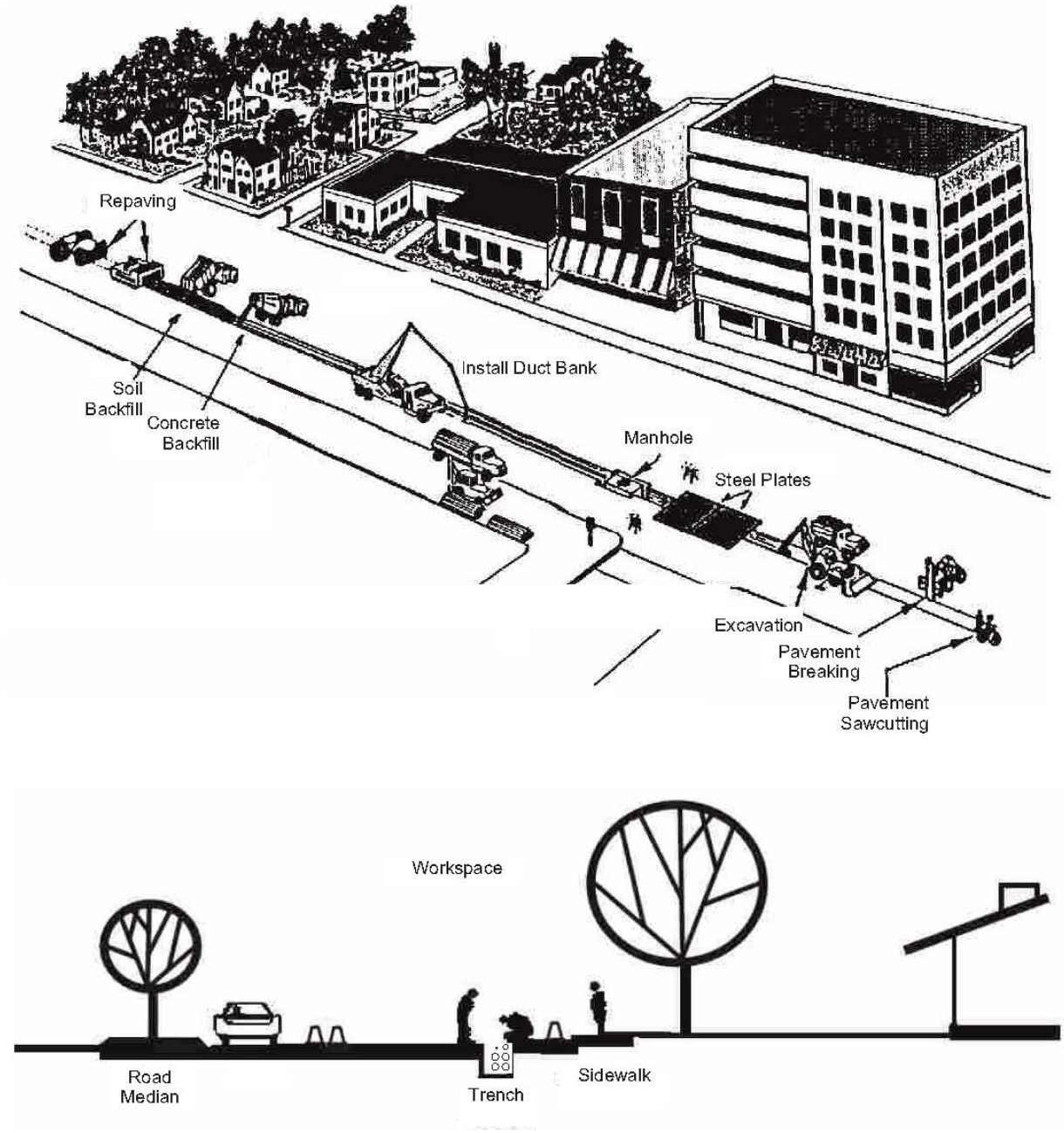
Alternatives Appendix A Table 7
Open Trench Characteristics

Line Type	Approximately Length of Open Trench at any one time (feet)	Average Length of Time Trench is Open	Notes
Cross- Linked Polyethylene (XLPE), in concrete ducts	600	6 to 7 work days	Requires laying and curing concrete ducts.

Source: PSCW 2007.

Approximately 500 to 1,000 gallons a day of water would be required for street cleaning during underground duct bank construction. Otherwise, small amounts of water would be used during underground construction activities, including borings.

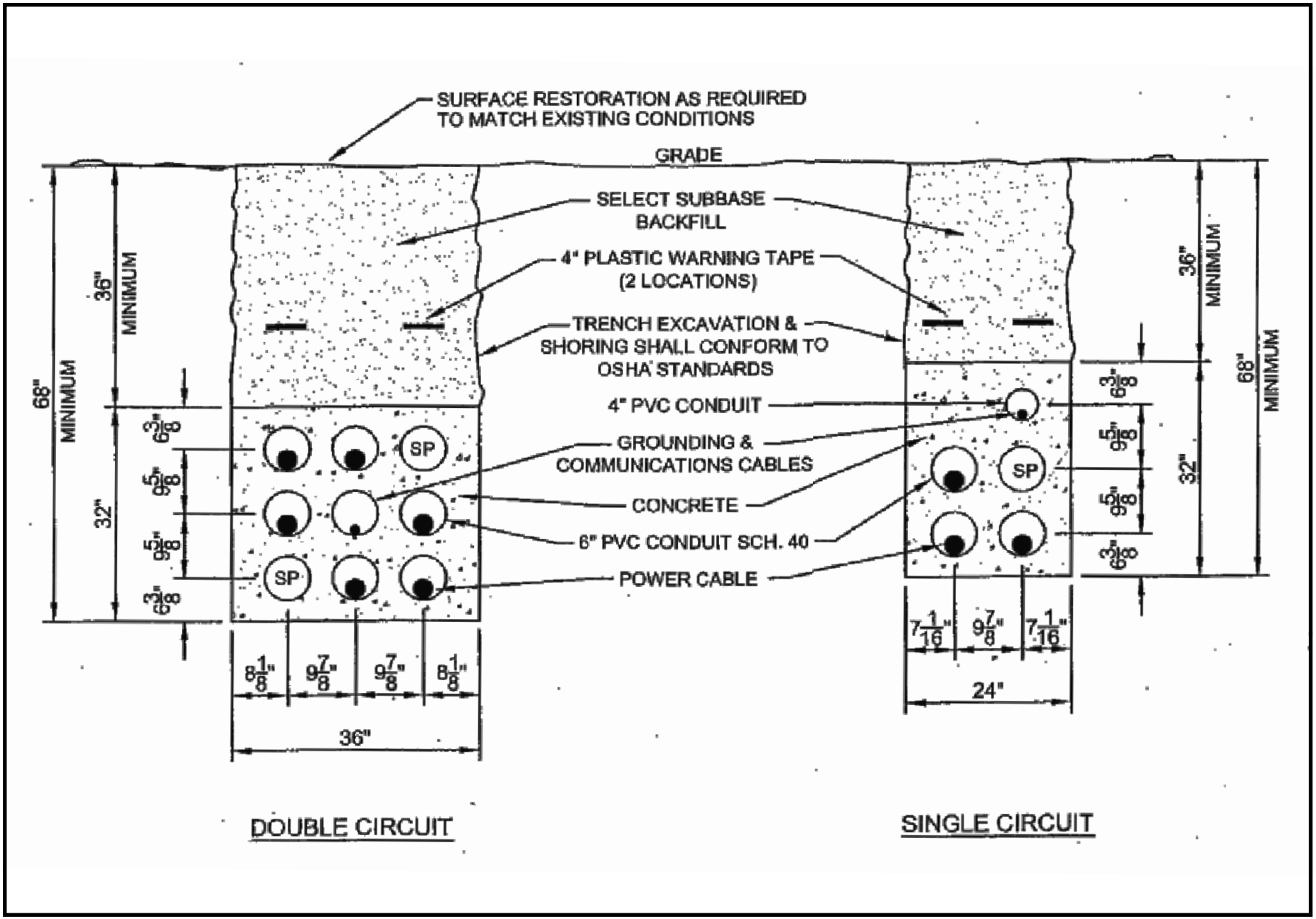
ALTERNATIVES APPENDIX A - FIGURE 3
Typical Construction of an Underground Line - Palmdale Hybrid Power Plant



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: California Energy Commission

PROJECT DESCRIPTION - FIGURE 1

Palmdale Hybrid Power Project - Typical Duct Bank Construction Underground Cable Transmission Line



TRANSMISSION SYSTEM ENGINEERING

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: C.C.I., Fig 1

As the trench for the underground 230 kV transmission line is completed, the city of Palmdale would install the cable conduit, reinforcement bar, ground wire, and concrete conduit encasement (duct bank). Depending on soil conditions, existing utility placement, and requirements to allow appropriate cover and repaving, the total excavation (i.e., width and/or depth) for the trench may vary. The duct bank would have a minimum cover of 36 inches. At regular intervals (e.g., every 1,600 feet), splice vaults would be incorporated for installing cables and splicing sections of cables together.

When the electrical transmission duct bank crosses or runs parallel to other substructures (which have operating temperatures not exceeding basal earth temperature), typically a minimum radial clearance of 12 inches is required from these substructures. These types of substructures include gas lines, telephone lines, water mains, storm lines, and sewer lines such as those already located in Sierra Highway and the proposed gas and water line required for the proposed project. In addition, a five-foot minimum radial clearance is required when the new electrical transmission duct bank crosses another heat-radiating substructure at right angles. A 15-foot minimum radial clearance is required between the electrical transmission duct bank and any paralleling substructure whose operating temperature significantly exceeds the normal earth temperature. Examples of heat radiating facilities are additional underground transmission circuits, primary distribution cables (especially multiple-circuit duct banks), steam lines, or heated oil lines. No heat radiating facilities were identified along Sierra Highway.

Once the PVC conduits are installed, thermal-select or controlled backfill would be imported, installed, and compacted. A road base back-fill or slurry concrete cap would then be installed, and the road surface would be restored in compliance with the locally issued permits. While the completed trench line sections are being restored, additional trench line would be opened further down the street. This process would continue until the entire conduit system is in place.

Vault Installation

As discussed above, the city of Palmdale would excavate and place pre-formed concrete splice vaults at approximately 1,600-foot intervals during trenching for pulling cables and housing cable splices. Approximately 23 vaults would be required. The vaults would be used initially to pull the cables through the conduits and to splice cables together. During operation, vaults provide access to the underground cables for maintenance, inspections, and repairs. Vaults would be constructed of steel-reinforced concrete (either prefabricated or cast-in-place), with inside dimensions of approximately 22 feet long, 8 feet wide, and 8 feet deep. The vaults would be designed to withstand the maximum credible earthquake in the area, as well as heavy truck traffic loading.

The total excavation footprint for a vault would be approximately 26 feet long by 12 feet wide and 10 feet deep. Approximately 3,120 cubic feet of soil per vault (71,760 total cubic feet for all vault installation) could be excavated although some amount may be used as backfill. Installation of each vault would take place over a 3-day period with excavation and shoring of the vault pit being followed by delivery and installation the vault, filling and compacting a backfill, and repaving of the excavation area.

Cable Pulling

Following installation of the conduit system, the city of Palmdale would pull each cable segment into the conduit bank and splice at vaults along the route and terminate cables at the transition station. Cable would be pulled through individual ducts at the rate of two of the three segments between vaults per day.

Cable Splicing and Termination

After cable installation is completed, the City would pull cable through the duct banks, splice the cable segments at each vault and terminate cables at the transition station where the line would transition from underground to overhead. To pull the cables through the duct banks, a cable reel would be placed at one end of the conduit segment, and a pulling rig would be placed at the opposite end. The cable from the cable reel would be attached to a rope in the duct bank, and the rope linked to the pulling rig, which would pull the rope and the attached cable through the duct banks.

After cable pulling is completed, the cables would be spliced, or fused together, at each vault. A splice trailer would be located directly above the vaults' manhole openings for easy access by workers. A mobile power generator would be located directly behind the trailer. Crews would enter the vault and splice the cables.

Cables would rise out of the ground at the transition station, which accommodates the transition to overhead lines. The transition structure would support cable terminations, lightning arresters, and dead-end hardware for overhead conductors. Construction methods for these structures would be substantially similar to those described for overhead transmission line structures for the proposed project.

Special Construction Methods (Horizontal Dry Boring)

In concert with the tasks outlined above, special construction methods (horizontal boring and/or directional drilling) may be required in areas where open trench construction is not feasible. These areas would include railroad tracks, large utility crossings, roads, drainage crossings, and other environmentally sensitive areas. The city of Palmdale would secure the necessary permits to conduct these specialized construction activities (expected for the reclaimed water line and gas line as well), such as a special use permit, encroachment permit, helicopter lift plan, explosives permit, etc.

Horizontal Boring

Horizontal boring (jack-and-bore) simultaneously pushes a steel casing through the crossing and removes the spoil inside the casing with a rotating auger. First, boring pits would be excavated at the sending (entrance) and receiving (exit) ends of the bore. The bore equipment is inserted into the bore pit at the sending end, where a 36- to 42-inch steel casing is pushed through the earth, under the crossing. Depending on soil conditions, water is often used to lubricate the auger during boring operations. Casings would be welded together incrementally and installed at least three to four feet below the crossing, or as required by local permits. Once the casing is in place, the duct banks would be installed using plastic spacers to secure them in place. The steel casings would remain to protect the conduit once it has been strung; however, use of fiber reinforced mortar pipes is preferred in areas where technically feasible. The duct banks and associated cables would consist of the same respective materials and strung by employing a similar

method as those installed on the remainder of the underground portions of the 230 kV transmission line.

Directional Drilling

Directional drilling uses a jet bit that can be steered to cut through the earth, creating a small pilot hole. A drill rig and control booth would be set up on one side of the directional drill to facilitate drilling operations. A small containment pit would be excavated around the drill stem to contain any drilling fluids used during the drilling process. Once the jet bit has reached the opposite side of the crossing, a reamer along with the casing (if determined for use by final engineering) would be attached to the auger and pulled back through the pilot hole to widen it. Multiple reamers of increasing diameters would be used to incrementally increase the size of the hole to the diameter necessary to install the conduit casings.

Vehicle and Equipment Use, and Job Site Cleanup

Throughout construction of the trench, duct bank and vaults, asphalt, concrete, and excavated material would be reused on-site or hauled off by truck for reuse or disposal at an approved disposal site, depending on the spoil characteristics. Excavated materials would be tested first for their suitability as a backfill material prior to being off-hauled.

Construction Schedule

Using the 600 feet length and 6-7 work days shown in **Alternatives Appendix A Table 7**, construction of the underground portion of Alternative Route 4 would require 416 work days (83 weeks or 18-20 months). [Note that trenching for the LADWP 12-mile underground line would proceed at a rate of 300 feet per day (LADWP 2009).] Vault installation would be conducted concurrently. Staff assumes that the 6.45 miles of overhead transmission line would also be constructed concurrently.

The projected 18-20 month timeframe is consistent with the estimated schedule (270 days) for the 3.5 mile underground segment of the Miguel-Mission 230kV #2 transmission line (CAI 2004). Prorating the 270 day duration would yield 525 days (17.5 months) for completion of a 6.8 mile segment.

It is also consistent with the 30 month estimate for the 12-mile LADWP Scattergood Olympic 230 kV Line which would be placed underground within paved city streets (LADWP 2009). Prorating the 30 month duration would yield 17 months for a 6.8 mile segment.

Similarly, an 18 month construction timeframe is estimated for the 6-mile Alpine Boulevard underground transmission line segment of the Sunrise Powerlink Transmission Line (Schmidt 2010). The 18-month construction period is considered an upper range, given that there will be two separate 230 kV lines undergrounded within Alpine Boulevard versus the single 230 kV underground line considered as part of Alternative Route 4.

Alternative Route 5 - Overhead Division Street Transmission Line

Construction of an overhead transmission line along Division Street would be similar to the applicant's proposed overhead transmission line. Using the limited information

presented in the AFC (page 2-33 and 2-34), overhead transmission line construction would involve the following:

Road work. Unlike the proposed transmission line route, significant clearing for roads would not be required to provide access to pole locations.

Foundations. Each pole would have a single foundation installed that would require curing prior to the pole installation. It is expected that the total area of disturbance at each location for all transmission line installation activities would average 200 feet by 200 feet (0.92 acres).

Pole Erection. Each pole, made up of two heavy duty tubular steel sections, would be assembled onsite and welded together. The insulators and conductor hardware would be installed following pole erection.

Conductors. From pulling sites, the conductors would be installed, sagged to specifications and permanently connected to the insulators. The conductor size is 1590 ACSR.

Pulling Sites. Pull sites would be required at a number of locations, using existing access roads or stub roads.

Communication System. The overhead ground/fiber optic communications (OPGW) cable would be installed using the same pulling sites as were used for the conductor installation.

Cleanup. Although cleanup would be ongoing as the work proceeds, once construction is completed, a final cleanup would occur.

Staff has supplemented the above information with typical overhead construction actions used by SCE (SCE 2010), as described below, to provide an example of equipment and actions needed.

The 230 kV structure locations and necessary laydown area would be graded and/or cleared of vegetation as required to provide a reasonably level and vegetation-free surface for footing and structure construction. Erection of the structure would require an erection crane. A crane pad would be located within the laydown area used for structure assembly. The structures would require drilled, poured-in-place, concrete footing.

The following four steps describe the wire installation activities:

- **Step 1**: Sock Line, Threading: Typically, a lightweight sock line is passed from structure to structure, which would be threaded through the wire rollers in order to engage a camlock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a conductor pull.
- **Step 2**: Pulling: The sock line would be used to pull in the conductor pulling cable. The conductor pulling cable would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel. A piece of

hardware known as a running board would be installed to properly feed the conductor into the roller; this device keeps the bundle conductor from wrapping during installation.

- **Step 3**: Splicing, Sagging, and Dead-ending: After the conductor is pulled in, the conductor would be sagged to proper tension and dead-ended to structures.
- **Step 4**: Clipping-in, Spacers: After the conductor is dead-ended, the conductors would be secured to all tangent structures; a process called clipping in. Once this is complete, spacers would be attached between the bundled conductors of each phase to keep uniform separation between each conductor.

An area of approximately 150 feet by 500 feet (1.72 acres) would be optimal for tensioning equipment setup sites. An area of 150 feet by 300 feet (1.03 acres) would be optimal for pulling and equipment set-up sites; however, crews can work from within slightly smaller areas when space is limited. Each stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end.

Construction Schedule

The applicant has estimated a 26-month schedule for Segment 1 (24 miles) of the proposed transmission line and 27 weeks/6.75 months for Segment 2 (12.2 miles) (AECOM 2009aa, Appendix G Air Quality Supporting Documentation, Appendix G.3 Emissions Calculations). Since the overhead alternative transmission line (Alternative Route 5) is more similar to Segment 1, staff assumes a construction timeline of 15 months (26 months/24 miles x 14 miles).

Construction Equipment

Typical construction equipment is expected to include the following. Not all equipment would be required for either the underground or above ground routes.

Equipment	Use
Pickup Trucks	Transport construction personnel
2-ton flatbed truck	Haul materials
Flatbed boom truck	Haul and unload materials
Rigging truck	Haul tools and equipment
Winch truck	Install and pull rope into position in conduits
Cable puller truck	Pull transmission cables through conduits
Concrete trucks	Transport and pour back-fill slurry
Worker lift	Lift workers to perform work on structures
Shop vans	Store tools
Backhoe	Excavate trenches
Dump trucks	Haul trench spoils/import backfill
Cranes	Lift and load/unload materials
Cable reel trailers	Transport cable reels/feed cable into conduits
Splice trailer	Splice supplies/air condition manholes
Air compressors	Operate air tools
Air tampers	Compact soil

Rollers	Repave streets
Portable generators	Provide construction power
Horizontal boring equipment	Bore underneath railroad lines
Water trucks	Fire control/dust control
Street sweepers	Dust control

3.0 ENVIRONMENTAL IMPACTS OF TRANSMISSION LINE ALTERNATIVES

3.1 AIR QUALITY

Setting and Existing Conditions

The project site is located in the city of Palmdale, California at the southwestern edge of the Mojave Desert at an average elevation of 2,505 feet above mean sea level (msl). The Tehachapi Mountains, located to southwest of the project site, reach elevations above 5,000 msl within 10 miles of the site.

The project site is located in the Mojave Desert which is classified as a “high desert.” It is a transition between the “hot” Sonoran Desert to the south and the “cold” Great Basin Desert to the north. Characteristic of a desert climate, the Mojave Desert has extreme daily temperature changes, low annual precipitation, strong seasonal winds, and mostly clear skies.

The prevailing winds for Palmdale, California, range from southerly to westerly approximately 75 percent of the time with the majority from the southwest, based on the 2002 to 2004 wind data collected at the Palmdale Regional Airport. Calm periods occur 10.31 percent of the time, and the frequency of winds from north through south-southeast are each less than 4percent.

PHPP is located in the Mojave Desert Air Basin and is under the jurisdiction of the Antelope Valley Air Quality Management District. This area is designated as non-attainment for both the state and the federal (1-hour and 8-hour) ozone and 24-hour and annual PM10 standards, attainment for the state’s CO, NO_2, SO_2, PM2.5, SO4 and Lead (Pb) standards, and unclassified for the federal PM2.5, CO, NO_2 and SO_2 standards.

Assessment of Impacts and Discussion of Mitigation

Method and Thresholds for Determining Significance

There are two criteria that staff uses to determine whether project emissions would be significant. Both are based upon the extensive federal and state regulatory programs designed to protect against adverse effects from air contaminants. The first is the status of the ambient air quality standards in the area. Staff finds that the release of all nonattainment air contaminants and their precursors caused by the construction and operation of this facility are significant and must be mitigated. For example, the area is currently non-attainment for ozone and PM10; therefore, all directly emitted PM10, and PM10 and ozone precursors (NOx, POC and SOx) that the facility releases during

construction and operation would potentially cause significant impacts through their contribution to the existing violations of the standards.

The second criterion is whether the project's construction and operational emissions would cause a new violation to the ambient air quality standards. Staff relies on air dispersion modeling in conducting this assessment. Air dispersion models provide a means of predicting the location and ground level magnitude of the impacts of a new emissions source. In general, the inputs for the modeling include stack information (exhaust flow rate, temperature, and stack dimensions), specific source (e.g., combustion turbine) emissions data, meteorological data, such as wind speed, atmospheric conditions, and site elevation. The model results are often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$). Staff adds the modeled impacts to the available highest ambient background concentrations recorded during the previous three years from nearby monitoring stations. Staff compares the results with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or if the emissions would contribute to an existing violation.

Potential impacts associated with the alternative transmission lines were evaluated based on both short- and long-term impacts to air quality. The transmission facilities do not directly emit air pollutant emissions during operations, with emissions limited to transmission line construction and periodic inspection, maintenance and repair. Emissions for each alternative route were estimated based on the applicant's construction schedule and equipment lists as provided in the AFC. For overhead transmission lines, the same emission calculation was used as presented in the AFC. For underground transmission lines through a conduit, staff used the applicant's emission estimation methodology for gas pipeline trenching and installation.

Peak daily emissions associated with transmission line construction would remain unchanged since daily activity levels would remain the same regardless of the proposed or alternative route. However, total emissions would differ substantially based on pipeline route and construction technique (underground versus overhead).

In the **Socioeconomics** section of this Appendix, staff presents census information that shows that there are minority populations within a three-mile buffer of the project. Since staff has added conditions of certification that would reduce the risk associated with air emissions to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the alternative transmission lines on minority populations. Therefore, there are no environmental justice issues for Air Quality.

Alternative Route 4 - Partial Underground Transmission Line

Emissions associated with Alternative Route 4 - Partial Underground Transmission Line are presented in **Air Quality Table 3.1-1**. Emissions are presented for a peak daily scenario and total tons emitted during transmission line construction.

Air Quality Table 3.1-1
Alternative Route 4
Estimated Maximum Transmission Line Construction Emissions

Activity	NOx	VOC	SOx	CO	PM10	PM2.5
Peak Daily Emissions (lb/day)						
Alternative – Partial Underground	475.3	63.8	0.5	351.5	393.8	96.0
Total Emissions (tons)						
Alternative – Partial Underground	38.4	8.0	0.1	47.9	31.7	8.3

Alternative Route 5 - Overhead Division Street Transmission Line

Emissions associated with Alternative Route 5 (Overhead Division Street Route) are presented in **Air Quality Table 3.1-2**. Emissions are presented for a peak daily scenario and total tons emitted during transmission line construction.

Air Quality Table 3.1-2
Alternative Route 5
Estimated Maximum Transmission Line Construction Emissions

Activity	NOx	VOC	SOx	CO	PM10	PM2.5
Peak Daily Emissions (lb/day)						
Alternative - Overhead	475.3	63.8	0.5	351.5	393.8	96.0
Total Emissions (tons)						
Alternative - Overhead	48.6	6.3	0.1	33.5	42.0	10.4

Proposed Conditions of Certification

Conditions of Certification **AQ-SC-1** through **AQ-SC-6,** as presented in the FSA Air Quality section, would reduce potential air quality impacts associated with transmission line construction to a less than significant level for all alternatives.

Comparison to Proposed Transmission Line Route

Emissions associated with the construction of the proposed transmission line and the two alternatives are presented in **Air Quality Table 3.1-3**.

Air Quality Table 3.1-3
Comparison of Transmission Line Alternative Routes
Estimated Maximum Transmission Line Construction Emissions

Activity	NOx	VOC	SOx	CO	PM10	PM2.5
Peak Daily Emissions (lb/day)						
Proposed Project	475.3	63.8	0.5	351.5	393.8	96.0
Alternative Route 4	475.3	63.8	0.5	351.5	393.8	96.0
Alternative Route 5	475.3	63.8	0.5	351.5	393.8	96.0
Total Emissions (tons)						
Proposed Project	123.7	16.1	0.1	85.1	106.8	26.5
Alternative Route 4	38.4	8.0	0.1	47.9	31.7	8.3
Alternative Route 5	48.6	6.3	0.1	33.5	42.0	10.4

Alternative Route 4

Locating a portion of the transmission line underground, especially if coordinated with gas pipeline construction, would substantially reduce transmission line construction emissions. Even if underground construction activities are not coordinated, emissions associated with this alternative represent the lowest possible construction emissions for the transmission line options.

Alternative Route 5

The overhead transmission line alternative would be substantially shorter than the proposed transmission line route, and would represent a substantial reduction in overall construction emissions.

3.2 BIOLOGICAL RESOURCES

Summary of Conclusions

This section summarizes the Energy Commission staff's analysis and conclusions about the impacts of Alternative Routes 4 and 5 for the PHPP and describes feasible mitigation measures for those impacts in accordance with the requirements of CEQA.

The summary provides a general overview of the project impacts from each of the proposed alternatives to biological resources that are present on the project site and transmission line alignments, have the potential to be present, or are present off-site and have the potential to be indirectly affected by the alternatives. This summary also describes potential mitigation measures that may be employed to avoid or reduce potentially significant project impacts. No new conditions of certification have been proposed for these alternatives; however the language of Conditions of Certifications **BIO-14**, **BIO-17**,and **BIO-20** have been revised for each of the alternatives to reflect a reduction in habitat affected by each of the alternatives.

Based on the timing of the alternatives analysis staff was not able to conduct a series of surveys which would be required to fulfill specific mitigation requirements linked to conditions of certification identified in this analysis. These include surveys for rare plants, desert tortoise, Mohave ground squirrel, burrowing owl, Swainson's hawk, and nesting birds. Further, staff was not able to complete a jurisdictional wetland delineation of the alternative transmission line right-of-ways. Because many surveys could not be conducted (i.e., seasonal restrictions and/or timing) the impact analysis had to rely on reconnaissance level surveys; review of aerial photography; the use of existing data; habitat assessments; known species associates and their distribution in the region; discussions with local experts; coordination with the USFWS and CDFG; and staff's knowledge of the region. Should one of the alternatives be selected, staff recommends that the applicant conduct these surveys to refine the mitigation requirements identified in the analysis.

Vegetation and Rare Plants: Construction of the PHPP and linear facilities would result in the conversion of both native and non-native vegetation in the Antelope Valley. Impacts to habitat on the PHPP power plant site are described in the FSA. Construction of Alternative Routes 4 and 5 would be located primarily in disturbed plant communities and along disturbed road shoulders in an urban setting. To reduce project effects on

vegetation communities staff has proposed Conditions of Certification **BIO-1** through **BIO-9** (Designated Biologist Selection, Designated Biologist Duties, Biological Monitor Qualifications, Biological Monitor Duties, Designated Biologist and Biological Monitor Authority, Worker Environmental Awareness Program, Biological Resources Mitigation Implementation and Monitoring Plan, Impact Avoidance and Minimization Measures, and Compliance Verification), and **BIO-10** (Revegetation for Impacts to Native Vegetation). The permanent loss of sensitive vegetation would be offset through the acquisition of mitigation lands for the Mohave ground squirrel in staff's proposed Condition of Certification **BIO-20.**

Threatened or endangered plants were not identified in the project area however surveys for rare plants have not been conducted along the alternative transmission line alignments. Based on habitat conditions and the location of the proposed transmission lines impacts to listed plants are not expected to occur. Only one sensitive plant, crowned muilla, a California Native Plant Society List 4.2 species, was observed by the applicant during botanical surveys of the project area conducted in 2007, 2008, and 2010. Staff believes that impacts to crowned muilla which occur on the proposed PHPP power plant site would be less than significant under CEQA. Impacts to other rare plants which may occur in the project area would be reduced to less than significant levels through the implementation of staff's Condition of Certification **BIO- 11** (Special-Status Plant Surveys/Protection Plan).

Common Wildlife and Nesting Birds: Construction of the PHPP power block and solar arrays would adversely affect common wildlife and nesting birds that occur on the project site through the loss of habitat. Construction of Alternative Routes 4 and 5 would primarily be located in more disturbed plant communities and within existing roadways. These areas support fewer native wildlife species and habitat along the urban interface has been degraded.

Impacts to habitat on the PHPP power plant site are described in the FSA. To reduce project effects on wildlife, staff has proposed Conditions of Certification **BIO-1** through **BIO-10**. Impacts to habitat loss would be compensated by the application of Condition of Certification **BIO-20** (Mohave Ground Squirrel Habitat Compensation), and impacts to nesting birds would be avoided by the application of **BIO-15** (Pre-Construction Nest Surveys and Impact Avoidance Measures for Migratory Birds). Staff has proposed Condition of Certification **BIO-24** (Avian Protection Plan / Monitoring Bird Impacts from Solar Technology), to monitor the death and injury of birds from collisions with facility features such as the solar arrays. In addition, while some disturbance-tolerant birds are expected to continue foraging on the project site once it is developed, most native birds are not expected to frequent the site.

Sensitive Wildlife: Construction of the power block and linear facilities also has the potential for impacts to listed species including desert tortoise (federal- and state-listed Threatened), Mohave ground squirrel (state-listed Threatened), and Swainson's hawk (state-listed Threatened). Construction of Alternative Routes 4 and 5 would primarily be located in more disturbed plant communities and within existing roadways. These alternatives have reduced potential impacts to sensitive wildlife when compared to the proposed project.

Potential direct and indirect impacts to wildlife at the PHPP plant site and along the transmission line alternatives can be reduced to less-than-significant levels with impact avoidance and minimization measures described in staff's proposed Conditions of Certification **BIO-1** through **BIO-12, BIO-15**, **BIO-18**, **BIO-20, BIO-21**,and **BIO-22**.

Desert tortoise: Although suitable habitat occurs on the project site desert tortoise has not been detected on the PHPP power plant site. Surveys for this species have not been conducted for Alternative Routes 4 and 5; however, it is unlikely that desert tortoise occur in these areas due to the urban setting and disturbed habitat that occurs along the alignment.

Based on the low potential for occurrence staff has not proposed compensatory mitigation for the loss of desert tortoise habitat but the applicant would be required to complete preconstruction surveys for this species. To reduce effects to desert tortoise should they occur, staff has proposed Conditions of Certification **BIO-1** through **BIO-9**, which apply to protection of desert tortoise and other biological resources in and near the PHPP. Staff's proposed Condition of Certification **BIO-13** would involve additional conditions including installation of tortoise exclusion fencing, clearance surveys, monitoring; and verification that all desert tortoise impact avoidance, minimization, and compensation measures have been implemented. Staff's proposed Condition of Certification **BIO-14** would require the development and implementation of a Raven Monitoring, Management, and Control Plan and the payment of a raven management fee to minimize impacts to desert tortoise resulting from increases in raven populations. Implementation of these conditions would reduce impacts to desert tortoise, if present, to less-than-significant levels and would satisfy the California Department of Fish and Game's (CDFG) requirements under Fish and Game Code Section 2081.

Mohave Ground Squirrel: Although not detected in the PHPP power plant project area the applicant has elected to consider the Mohave ground squirrel as being present on the power plant site. Surveys for this species have not been conducted for Alternative Routes 4 and 5. Staff concludes that a compensatory mitigation ratio of 2:1 for the power plant site and 1:1 ratio would be warranted for Alternative Route 5 in the area between West Avenue M and West Avenue O. Compensatory mitigation is not required for the urban portions of the project. Implementation of staff's proposed Conditions of Certification **BIO-19** and **BIO-20** would reduce impacts to Mohave ground squirrel to less-than-significant levels and would satisfy the CDFG's requirements under Fish and Game Code Section 2081. However, supplemental data quantifying the exact acreage of habitat lost to construction would be required.

Swainson's hawk: Suitable foraging and nesting habitat occurs within the project area, on the power plant site, and portions of Alternative Routes 4 and 5. Nesting Swainson's hawks have not been detected on the project site or linear facilities. Construction of the PHPP transmission line would result in the removal of 301 acres of foraging habitat. This includes 116.55 acres of Mojave creosote bush scrub, and 183.15 acres of Joshua tree woodland on the project site and approximately one acre on the transmission line alignment. Staff would consider the dedication of mitigation lands for Mohave ground squirrel identified in Condition of Certification **BIO-20** to compensate for loss of native plant communities if they are located within 15 miles of known Swainson's hawk nest sites. Otherwise the applicant would be required to dedicate other native lands to

mitigate the loss of foraging habitat for this species. However, for the purposes of compliance with the California Endangered Species Act the applicant must provide security for the replacement costs of 301 acres of foraging habitat. By the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9** which include worker training, implementation of Best Management Practices, and biological monitoring, and Conditions of Certification **BIO-16** and **BIO-17**, which include pre-construction surveys and compensatory mitigation, potential impacts to Swainson's hawk would be reduced to less-than-significant levels and the project would be in compliance with the California Department of Fish and Game's requirements to fully mitigate the project's impacts under section 2081 of the California's Fish and Game Code.

Burrowing Owl: Burrowing owls or their sign (i.e., individuals, pellets, or feathers) were not observed within 500 feet of the PHPP power plant site. Surveys for this species have not been conducted for Alternative Routes 4 and 5. Habitat for this species occurs in disjunct locations along the transmission line alignment. To reduce potential impacts to this species staff has proposed Condition of Certification **BIO-18** which requires pre-construction surveys for burrowing owls. With implementation of this condition, potential impacts to burrowing owls would be reduced to less-than-significant levels.

Golden Eagle: Golden eagles, a California Fully Protected species, were not observed at the PHPP power plant but are known to be an occasional visitor to Palmdale Lake. Golden eagles are not expected to frequent the PHPP power plant site due to its proximity to the Los Angeles World Airport and urbanized areas such as the city of Palmdale. Likewise this species is not expected to occur along most of the Alternative Route 4 and Alternative Route 5 alignment. Construction of the PHPP project is not expected to result in the loss of important foraging habitat for golden eagles and staff considered impacts to be less than significant due to the project's location in a largely urban environment. However, implementation of staff's proposed Condition of Certification **BIO-20**, the compensatory mitigation plan for Mohave ground squirrels, would further offset this habitat loss by the preservation of native vegetation in the region. To address potential collision concerns (discussed below under operational effects) staff has proposed Condition of Certification **BIO-24** (Avian Protection Plan / Monitoring Bird Impacts from Solar Technology). This requires a monitoring and reporting program that would document and report potential collision mortality from the proposed solar fields. The implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9, BIO-20,** and **BIO-24** which include worker training, implementation of Best Management Practices, pre-construction surveys, biological monitoring, and the avian protection plan, would be expected to reduce potential impacts to golden eagles to less-than-significant levels under CEQA, and the project would be in compliance with the California Department of Fish and Game's provision for no take of the State Fully Protected Species under Section 3511 of the California Fish and Game Code.

American Badger and Kit Fox: American badgers were not detected during project surveys in 2006 or 2008, although suitable habitats are present in the project area and along portions of Alternative Routes 4 and 5 that occur outside of urban areas. Implementation of **BIO-21** would reduce impacts to the American badger and desert kit fox to a less-than-significant level. Staff's proposed Condition of Certification **BIO-20**,

the compensatory mitigation plan for Mohave ground squirrel habitat, would also offset the loss of habitat for these species and reduce the impact from habitat loss to less-than-significant levels under CEQA.

Jurisdictional Waters: Construction at the PHPP power plant site would not result in permanent impacts to State or federal jurisdictional waters; however the project's transmission line would span and access roads would cross a variety of jurisdictional features. Although a jurisdictional delineation has not been completed for Alternative Routes 4 and 5, the alternatives cross several small drainages. Staff's proposed Condition of Certification **BIO-23** provides recommendations and guidance consistent with CDFG Streambed Alteration Agreement requirements. These include restoration and compensation should permanent loss of state jurisdictional habitat occur. With implementation of staff's proposed Condition of Certification **BIO-23**, this will require the completion of a jurisdictional wetland delineation. Impacts to State waters would be mitigated to less-than-significant levels. This condition also fulfills requirements of CDFG's Lake and Streambed Alteration Agreement program pursuant to Fish and Game Code Section 1600 et seq.

Setting and Existing Conditions

The proposed PHPP power plant site, water and gas pipelines and other project components is the same as described in Section 4.4 of the FSA. The exception is the removal of the proposed 35.6 mile long transmission line segments. The proposed PHPP site would have the development footprint described in the FSA. Most of the PHPP site supports a mosaic of native plant communities including Creosote bush scrub, Saltbush scrub, and Joshua tree woodland. Several dirt access roads cross the parcel and a small barren area occurs near the center of the site. This area would support the solar thermal array, power block, access roads, and on-site support facilities such as an administration building, potable water tanks, and warehouse. To support construction, a temporary 50-acre construction laydown area would be located west of the proposed project site within the adjacent City-owned property. The main access to the site during construction and operation would be via a new street and signalized intersection at 10th Street developed by the City.

Each of the settings for the proposed partial underground (Alternative Route 4) and overhead (Alternative Route 5) routes for the PHPP is described below.

Laws, Ordinances, Regulations, and Standards (LORS)

Biological resources LORS directly applicable to Alternative Routes 4 and 5 are the same as described in the FSA. Refer to **Biological Resources Table 1** in the FSA which provides a general description of the biological resources LORS applicable to the proposed project and alternatives.

Alternative Route 4 - Partial Underground Transmission Line

This alternative route would include 6.75 miles of underground transmission line and approximately 6.1 miles of overhead transmission line. Approximately 6.5 miles of the underground transmission line length would follow the same route as the fuel gas supply line, described in the FSA. The overhead transmission line portion of this

alternative would follow the same route as the southern half of the overhead alternative route.

The route would exit the proposed project site and head west along East Avenue M-12 until reaching Sierra Highway where the route would turn south and run parallel to the Highway through mostly disturbed scrub communities. At Lockheed Way (Blackbird Lane), the pipeline would turn east until reaching 10th Street East. This area is characterizes as existing earthen and paved roadways. Open space supporting Desert Scrub communities borders this area from Blackbird Land to East Avenue P. Along 10th Street East south of Rancho Vista Blvd the area is dense with residential, commercial, and mixed-use developments. At approximately 0.25 miles past East Avenue R-4, the line would cross a railroad line which would likely require boring under the line. At East Avenue S, the line would turn west for approximately 0.15 miles and then transition to an overhead line at approximately East Avenue S and Sierra Highway. From this point, the route traversed by this transmission line alternative would be the same as the Overhead Alternative.

Alternative Route 5 - Overhead Division Street Transmission Line

This alternative route would be a total of 12.8 miles of overhead transmission line within the city of Palmdale and unincorporated Los Angeles County. Existing land uses that would be traversed by and adjacent to this alternative route would primarily be vacant land, road or highway rights-of-way, and dispersed areas of commercial, residential or light industrial development. The route would exit the proposed project site west until reaching Division Street. Along Division Street, the line would generally be adjacent to a 66kV transmission corridor on the west side of the street for approximately five miles until reaching Avenue R. The western side of Division Street is undeveloped except for an area between Avenue O and Avenue P and some development along East Palmdale Boulevard and Avenue R. Much of the vegetation in this area is characterized as disturbed Rabbit Bush Scrub, Saltbush Scrub, and Joshua Tree Woodland. Because of pipeline development and the presence of numerous access roads, this area supports a broad array of non-native weedy annuals including brome grasses, various mustards, red-stemmed filaree, and Russian thistle. Other invasive species, particularly mustards, can substantially alter native habitats and have compromised the integrity of the habitat in this location. This area is also littered with debris including construction waste, carpet, broken glass, discarded household appliances, and auto parts.

Habitat between East Avenue O and East Avenue supports disturbed Joshua Tree Woodland but begins to transmission to more disturbed scrub communities as the alignment moves south. As most of the proposed alignment is located along the disturbed road shoulder, this habitat is largely avoided.

South of East Avenue P the transmission line alignment crosses a series of highly disturbed native and non-native plant communities that occur within open space areas confined by urban development. Vegetation communities identified in this area include disturbed ruderal habitat, California Annual Grassland, Rabbit Bush Scrub, and small patches of Desert Saltbush Scrub. Small isolated areas supporting Big Basin Scrub and Riparian Scrub also occur. At East Avenue R the transmission line heads east and runs adjacent to the roadway bordering a vacant lot supporting ruderal plant communities until reaching Sierra Highway.

At Sierra Highway, the line would follow the west side of Sierra Highway and would generally parallel an existing distribution line right-of-way south along Sierra Highway. Abandoned olive orchards, disturbed ruderal habitat, and degraded Rabbit Bush Scrub occur along portions of this area. As the line moves south, the right-of-way transitions into Juniper Woodland, Creosote Bush Scrub, and passes adjacent to riparian habitat at Una Lake, an important birding area in the Antelope Valley. Much of this area also supports dispersed residential, commercial and light industrial development. At Barrel Springs Road, the line would cross to the east of Sierra Highway and the railroad right-of-way which supports disturbed plant communities. Between the Angeles Forest Highway and the Vincent substation the habitat consists of lands that appear to be in the process of type converting from Juniper Woodland Scrub and various desert scrub communities to California annual grassland and more disturbance tolerant plant communities. See **Section 4.2, Biological Resources** of the FSA for a complete description of vegetation communities occurring within the project area. No new communities were identified along the overhead alternative route.

Special-status species with the potential to occur in the vicinity of Alternative Routes 4 and 5 are presented in **Biological Resources Table 3.2-1,** below. Potential for occurrence is defined as follows:

Present: Species or sign of their presence recently observed on the site (species that are present are noted in **bold text** in **Biological Resources Table 3.2-1**).

High: Species or sign not observed on the site, but reasonably certain to occur on the site based on conditions, species ranges, and recent records.

Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record exists in the vicinity.

Low: Species or sign not observed on the site, and conditions marginal for occurrence.

Not likely to occur: Species or sign not observed on the site, outside of the known range, and conditions unsuitable for occurrence.

Biological Resources Table 3.2-1
Special-Status Species, Their Status, and Potential Occurrence at the Palmdale Hybrid Power Project Site and Alternative Transmission Line Routes

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
PLANTS			
Androsace elongata ssp. acuta	California androsace	CNPS: 4.2	**High**
Arctostaphylos gabrielensis	San Gabriel manzanita	CNPS:1B.2	**Not likely to occur**
Astragalus lentiginosus var. *Antonius*	San Antonio milk-vetch	CNPS: 1B.3	**Not likely to occur**
Astragalus preussii var. laxiflorus	Lancaster milk-vetch	CNPS: 1B.1	**Low**
Calochortus clavatus var. *Clavatus*	Slender mariposa lily	CNPS: 4.3	**Low**
Calochortus palmeri var. *palmeri*	Palmer's mariposa lily	CNPS: 1B.2	**Not likely to occur**
Calochortus striatus	Alkali mariposa lily	CNPS: 1B.2	**Moderate**
Calystegia peirsonii	Pierson's morning glory	CNPS: 4.2	**High**

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
Canbya candida	Pygmy poppy	CNPS: 4.2	**High**
Carex vulpinoidea	Brown fox sedge	CNPS: 2.2	**Moderate**
Castilleja gleasonii	Mt. Gleason Indian paintbrush	**SR,** CNPS: 1B.2	**Not likely to occur**
Castilleja plagiotoma	Mojave Indian paintbrush	CNPS: 4.3	**Moderate**
Chorizanthe parryi var. *fernandina*	San Fernando Valley spineflower	**FC, SE,** CNPS:1B.1	**Not likely to occur**
Chorizanthe parryi var. *parryi*	Parry's spineflower	CNPS: 1B.1	**Low**
Chorizanthe spinosa	Mojave spineflower	CNPS:4.2	**Moderate**
Cryptantha holoptera	Winged cryptantha	CNPS: 4.3	**High**
Delphinium parryi ssp. *purpureum*	Mt. Pinos larkspur	CNPS: 4.3	**Moderate**
Eriastrum hooveri	Hoover's eriastrum	**FD,** CNPS: 4.2	**Moderate**
Eriogonum baileyi var. *praebens*	Bailey's woolly buckwheat	CNPS: 4.3	**High**
Galium johnstonii	Johnston's bedstraw	CNPS: 4.3	**Moderate**
Gilia interior	Inland gilia	CNPS: 4.3	**Low**
Gilia latiflora ssp. *cuyamensis*	Cuyama gilia	CNPS: 4.3	**High**
Goodmania luteola	Golden goodmania	CNPS: 4.2	**Moderate**
Juncus duranii	Duran's rush	CNPS: 4.3	**Moderate**
Layia heterotricha	Pale-yellow layia	CNPS: 1B.1	**Moderate**
Lilium parryi	Lemon lily	CNPS: 1B.2	**Not likely to occur**
Linanthus concinnus	San Gabriel linanthus	CNPS: 1B.2	**Not likely to occur**
Loeflingia squarrosa var. *artemisiarum*	Sagebrush loeflingia	CNPS: 2.2	**Not likely to occur**
Mimulus johnsoni	Johnston's monkeyflower	CNPS: 4.3	**Not likely to occur**
Muhlenbergia californica	California muhly	CNPS: 4.3	**Not likely to occur**
Muilla coronata	**Crowned muilla**	CNPS: 4.2	**Present**
Nemacladus gracilis	Slender nemacladus	CNPS: 4.3	**High**
Opuntia basilaris var. *brachyclada*	Short-joint beavertail	CNPS: 1B.2	**High**
Orobanche valida ssp. *valida*	Rock Creek broomrape	CNPS: 1B.2	**Not likely to occur**
Perideridia pringlei	Adobe yampah	CNPS: 4.3	**High**
Phacelia mohavensis	Mojave phacelia	CNPS: 4.3	**Low**
Stylocline masonii	Mason's bedstraw	CNPS: 1B.1	**Low**
Symphyotrichum greatae (= Aster greatae)	Greata's aster	CNPS: 1B.3	**Not likely to occur**
Syntrichopappus lemmonii	Lemmon's syntrichopappus	CNPS: 4.3	**High**
Viola aurea	Golden violet	CNPS: 2.2	**Low**
INVERTEBRATES			
Plebulina emigdionis	San Emigdio blue butterfly	CDFG Special Animal	**Low**
FISH			
Catostomus santaanae	Santa Ana sucker	**FT**, CSSC	**Not likely to occur**
Gasterosteus aculeatus williamsoni	Unarmored threespine stickleback	**FE**, **SE**, SP	**Not likely to occur**
Gila orcutti	Arroyo chub	CSSC	**Not likely to occur**
Rhinichthys osculus ssp.	Santa Ana speckled dace	CSSC	**Not likely to occur**
AMPHIBIANS			
Bufo californicus	Arroyo toad	**FE**, CSSC	**Not likely to occur**
Rana muscosa	Mountain (Sierra Madre) yellow-legged frog	**FE**, CSSC	**Not likely to occur**
Spea hammondii	Western spadefoot	CSSC	**Low**

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
REPTILES			
Anniella pulchra pulchra	Silvery legless lizard	CSSC	**High**
Charina bottae umbratica	Southern rubber boa	**ST**	**Not likely to occur**
Emys (Clemmys) marmorata pallida	Southwestern pond turtle	CSSC	**Moderate**
Gopherus agassizii	Desert tortoise	**FT, ST**	**Low on power plant/Low on Transmission line**
Phrynosoma coronatum blainvillii	San Diego horned lizard	CSSC	**High**
Phrynosoma coronatum frontale	California horned lizard	CSSC	**Moderate**
Thamnophis hammondii	Two-striped garter snake	CSSC	**Moderate**
BIRDS			
Accipiter cooperii	**Cooper's hawk**	CDFG WL	**Present**
Agelaius tricolor	**Tricolored blackbird**	**CSSC**	**Present**
Aquila chrysaetos	Golden eagle	SP	**Low on power plant/Moderate on Transmission line**
Asio otus	Long-eared owl	CSSC-	**Moderate**
Athene cunicularia	**Western burrowing owl**	CSSC	**Present**
Buteo regalis	**Ferruginous hawk**	CDFG WL	**Present**
Buteo swainsoni	**Swainson's hawk**	**ST**	**Present**
Chaetura vauxi	**Vaux's swift**	CSSC	**Present**
Charadrius montanus	Mountain plover	CSSC	High
Circus cyaneus	Northern harrier	CSSC	**Moderate**
Coccyzus americanus	Yellow-billed cuckoo	**FC, SE**	**Not likely to occur**
Elanus leucurus	White-tailed kite	SP	**Low**
Empidonax traillii extimus	Southwestern willow flycatcher	**FE, SE**	**Moderate**
Eremophila alpestris actia	**California horned lark**	CDFG WL	**Present**
Falco columbarius	Merlin	CDFG WL	**High**
Falco mexicanus	**Prairie falcon**	CDFG WL	**Present**
Gymnogyps californianus	California condor	**FE, SE,** SP	**Low**
Haliaeetus leucocephalus	Bald eagle	**FD, SE,** SP	**High**
Icteria virens	Yellow-breasted chat	CSSC	**High**
Lanius ludovicianus	**Loggerhead shrike**	CSSC	**Present**
Numenius americanus	Long-billed curlew	CDFG WL	**High**
Piranga rubra	Summer tanager	CSSC	**Moderate**
Pyrocephalus rubinus	Vermilion flycatcher	CSSC	**Moderate**
Toxostoma bendirei	Bendire's thrasher	CSSC	**Moderate**
Toxostoma lecontei	**LeConte's thrasher**	CDFG WL	**Present**
Vireo bellii pusillus	**Least Bell's vireo**	**FE, SE**	**Present**
Xanthocephalus xanthocephalus	**Yellow-headed blackbird**	**CSSC**	**Present**
MAMMALS			
Antrozous pallidus	Pallid bat	CSSC	**Moderate**
Chaetodipus fallax pallidus	Pallid San Diego pocket mouse	CSSC	**Moderate**
Corynorhinus townsendii	Townsend's big-eared bat	CSSC	**Moderate**
Euderma maculatum	Spotted bat	CSSC	**Low**
Eumops perotis	Western mastiff bat	CSSC	**Low**
Lasiurus blossevillii	Western red bat	CSSC	**Moderate**
Onychomys torridus ramona	Southern grasshopper mouse	CSSC	**Moderate**
Perognathus longimembris brevinasus	Los Angeles pocket mouse	CSSC	**Not likely to occur**
Spermophilus mohavensis	**Mohave ground squirrel**	**ST**	**Present*/Low on Transmission line**
Taxidea taxus	American badger	CSSC	**High**

FE = Federally listed Endangered
FT = Federally listed Threatened

Scientific Name	Common Name	Status	Potential For Occurrence On-Site

FD = Federally Delisted
FC = Federal Candidate
SE = State listed Endangered
ST = State listed Threatened (wildlife)
SR = State listed Rare (plants)
CSSC = California Species of Special Concern (wildlife)
SP = State Fully Protected Species
CDFG WL = California Department of Fish and Game Watch List species
CNPS (California Native Plant Society) Designations:
List 1A = Plants presumed extinct in California
List 1B = Plants considered by CNPS to be rare, threatened, or endangered in California, and throughout their range
List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere in their range
List 3 = Plants about which we need more information - a review list.
List 4 = Plants of limited distribution – a watch list
CNPS Threat Rank:
.1 = Seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat)
.2 = Fairly endangered in California (20-80% occurrences threatened)
.3 = Not very endangered in California (<20% of occurrences threatened or no current threats known)
*The Mohave ground squirrel was not detected during protocol surveys conducted for the PHPP, but the applicant has elected to assume presence in the project area. Surveys for this species have not been conducted for the proposed alternative transmission line alignments.

Assessment of Impacts and Discussion of Mitigation[1]

Energy Commission staff has analyzed the Overhead and Partial Underground Alternatives to determine consistency with applicable biological resources LORS and the potential to have significant adverse biological resources-related impacts. In addition, conditions developed by staff to reduce any potential impacts to a less-than-significant level are provided, as well as the feasibility and enforceability of the recommended conditions of approval.

Method and Thresholds for Determining Significance

The method and thresholds used for determining significance of impacts in this analysis of alternatives are the same as were used for the proposed project. See **Section 4.2, Biological Resources** of the FSA for a description of CEQA thresholds for determining significance of impacts to biological resources.

Alternative Route 5 - Overhead Division Street Transmission Line

Vegetation Impacts

Construction of Alternative Route 5 would result in the permanent loss of less than one acre of native and non-native vegetation. This estimate is based on the expected disturbance associated with the construction of the towers, pulling sites, and footings required for construction of the tubular steel poles. Because Alternative Route 5 would require tubular steel poles the expected areas of disturbance, both temporary and permanent, would be much smaller when compared to a lattice steel tower.

Further, because of the disturbed nature of this alignment (i.e., ruderal habitats, disturbance from off highway vehicles, illegal dumping, and pipeline construction), impacts to native vegetation would be minimal for this alternative. As described above in the **Setting and Existing Conditions**, this alternative route traverses a variety of native, ruderal, disturbed, and developed lands. In addition, most of the transmission

[1] Note for Biological Resources, the discussion of Alternative Route 5 impacts appears before the discussion of Alternative Route 4 impacts.

line route is located along existing access roads, disturbed pipeline right of ways, or along sparsely vegetated road shoulders within developed portions of the City of Palmdale and other unincorporated communities. Historic and recent land uses in this area have also compromised the functional integrity of the existing vegetation and has likely degraded the value of these plant communities. For example, many areas appear to have been disturbed from past agriculture practices and grazing. Recent disturbance appears to be largely from urban growth, road and pipeline construction, illegal dumping, and other infrastructure development such as electrical and water distribution.

The most intact native habitat appears to be the disturbed rabbit bush scrub, saltbush scrub, and Joshua tree woodlands located adjacent to the right of way along the northern portion of Division Street between the small office complex south of Avenue M and the residential development at Avenue O. These areas occur within a broad association of native vegetation bordered by Interstate 14 and Sierra Highway. While largely intact throughout this area, the habitat along Division Street has been subject to extensive disturbance from pipeline construction, illegal dumping, and off-highway vehicle traffic. In some areas vegetation consist largely of monocultures of rubber rabbit brush, which are indicative of previous disturbance. In addition, this area supports a rectilinear grid system of dirt roads that were likely constructed during the early development of Palmdale. Currently these roads provide unobstructed access to this region and, coupled with the highways, have fragmented these habitats.

The alternative route also passes adjacent to Una Lake, a natural rift lake which supports various riparian and marsh habitats and is recognized as an important birding area in the Antelope Valley. Una Lake is located immediately adjacent to Sierra Highway south of East Avenue S. Direct impacts to these riparian habitats are not expected to occur as the line would be placed along Sierra Highway, but these habitats could be subject to indirect impacts such as fugitive dust and potential spread of nonnative and invasive weed species However, this area is already somewhat degraded as it is subjected to ongoing impacts from the adjacent highway and nearby developments. Much of the habitat surrounding Una Lake consists of creosote bush scrub, juniper woodlands, and rabbit bush scrub.

Native vegetation communities also occur toward the southern portion of the route in the foothills of the San Gabriel Mountains. These areas are bordered by Interstate 14 and Sierra Highway and the transmission line alignment traverses lands that appear to be in the process of type converting from Juniper Woodland Scrub and various desert scrub communities to California annual grassland and more disturbance tolerant plant communities. This may be in response to the ongoing anthropogenic disturbances, grazing, and increased fire frequency that this area has been subject to over the past decade.

Impacts to native vegetation from construction of Alternative Route 5 are expected to be minimal, as the transmission line is sited in existing disturbed road shoulders and ROWs, and adjacent native vegetation communities have largely been subject to historic and ongoing disturbance. Given the proximity to existing roadways, staff anticipates that minimal access roads would be required for construction of this alternative transmission line, and disturbance would be limited to the pole locations and

pulling sites except where access is required to construct the transmission line east of Highway 14 near the Vincent substation.

Nonetheless impacts to native vegetation would be considered significant absent mitigation. Impacts to ruderal or highly disturbed habitat located in urban areas would be considered less than significant. Specifically, compensatory mitigation would be required between the PHPP project site and between East Avenue P, and between East Avenue S and the Vincent substation.

Direct and indirect construction impacts to vegetation would be reduced to less-than-significant levels with implementation of impact avoidance and minimization measures described in staff's proposed Conditions of Certification **BIO-1** through **BIO-8** and in other conditions of certification. To address specific construction-related impacts to native vegetation communities and habitat loss, staff has incorporated existing measures provided by the applicant and proposed supplemental measures into the Condition of Certification **BIO-10.** Pull sites would be required at a number of locations, using existing access roads or stub roads. Any pull site that is located off of an existing road would also be restored pursuant to Condition of Certification **BIO-10**. In addition, to mitigate for the loss of Mohave ground squirrel habitat, the applicant will implement Condition of Certification **BIO-20** which requires the applicant to obtain 600 acres of desert scrub habitat. The implementation of these measures would reduce impacts to native plant communities to less-than-significant levels.

Invasive and Noxious Weeds/Fugitive Dust

Much of Alternative Route 5 is characterized as highly disturbed native and ruderal plant communities. Invasive weeds and other non-native plants including Russian thistle, various species brome grasses, mustards, and tamarisk are common along portions of the right of way. In some areas, particularly south of West Avenue P and along East Avenue R, the transmission line is located in ruderal plant communities. Similarly, much of the road shoulder along Sierra Highway consists of barren or disturbed plant communities. However, construction activities and soil disturbance could introduce new noxious weeds and further degrade habitat in the remaining natural areas. For natural areas these impacts would be considered significant absent mitigation.

To reduce the potential for the spread of invasive plants, staff has proposed Condition of Certification **BIO-8**. Implementation of this and other conditions would reduce potential impacts to adjacent native plant communities from the introduction and spread of noxious weeds.

Impacts from fugitive dust are the same as described in the FSA; however the more disturbed habitat that occurs along this alignment will likely be less affected by dust. Soil erosion from construction activities and vehicle activity, which affects vegetation and soil properties, could have an adverse effect on Mohave ground squirrel foraging and burrowing potential in the northern portion of the project between Avenue M and the residential development at Avenue O. Indirect impacts associated with fugitive dust would be minimized through the implementation of dust control measures identified in Condition of Certification **BIO-8** and with **SOIL&WATER-3** and **SOIL&WATER-4** (included in staff's **Soil and Water** analysis in the FSA). With the implementation of these conditions of certification, impacts to vegetation communities from dust and

weeds would be less than significant. No additional mitigation is required for this alternative.

Impacts to Special-Status Plants

Floristic surveys for rare plants have not been conducted for this alignment. Reconnaissance level surveys were conducted by Staff in November and December 2010, and with the exception of perennial species such as short-joint beaver tailed cactus the detection of most rare annual plants would not be possible. As discussed in **Section 4.2** of the FSA, one special-status plant, the crowned muilla (*Muilla coronate;* CNPS list 4.2), has been observed on the proposed PHPP project site and potential habitat for several additional special-status plant species, including short-joint beaver tail cactus (*Opuntia basilaris var. brachyclada*; CNPS List 1B.2) occurs along various portions of the line. However, as discussed above, this alternative includes construction of the transmission line in disturbed and ruderal habitats along existing road shoulders and within existing ROWs. Therefore, the potential for rare plants to occur along the transmission line route is considered low. However, impacts to rare plants, should they occur, would be similar to those discussed in the FSA.

Staff concludes that, absent mitigation, adverse impacts to special-status plant species would be significant under CEQA. Staff concludes that these impacts can be mitigated below a level of significance by implementing staff's proposed Condition of Certification **BIO-11.** No additional mitigation is required for this alternative.

Impacts to Common Wildlife

Direct and indirect impacts to common wildlife would be the same as described in the FSA. Common wildlife are also expected to occur along Alternative Route 5; however many of these areas, particularly the urban areas, are not likely to support a broad diversity of native wildlife. Many native species of wildlife are not well adapted to persist in urban areas or have reduced survivorship/ reproductive output when found in developed and urbanized regions. The overall impacts to common wildlife are expected to be low for this alternative as much of the transmission line is located along existing road shoulders and in disturbed habitat. While the alignment does pass through some native habitat and adjacent to Una Lake, an area with a rich diversity of bird life, most of the construction would occur in or adjacent to urbanized and disturbed areas

Staff concludes that, absent mitigation, adverse impacts to common wildlife would remain significant under CEQA. Staff concludes that these impacts can be mitigated below a level of significance by implementing staff's proposed Conditions of Certification **BIO-1** through **BIO-9**. No new mitigation has been proposed for this alternative.

Impacts to Special-Status Invertebrates

Habitat for the San Emigdio blue butterfly has some potential to occur in association with riparian and saltbush scrub habitat that occurs at Una Lake. However, most of this area is disturbed and construction is not expected to impact areas supporting this species. If present, these impacts would be considered significant absent mitigation. Because this alternative would avoid the riparian habitat at Una Lake and the implementation of dust control measures identified in staff's proposed Condition of

Certification **BIO-8**, staff considers the potential impacts to this species to be reduced to a level that is less than significant.

Impacts to Special-Status Amphibians

As discussed in **Section 4.2** of the FSA, several rare amphibian species have been documented in the region, including arroyo toad, mountain yellow-legged frog, and spadefoot toad. Habitat for arroyo toads and mountain yellow-legged frogs are not present along or near the overhead alternative transmission line route and staff concurs that arroyo toads and mountain yellow-legged frogs do not have the potential to occur in this alternative's project area. Therefore, under Alternative Route 5, no impacts to these special-status amphibians would occur and no mitigation is required.

Spadefoot toads have limited potential to occur along the Division Street alignment. While some depressions and swales hold water after seasonal rainfall in the open fields that occur within the city of Palmdale, most of these areas are highly disturbed and appear to be subject to off highway vehicles use and other anthropogenic disturbances. Some limited habitat also occurs along the southern portion of this alternative in the foothills of the San Gabriel Mountains. If present, impacts to this species would be the same as described in the FSA. Staff considers these impacts to be significant absent mitigation. With implementation of Conditions of Certification **BIO-1** through **BIO-9**, impacts would be less than significant. No additional mitigation is required for this alternative.

Impacts to Special-Status Reptiles

As discussed in **Section 4.2** of the FSA, six special-status reptile species have been reported from the vicinity of the project and have some potential to occur along Alternative Route 5. These include desert tortoise, silvery legless lizard, San Diego coast horned lizard, California coast horned lizard, southwestern pond turtle, and two-striped garter snake.

Southwestern pond turtle and two-striped garter snake are riparian associated species and would likely be restricted to aquatic and upland habitat located at Una Lake. Despite its urban setting Una Lake provides suitable habitat for pond turtles and two-striped garter snake. Likewise, upland breeding habitat for both these species is present east of Sierra Highway. While it is not known if these species occur in Una Lake, observations of an unknown turtle species, possibly western pond turtles, have been observed within the Lake (Personal Communication with Dr. Callyn Yorke 2010).

Coast horned lizards and silvery legless lizards have a low potential to occur within the urban portions of Alternative Route 5. Both urbanization and residential development are often cited as a reason for the decline of these species and existing conditions in most of the Alternative Route 5 alignment limit the potential for these species to occur. However, remnant or small isolated populations of these species may still exist within the less disturbed portions of the alignment north of Avenue P and South of Avenue S. If present, impacts to these species would be the same as described in the FSA. Although staff recognizes much of the alignment is disturbed; these impacts would be significant absent mitigation.

Implementation of Conditions of Certification **BIO-1** through **BIO-9** would reduce impacts of the alternative to less than significant. No additional mitigation is required for this alternative.

Desert Tortoise

Surveys for desert tortoises have not been conducted for Alternative Route 5. As described in **Section 4.2** of the FSA, desert tortoise, a once common species from the region, has largely been extirpated from portions of its historic range in the western Mojave Desert. For this alignment, native habitat that could support desert tortoise is present between West Avenue M and West Avenue O. The area between West Avenue M and West Avenue O consists of two sections of land supporting mostly disturbed native scrub communities and Joshua tree woodland. A large wash runs in a north south direction down the middle of the sections but is confined to flood control channels on both the north and southern section. This habitat is crossed by a network of dirt roads, trails, utility rights of ways, and foot paths that support various off highway vehicle use, residential traffic, and illegal dumping. Both of these parcels are confined by development and are further fragmented by Highway 14 and Sierra Highway; two well traveled arterial roadways that border the parcels on the east and west. Staff considers the potential for desert tortoise to occur in these parcels to be low. Portions of the Alternative Route 5 alignment south of West Avenue O are not considered potential habitat for desert tortoise. If present, impacts to this species would be the same as described in the FSA.

One important consideration of indirect impacts is the creation of additional perch and nest sites for ravens. Within the urban built environment south of West Avenue O, the construction transmission line is not expected to increase potential nest and perch sites for common ravens, which are known predators of juvenile desert tortoises. There remain extensive nesting opportunities in the built environment and availability of perch sites and prey, largely a result of human presence, is already high. However, in areas where populations are already low, such as the western Antelope Valley and areas east of the PHPP site, increased raven predation can affect recruitment and recovery of the species.

Regional Approach to Raven Control

The regional approach to raven management is described in the FSA. To mitigate the PHPP Project's contribution to cumulative and indirect impacts on desert tortoise from raven predation, staff proposes that the applicant contribute toward implementation of the Regional Raven Management Program (USFWS 2010), as described in staff's proposed Condition of Certification **BIO-14**.

To mitigate for the regional effects of ravens on desert tortoise, the applicant shall provide a onetime fee in the amount of $105.00 per acre through the REAT Account held by the National Fish and Wildlife Foundation (NFWF). The PHPP will result in the loss of 333 acres of native vegetation at the power plant site, 50 acres at the adjacent laydown area, and approximately one acre along Alternative Route 5. Because a large portion of the transmission line is located within urban areas, staff does not consider these areas to contribute to the tortoise predation risk. For the purposes of this alternative, staff is requiring compensatory mitigation for all lands north of West Avenue

O and South of West Avenue S. This totals less than one acre of permanent disturbance to potential desert tortoise habitat disturbed by the alternative. This payment of $40,320.00 would support the regional raven management plan activities focused within the Mojave Desert Recovery Unit.

To reduce impacts to desert tortoise staff has recommended proposed Conditions of Certification **BIO-1** through **BIO-9**, **BIO-13** and **BIO-14.** No additional mitigation is required for this alternative. Implementation of these conditions would reduce impacts to desert tortoise, if present, to less-than-significant levels and would also satisfy the California Department of Fish and Game's requirements under Fish and Game Code Section 2081.

Impacts to Migratory/Special-Status Bird Species

Focused surveys for birds were not conducted for the Alternative Route 5 alignment. As described in Section 4.2 of the FSA the PHPP site is known to support a broad assemblage of sensitive bird species. Many of the same species are expected to occur within portions of the Alternative Route 5 alignment. In addition, numerous riparian song birds, shore birds, and other avian species not associated with the proposed Project and transmission line alignment, are known to occur at Palmdale Lake and Una Lake. In addition, native vegetation communities located between West Avenue M and West Avenue O support foraging, cover, and/or breeding habitat for a variety of resident and migratory birds. The presence of Joshua tree woodlands in this area increases the nesting potential for a variety of birds including ravens, raptors, and various song birds. A large stick nest, likely occupied by ravens, was observed by staff along Division Street north of West Avenue O.

Although the Alternative Route 5 alignment supports a variety of vegetation communities, much of the route is located either adjacent to existing disturbed habitat, urban areas, residential streets, or the Sierra Highway. While sensitive birds likely occur in some of these some of these areas such as Una Lake, most sensitive birds have a lower level of tolerance for disturbance and construction would occur largely within disturbed habitat and existing road shoulders. Nonetheless, impacts to sensitive birds could occur absent mitigation.

For example, several riparian associated birds identified in **Biological Resource Table 3.2-1** have the potential to occur in the project area. These include the State and federally listed as endangered least bell's vireo and southwestern willow flycatcher. Least Bell's vireo has been documented at Una Lake and it is possible that other sensitive songbirds use the area. Bird surveys conducted by the Antelope Valley College on April 16, 2010 documented 39 Species of birds at Una Lake (http://avconline.avc.edu/cyorke/fieldnotes/lakeuna.html). These included tri-colored blackbirds and yellow-headed blackbird (*Xanthocephalus xanthocephalus*) both species are considered species if special concern by the CDFG. Other species that may occur in the riparian and grassland areas associated Una Lake include long-eared owl (*Asio otus*), which are known to nest in riparian areas, and short eared owls, a species often found in grassland and low scrub communities (*Asio flammeus*).

Burrowing owl, another species well known from the Antelope Valley, may occur along portions of Alternative Route 5. As described in the FSA, Swainson's hawks were

identified by CDFG and staff on the power plant site in September 2009 but have limited potential to occur on most of the alternative corridor. Golden eagle also has a low to moderate potential to occur; primarily due to the proximity of urban development. However, this species may be an occasional visitor to Palmdale Lake. These species are discussed further below.

Direct and indirect impacts to nesting birds or raptors would be the same as described in the FSA and these impacts would be considered significant absent mitigation. However, it is recognized that because of the proximity to existing roadways and developed areas the potential for direct impacts to most species is low.

To reduce impacts to nesting birds, staff has proposed Condition of Certification **BIO-15**. Implementation of this condition would reduce impacts to less-than-significant levels.

Swainson's Hawk

Protocol surveys for the Swainson's hawk (state-listed Threatened) have not been completed for this alternative. However, suitable foraging habitat occurs within the desert scrub and Joshua tree woodland habitat that occurs between West Avenue M and West Avenue O. In addition, seven pairs of Swainson's hawks have been documented nesting within approximately 16 miles of the project site west of Highway 14, with at least one successful nest (CPUC 2009). At least two of those nests occur within 12 miles of the Alternative Route 5 alignment. Swainson's hawks are not expected to occur within the built areas between West Avenue O and West Avenue S.

Staff considers the habitat that occurs between West Avenue M and West Avenue O as potential foraging habitat for Swainson's hawks. Due to the level of disturbance that occurs in this area staff considers the alternative alignment to have a low potential for nesting. If present, impacts to this species would be the same as described in the FSA and would be considered significant absent mitigation.

Construction of the PHPP and Alternative Route 5 would result in the removal of approximately 301 acres of foraging habitat. This includes 116.55 acres of Mojave Creosote Bush Scrub, 183.15 acres of Joshua tree woodland, and one acre on the transmission line alignment.

Calculation of Security for Swainson's Hawk Compensatory Mitigation

Text describing the requirements for the applicant to comply with Section 2081 of the California Endangered Species Act are described in the FSA.

As described in Section 4.2 of the FSA Condition of Certification **BIO-17** would require that the project owner provide financial assurances to guarantee an adequate level of funding to implement the compensation measures described above.

Depending on the location and habitat type of the proposed Mohave ground squirrel mitigation lands (described below), it is possible that some or all of the compensation required under **BIO-17** would be achieved through implementation of Mohave ground squirrel habitat compensation. Should lands identified under Condition of Certification

BIO-20 (Compensation for Mohave Ground Squirrel) provide the habitat types and mitigation acreage required the funds dedicated for Condition of Certification **BIO-17** would be returned. Staff's calculation of the security amount includes estimates of all transaction and management fees required for land acquisition and management. These calculations are presented in **Biological Resources Table 3.2-2**.

Biological Resources Table 3.2-2
Swainson's Hawk Compensation Cost Estimate[1]

	Task	Cost
1.	Land Acquisition 301 acres at 2:1 ratio=602 acres	$10,000 per acre[2]
2.	Level 1 Environmental Site Assessment	$3000 per parcel[3]
3.	Appraisal	$5000 per parcel
4.	Initial site work - clean-up, enhancement , restoration	$250 per acre[4]
5.	Closing and Escrow Costs – 1 transaction includes landowner to 3rd party and 3rd party to agency	$5000 per transaction
6.	Biological survey for determining mitigation value of land (habitat based with species specific augmentation)	$5000 per parcel
7.	3rd party administrative costs - includes staff time to work with agencies and landowners; develop management plan; oversee land transaction; organizational reporting and due diligence; review of acquisition documents; assembling acres to acquire….	10% of land acquisition cost (#1)
8.	Agency costs to review and determine accepting land donation - includes 2 physical inspections; review and approval of the Level 1 ESA assessment; review of all title documents; drafting deed and deed restrictions; issue escrow instructions; mapping the parcels….	15% of land acquisition costs (#1) × 1.17 (17% of the 15% for overhead)
	SUBTOTAL *- Acquisition & Initial Site Work*	***$8,009,610.00***
9.	Long-term Management and Maintenance (LTMM) Fund - includes land management; enforcement and defense of easement or title [short and long term]; monitoring….	$1450 per acre[5]
	SUBTOTAL *- Acquisition, Initial Site Work, & LTMM*	***$8,882,510.00***
	NFWF Fees	
10.	Establish the project specific account	n/a (presumes establishment of Mohave ground squirrel account for project)
11.	NFWF management fee for acquisition & initial site work	3% of SUBTOTAL
12.	NFWF Management fee for LTMM Fund	1% of LTMM Fund
13.	Call for and Process Pre-Proposal Modified RFP	n/a (presumes establishment of Mohave ground squirrel account for project)
	TOTAL *for deposit in REAT-NFWF Project Specific Account*	***$9,131,527.00***

1-5. See FSA

By the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9 and** Conditions of Certification **BIO-16** and **BIO-17,** potential impacts to Swainson's hawk would be reduced to less-than-significant levels and the project would be in compliance with the California Department of Fish and Game's requirements to fully mitigate under section 2081 of California's Fish and Game Code.

Burrowing Owls

Surveys for burrowing owl have not been completed for the Alternative Route 5 alignment. Habitat for burrowing owls occurs intermittingly along the alternative right of way where vegetation conditions, (i.e., shrub cover) provide adequate open space and where access to small mammal burrows, rock piles, or other features support suitable burrowing locations. Habitat includes open areas within desert scrub communities between West Avenue M and East Avenue P. Similarly, large open fields supporting disturbed California annual grassland, ruderal lands, and various scrub communities occurs South of East Avenue P. However, much of this land is confined by development and appears to be subject to human disturbance. As the alignment moves south it transitions to disturbed road shoulders; however, in some areas adjacent lands could support burrowing owls, particularly in the Juniper woodlands and open areas near Una Lake.

Burrowing owls are have limited potential to occur along the proposed alternative alignment. As described in the FSA, implementation of staff's proposed Condition of Certification **BIO-18** would reduce impacts to this species to less-than-significant levels. No additional mitigation is required for this alternative.

Golden Eagles

Golden eagles may occur along portions of Alternative Route 5. Golden eagles avoid developed areas, and eagle populations in California have declined during the past century due to a decrease in open habitats (Grinnell and Miller 1944). The most likely potential for golden eagles to occur is near Palmdale Lake and near the southern terminus of the transmission line as it nears the Vincent substation. Because of the urban development this species is not expected to be a frequent visitor along portions of the transmission line alignment that occurs between West Avenue O and East Avenue S.

Nest sites or breeding activity was not observed on the site and the project does not support nesting habitat. However, potential nesting habitat is present south of the project in the San Gabriel Mountains; however this alignment is not located adjacent to these areas. While large trees do occur in the project area, the proximity to residential and urban development, Highway 14, Sierra Highway and the railroad limit the likelihood of nesting for this species. Based on this staff concluded that project construction activities are not likely to potentially injure or disturb golden eagles.

Impacts to golden eagles are described in the FSA. Indirect effects to golden eagles could result from degradation and alteration of habitat along the transmission line route or through collision with new transmission line structures that will introduce a collision risk between Palmdale Lake and Una Lake.

Golden eagles are not known to nest in the project area and are unlikely to be disturbed from the construction of the proposed project. However, if present in the project area, project activities that disrupt nesting would be considered significant absent mitigation.

The implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9, BIO-20,** and **BIO-24** would be expected to reduce potential impacts to golden eagles to

less-than-significant levels under CEQA, and the project would be compliance with the California Department of Fish and Game's provision for no take of the State Fully Protected Species under Section 3511 of California's Fish and Game Code. No new mitigation has been proposed for this alternative.

Impacts to Special-Status Mammals

Mohave Ground Squirrel

Potential habitat for the Mohave ground squirrel is located along approximately three miles of the Alternative Route 5 right-of-way between West Avenue M and East Avenue P and portions of the right-of-way between East Avenue S and the California Aqueduct. However portions of these areas are highly disturbed or support rabbit bush scrub and other ruderal communities, habitat that typically is not associated with this species.

Trapping was not conducted along the Alternative Route 5 alignment. However, most of the habitat along this alignment is degraded, disturbed areas or adjacent to urban development. In addition, most of the alignment either occurs along disturbed habitat, road shoulders, or in areas not suitable for this species. Further, these areas have been fragmented by road construction and residential development.

In total, approximately 301 acres of permanent habitat loss is expected to occur for this species. This includes 300 acres at the power plant site and approximately one acre along the transmission line route.

Because trapping for this species has not occurred, staff has chosen to assume presence of Mohave ground squirrel for portions of the Alternative Route 5 alignment. This includes the area between West Avenue M and East Avenue P and between East Avenue S and the California Aqueduct. Impacts to suitable habitat within these areas will require compensatory mitigation.

Impacts to Mohave ground squirrel have been described in the FSA and would be considered significant, if present. As described in Section 4.2 of the FSA, the applicant proposes to acquire and enhance mitigation lands to compensate for the potential take of Mohave ground squirrels during construction of the proposed project. Staff recognizes the reduced habitat quality within the Alternative Route 5 alignment and has proposed compensatory mitigation in consideration of the habitat, level of disturbance, and urban setting. Staff concludes that a ratio of 2:1 for the power plant site and areas east of Sierra Highway and 1:1 for the linear routes between West Avenue M and East Avenue P and between East Avenue S and the California Aqueduct, in areas supporting suitable habitat, would be required to mitigate for this species. This would require the project owner to acquire 601 acres of compensatory mitigation. These ratios and the applicant's impact avoidance, minimization, and compensation measures provided in the Incidental Take Permit application have been incorporated into staff's proposed Conditions of Certification **BIO-19** and **BIO-20**. Implementation of these conditions would reduce impacts to Mohave ground squirrel to less-than-significant levels and would also satisfy the CDFG's requirements under Fish and Game Code Section 2081.

Calculation of Security for Mohave Ground Squirrel Compensatory Mitigation

Text describing the requirements in order for the applicant to comply with Section 2081 of the California Endangered Species Act are described in the FSA.

Condition of Certification **BIO-20** would require that the project owner provide financial assurances to guarantee an adequate level of funding to implement the compensation measures described above. These calculations are presented in **Biological Resources Table 3.2-3**.

Biological Resources Table 3.2-3
Mohave Ground Squirrel Compensation Cost Estimate[1]

	Task	Cost
1.	Land Acquisition (total of 610 acres) 2:1 ratio on power plant site 1:1 on transmission line between West Avenue M and West Avenue O.	$10,000 per acre[2]
2.	Level 1 Environmental Site Assessment	$3000 per parcel[3]
3.	Appraisal	$5000 per parcel
4.	Initial site work - clean-up, enhancement , restoration	$250 per acre[4]
5.	Closing and Escrow Costs – 1 transaction includes landowner to 3rd party and 3rd party to agency	$5000 per transaction
6.	Biological survey for determining mitigation value of land (habitat based with species specific augmentation)	$5000 per parcel
7.	3rd party administrative costs - includes staff time to work with agencies and landowners; develop management plan; oversee land transaction; organizational reporting and due diligence; review of acquisition documents; assembling acres to acquire….	10% of land acquisition cost (#1)
8.	Agency costs to review and determine accepting land donation - includes 2 physical inspections; review and approval of the Level 1 ESA assessment; review of all title documents; drafting deed and deed restrictions; issue escrow instructions; mapping the parcels….	15% of land acquisition costs (#1) × 1.17 (17% of the 15% for overhead)
	SUBTOTAL *- Acquisition & Initial Site Work*	***$7,996,305.00***
9.	Long-term Management and Maintenance (LTMM) Fund - includes land management; enforcement and defense of easement or title [short and long term]; monitoring….	$1450 per acre[5]
	SUBTOTAL *- Acquisition, Initial Site Work, & LTMM*	***$8,867,755.00***
	NFWF Fees	
10.	Establish the project specific account	$12,000
11.	NFWF management fee for acquisition & initial site work	3% of SUBTOTAL
12.	NFWF Management fee for LTMM Fund	1% of LTMM Fund
13.	Call for and Process Pre-Proposal Modified RFP	$30,000
	TOTAL *for deposit in REAT-NFWF Project Specific Account*	***$9,158,358.00***

1-5. See FSA

American Badger and Desert Kit Fox

Habitat for American badgers occurs along the Alternative Route 5 alignment in some locations. Desert kit fox may occur in the project area and portions of the alignment includes suitable foraging and denning habitat for this species.

Impacts to these species would be the same as described in the FSA and would be significant absent mitigation. Implementation of **BIO-21** would reduce impacts to the American badger and desert kit fox to a less-than-significant level.

Pallid San Diego Pocket Mouse and Southern Grasshopper Mouse

Impacts to the Pallid San Diego pocket mouse and southern grasshopper mouse would be the same as described in Section 4.2 of the FSA. However, these species have a limited potential to occur in the Alternative Route 5 alignment and these species are likely not associated with urban areas and disturbed road edges along the Sierra Highway. However, suitable habitat occurs to a limited degree adjacent to the proposed alignment and there is potential for direct loss of these species. Impacts to these species would be the same as described in the FSA and would be significant absent mitigation. Implementation of **BIO-1** through **BIO-9, and BIO-20** would reduce impacts to these species to a less-than-significant level.

Special-Status Bats

Impacts to special status bats would be the same as described in Section 4.2 of the FSA. Bats may also occur along portions of Alternative Route 5. However, this alternative does not support large rock outcrops, bridges, or tunnels. The most likely area to encounter foraging bats on this alternative is near Una Lake and the desert scrub communities between West Avenue M and West Avenue O.

In general, bats are highly mobile and it is unlikely that construction activities would Implementation of **BIO-22** would reduce impacts to these species to a less-than-significant level.

Impacts to Wildlife Movement Corridors or Native Wildlife Nursery Sites

Impacts to wildlife movement corridors or native nursery sites would be the same as described in Section 4.2 of the FSA and are considered less than significant. This alignment is primarily located within historically disturbed areas and most of the right-of-way occurs within or adjacent to commercial and residential development, disturbed road shoulders of major highways and along railroad rights of way. Much of this habitat is fragmented and lacks connectivity to adjacent natural lands.

Impacts to Waters of the State

A jurisdictional delineation for Alternative Route 5 has not been conducted. A review of aerial photography of the proposed alignment and reconnaissance level surveys of the right-of-way identified a series of potential State jurisdictional waters. Most of these features are ephemeral, lack riparian vegetation and consist of small swales, gullies, culverts, and drainages that cross the transmission line alignment between West Avenue M and the Vincent substation. Una Lake and Palmdale Lake, both known jurisdictional features, border Sierra Highway but would not be directly impacted by the proposed alternative. Small drainages that support riparian vegetation were noted south of East Avenue S and near Una Lake.

Direct impacts to jurisdictional habitats would be the same as described in the FSA.

Implementation of **BIO-23** would reduce impacts to these species to a less-than-significant level. This condition would require the completion of a jurisdictional delineation to fulfill the requirements of CDFG's Lake and Streambed Alteration Agreement program pursuant to Fish and Game Code Section 1600 et seq. The USACE has indicated that although waters of the United States do occur, the proposed project would not be regulated provided work is conducted outside the ordinary high water mark for areas designated as waters of the United States. Condition of Certification **BIO-23** includes language requiring the applicant to avoid permanent impacts to all waters of the United States.

Operation Impacts and Mitigation

Potential impacts to biological resources from the operation of the project include increased risk of raven predation on desert tortoise and wildlife, increased levels of traffic and disturbance, potential collisions with structures, and lighting. These impacts are discussed below.

Ravens

The operational impacts to desert tortoise are described in the FSA for the proposed project.

Cumulative/Regional Impacts of Ravens

The regional impacts from ravens are the same as described in the FSA. However, most of the Alternative Route 5 alignment is located in close proximity to urban areas and the risk of further subsidies to ravens is considered low. To reduce this effect, staff has proposed the development and implementation of a Raven Monitoring, Management, and Control Plan for the project. Condition of Certification **BIO-14** would require the applicant to contribute a one-time fee to support the regional raven management plan activities. The fund and fee are described above (**Impacts to Desert Tortoise**). The fee would offset contributions of the project to cumulative impacts associated with regional increases in raven numbers, and implementation of the project-specific raven management efforts proposed by the applicant would reduce impacts to desert tortoise from raven predation to less-than-significant levels under CEQA.

Project impacts would also be minimized from the implementation of staff's proposed Condition of Certification **BIO-8**, which requires the control of excess ponded water, food waste and other attractants to reduce subsidies to ravens.

Other Predators

Most of the Alternative Route 5 alignment is located in close proximity to urban areas and tortoises are not expected to occur. However, dogs may range several miles into the desert and have been found digging up and killing desert tortoises (USFWS 1994; Evans 2001). Implementation of staff's proposed Condition of Certification **BIO-6**, the Worker Environmental Awareness Program (WEAP), and restrictions on pets being brought to the site (Condition of Certification **BIO-8**), would reduce the potential for these impacts.

Increased Risk from Roads/Traffic

Direct and indirect impacts to from increased road traffic would be the same as described in the FSA. However, wildlife use along Alternative Route 5 is currently subject to high levels of vehicle traffic and largely occurs in an urban setting. Therefore, the overall impacts from increased road traffic are expected to be low for this alternative as much of the transmission line is located along existing road shoulders and in disturbed habitat. While the alignment does pass through some native habitat and adjacent to Una Lake, most of the construction would occur in or adjacent to urbanized and disturbed areas. Implementation of **BIO-8** would reduce impacts from road traffic to a less-than-significant level. No new mitigation has been proposed for this alternative.

Noise

Direct and indirect impacts to from noise would be the same as described in the FSA. However, current noise levels along most of Alternative Route 5 are high due to road traffic, rail use, and residential/commercial development. More natural areas include the scrub communities that occur between West Avenue M and West Avenue O. In addition, noise could adversely impact birds at Una Lake. However, the impact on operational noise from this alternative on surrounding wildlife is expected to be less than significant.

Bird Collisions and Electrocution

Bird collision risk for the transmission line is the same as described in the FSA. In addition, the reduced distance of Alternative Route 5 and its location in more urban settings would result in a lower risk of collision for most species. However, because this alternative would result in the introduction of a new transmission line that bisects potential flight paths between Una Lake and Palmdale Lake, this alternative could result in elevated collision risks for shore birds and other avian species that are associated with these lakes.

Risk of power line electrocutions are the same as described in the FSA. The proposed transmission line would be energized at 230 kV, which poses a low risk for most avian electrocutions. Implementation of staff's proposed Condition of Certification **BIO-8** requires transmission lines and all electrical components to be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Mitigating Bird Collisions with Power Lines* (APLIC 2004) to reduce the likelihood of large bird electrocutions and collisions. With the proposed mitigation addressed in staff's proposed Condition of Certification **BIO-8**, staff concludes that the proposed transmission lines would not pose a significant threat to birds.

Lighting

Project impacts from night lighting would be the same as described in the FSA. No additional night lighting would be required for Alternative Route 5. As discussed in the Visual Resources section, construction lighting must be consistent with worker safety codes, directed toward the center of the construction site, shielded to prevent light from straying offsite, and task-specific. Staff has proposed Condition of Certification **VIS-3** to formalize temporary lighting measures during construction activity and on the laydown

area. See staff's **Visual** analysis for more details about staff's proposed Conditions of Certification **VIS-3** and **VIS-4**. With implementation of this measure, construction lighting at the PHPP would have no adverse effects on wildlife.

Glare

Project impacts from glare would be the same as described in the FSA. No additional impacts from glare would occur for Alternative Route 5.

Staff concludes that the Avian and Bat Protection Plan and mortality monitoring as recommended in Condition of Certification **BIO-24** would effectively determine rates of bird and bat mortality and would result in implementation of further feasible measures as needed to mitigate significant bird collisions, if they should occur, below a level of significance.

Proposed Conditions of Certification – Alternative Route 5

No new Conditions of Certification are proposed for Alternative Route 5. However, the impact acreages associated with Conditions of Certification **BIO-14**, **BIO-17**, and **BIO-20** have been revised to reflect the altered project footprints.

RAVEN FEE, MONITORING, MANAGEMENT, AND CONTROL PLAN

BIO-14 The project owner shall design and implement a Raven Monitoring, Management, and Control Plan (Raven Plan) that is consistent with the most current USFWS-approved raven management guidelines and that meets the approval of the USFWS, CDFG, and the CPM. Any subsequent modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG. The Raven Plan shall include but not be limited to a program to monitor increased raven presence in the Project vicinity and to implement raven control measures as needed based on that monitoring. The purpose of the plan is to avoid any Project-related increases in raven numbers during construction, operation, and decommissioning. The threshold for implementation of raven control measures shall be any increases in raven numbers from baseline conditions, as detected by monitoring to be proposed in the Raven Plan. Regardless of raven monitoring results, the project owner shall be responsible for all other aspects of the Raven Plan, including avoidance and minimization of project-related trash, water sources, or perch/roost sites that could contribute to increased raven numbers. In addition, to offset the cumulative contributions of the Project to desert tortoise from increased raven numbers, the Project owner shall also contribute to the USFWS Regional Raven Management Program. The Project owner shall do all of the following:

1. Prepare and Implement a Raven Management Plan that includes the following:
    a. Identify conditions associated with the Project that might provide raven subsidies or attractants;
    b. Describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities;

c. Describe control practices for ravens;

d. Address monitoring and nest removal during construction and for the life of the Project, and;

e. Discuss reporting requirements.

2. Contribute to the REAT Regional Raven Management Program. The project owner shall submit payment to the project sub-account of the REAT Account held by the National Fish and Wildlife Foundation (NFWF) to support the REAT Regional Raven Management Program. The amount shall be a one-time payment of $105 per acre (384 acres) of permanent disturbance fee $40,320.00.

Verification: No later than 30 days prior to any construction-related ground disturbance activities, the Project owner shall provide the CPM, USFWS, and CDFG with the final version of a Raven Plan. All modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG. No later than 60 days prior to the start of construction, the project owner shall provide written verification to the CPM that NFWF has received and accepted payment into the project's sub-account of the REAT Account to support the USFWS Regional Raven Management Program. On January 31st of each year following construction, the Designated Biologist shall provide a report to the CPM that includes: a summary of the results of raven management and control activities for the year; a discussion of whether raven control and management goals for the year were met; and recommendations for raven management activities for the upcoming year.

SWAINSON'S HAWK HABITAT COMPENSATORY MITIGATION

BIO-17 The project owner shall either assume that Swainson's hawk nest within five miles of the project site and provide compensatory mitigation as described below or complete CFDG protocol surveys within five miles of project facilities that result in permanent impacts to Swainson's hawk foraging habitat. If surveys are completed they shall include the following components.

The survey periods shall follow a specified schedule: Period I occurs from 1 January to 31 March, Period II occurs from 1 April to 30 April, Period III occurs from 1 may to 30 May, and Period IV occurs from 1 June to 15 July. No fewer than three surveys per period in at least two survey periods shall be completed immediately prior to the start of project construction. All nest sites shall be recorded, mapped using GIS and provided to the CPM and CDFG. Compensatory mitigation at a 2:1 ratio shall be required for permanent impacts. If active Swainson's hawk nests (i.e., any nest active within five years) are not detected within 5 miles of the project site or linear facilities, the project owner will not be required to provide compensatory mitigation.

If the project owner assumes presence, the project owner shall provide compensatory mitigation acreage for 602 acres of Swainson's hawk habitat lands, adjusted to reflect the final project footprint, as specified in this condition. In addition, the project owner shall provide funding for initial improvement and long-term maintenance, enhancement, and management of

the acquired lands for protection and enhancement Swainson's hawk populations, and comply with other related requirements of this condition.

a. Loss of foraging habitat for Swainson's hawks shall be mitigated by providing Habitat Management (HM) lands at a ratio of 2:1 for any foraging habitat impacted within a 5-mile radius of active Swainson's hawk nest(s) (CDFG considers a nest active if it was used one or more times within the last 5 years). Foraging habitat includes but is not limited to alfalfa; fallow fields; beet, tomato, onions, and other low-growing row or field crops; dry-land and irrigated pasture; and cereal grain crops (including corn after harvest). Joshua tree woodland shall be considered foraging habitat in the Antelope Valley.

b. Lands which are currently in urban use or lands that have no existing or potential value for foraging Swainson's hawks will not require mitigation. The project owner will provide the CPM and CDFG a report of potential foraging lands impacted by the proposed project as determined by consultation with the CDFG and recent site-specific surveys conducted by a CDFG-qualified raptor biologist.

This acreage was calculated as follows: a ratio of 2:1 for the PHPP power plant site and transmission line alignment (602 acres). Costs of these requirements are estimated to be $8,882,510.00 (see **Biological Resources Tables 3.2-3** for a complete breakdown of costs and acreage). All costs are best estimates as of fall 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation based on changing land costs or management fees. Regardless of the estimates, the project owner is responsible for providing adequate funding to implement the required mitigation.

These impact acreages shall be adjusted to reflect the final project footprint. For purposes of this condition, the Project footprint means all lands disturbed in the construction and operation of the Palmdale Hybrid Power Plant Project Site and one acre of land between West Avenue M and West Avenue O.

This compensation acreage may be included ("nested") within the acreage acquired and managed as Mohave ground squirrel habitat compensation (Condition of Certification **BIO-20**) only if:

a. A minimum of 601 acres of habitat including a minimum of 366.3 acres of Joshua tree woodland, 234.1 acres of Mojave creosote bush scrub are present.

b. The Mohave ground squirrel habitat compensation lands are acquired and dedicated as permanent conservation lands within 18 months of the start of project construction.

If these two criteria are not met, then the project owner shall provide the required number of acres of Swainson's hawk habitat compensation lands, adjusted to reflect the final project footprint and additional delineation of suitable habitat, independent of any compensation land required under other conditions of certification, and shall also provide funding for the initial

improvement and long-term maintenance and management of the acquired lands, and shall comply with other related requirements this condition.

The project owner shall provide financial assurances as described below in the amount of $8,882,510.00. In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by depositing funds into a Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described below. If the Project owner elects to establish a REAT NFWF Account and have NFWF and the agencies complete the required habitat compensation, then the total estimated cost of complying with this condition is $9,131,527.00. The amount of security or NFWF deposit shall be adjusted up or down to reflect any revised cost estimates recommended by REAT.

The actual costs to comply with this condition will vary depending on the final footprint of the project, the costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a Property Analysis Report or similar analysis (below). The 602 acre habitat requirement, and associated funding requirements based on that acreage, shall be adjusted up or down if there are changes in the final footprint of the project or the associated costs of evaluation, acquisition, management, and other factors listed in **Biological Resources Tables 3.2-2**. Regardless of actual cost, the project owner shall be responsible for funding all requirements of this condition.

COMPENSATORY MITIGATION LAND ACQUISITION

1. Method of Acquisition. Compensation lands shall be acquired by either of the two options listed below. Regardless of the method of acquisition, the transaction shall be complete only upon completion of all terms and conditions described in this Condition of Certification.

a. The project owner shall acquire lands and transfer title and/or conservation easement to a state or federal land management agency or to a third-party non-profit land management organization, as approved by the CPM in consultation with CDFG; or

b. The Project owner shall deposit funds into a project-specific subaccount within the REAT Account established with the NFWF, in the amount as indicated in **Biological Resources Tables 3.2-2** (adjusted to reflect final project footprint and any applicable REAT adjustments to costs).

2. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition to meet Energy Commission and CESA requirements shall be equal to or better than the quality and function of the habitat impacted and:

   a. Be within the Western Mojave Desert;

   b. Provide moderate to good quality foraging habitat for Swainson's hawk with capacity to improve in quality and value for this species; and

c. Be near lands for which there is reasonable evidence (for example, recent (<15 years) CNDDB occurrences on or immediately adjacent to the proposed lands) suggesting current occupation by Swainson's hawk ideally with populations that are stable, recovering, or likely to recover.

d. be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;

e. not have a history of intensive recreational use or other disturbance that might cause future erosional damage or other habitat damage, and make habitat recovery and restoration infeasible;

f. not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration; and

g. not contain hazardous wastes that cannot be removed to the extent that the site could not provide suitable habitat; and

h. have water and mineral rights included as part of the acquisition, unless the CPM, in consultation with CDFG, agrees in writing to the acceptability of land without these rights.

3. Review and Approval of Compensation Lands Prior to Acquisition. The project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for Swainson's hawk in relation to the criteria listed above and must be approved by the CPM. The CPM will share the proposal with and consult with CDFG before deciding whether to approve or disapprove the proposed acquisition.

4. Compensation Lands Acquisition Conditions: The project owner shall comply with the following conditions relating to acquisition of the compensation lands after the CPM, in consultation with CDFG approved the proposed compensation lands:

a. Preliminary Report: The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM, in consultation with CDFG. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

b. Title/Conveyance: The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM in consultation with CDFG. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to other public agency approved by the CPM in consultation with CDFG. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM, in consultation with CDFG, of the terms of any transfer of fee title or conservation easement to the compensation lands.

c. Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM, in consultation with CDFG, before it can be used to establish funding levels or management activities for the compensation lands.

5. Compensation Lands Acquisition Costs: The Project owner shall pay all other costs related to acquisition of compensation lands and conservation easements. In addition to actual land costs, these acquisition costs shall include but shall not be limited to the items listed below. Management costs including site cleanup measures are described separately, in the following section.

a. Level 1 Environmental Site Assessment;

b. Appraisal;

c. Title and document review costs;

d. Expenses incurred from other state, federal, or local agency reviews;

e. Closing and escrow costs;

f. Overhead costs related to providing compensation lands to CDFG or an approved third party;

g. Biological survey(s) to determine mitigation value of the land; and

h. Agency costs to accept the land (e.g., writing and recording of conservation easements; title transfer).

COMPENSATORY MITIGATION LAND IMPROVEMENT

1. Land Improvement Requirements: The Project owner shall fund activities that the CPM, in consultation with the CDFG, requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include surveys of boundaries and property lines, installation of signs, trash removal and other site cleanup measures, construction and repair of fences, invasive plant removal, removal of roads, and similar measures to protect habitat and improve habitat quality on the compensation lands.

   The costs of these activities are estimated at $250 an acre, but will vary depending on the measures that are required for the compensation lands. A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

COMPENSATORY MITIGATION LAND LONG-TERM MANAGEMENT

1. Long-term Management Requirements: Long-term management is required to ensure that the compensation lands are managed and maintained to protect and enhance habitat for desert tortoise. Management activities may include maintenance of signs, fences, removal of invasive weeds, monitoring, security and enforcement, and control or elimination of unauthorized use.

2. Long-term Management Plan. The project owner shall pay for the preparation of a Management Plan for the compensation lands. The Management Plan shall reflect site-specific enhancement measures on the acquired compensation lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG.

3. Long-Term Maintenance and Management Funding. The Project owner shall provide money to establish an account with a non-wasting capital that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. The amount of required funding is initially estimated to be $1,450 for every acre of compensation lands. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the Project owner shall provide initial payment of $872,900.00 calculated at $1,450 an acre for each compensation acre, as shown in **Biological Resources Tables 3.2-2** (above) into an account for long-term maintenance and management of compensation lands. The amount of the required initial

payment or security for this item shall be adjusted for any change in the Project footprint as described above. If an initial payment is made based on the estimated per-acre costs, the project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $1,450 an acre will be required for long-term maintenance and management, the excess paid will be returned to the Project owner.

The project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with the project owner and CDFG before deciding whether to approve an entity to hold the project's long-term maintenance and management funds on any lands. The CPM, in consultation with the project owner and CDFG, may designate another state agency or non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity.

If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity such as NFWF to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following conditions:

i. Interest. Interest generated from the initial capital shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by CDFG designed to protect or improve the habitat values of the compensation lands.

ii. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFG designates NFWF or another entity to manage the long-term maintenance and management fee for CDFG.

iii. Pooling Funds. A CPM- approved non-profit organization qualified to hold long-term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the fund with other

funds for the operation, management, and protection of the compensation lands for local populations of desert tortoise. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CDFG and CPM.

iv. Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State or State-approved federal agency reviews; and overhead related to providing compensation lands.

COMPENSATORY MITIGATION LAND SECURITY

1. Compensation Mitigation Security: The project owner shall provide security sufficient for funding acquisition, improvement, and long-term management of Swainson's hawk compensation land. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security.

   The security amount shall be based on the estimates provided in **Biological Resources Tables 3.2-2.** This amount shall be updated and verified prior to payment and shall be adjusted to reflect actual costs or more current estimates as agreed upon by the REAT agencies.

   The Project owner shall provide verification that financial assurances have been established to the CPM with copies of the document(s) to CDFG, to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing activities described in Section A of this condition.

   In the event that the project owner defaults on the Security, the CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition. Any amount of the Security that is not used to carry out mitigation shall be returned to the Project owner upon successful completion of the associated requirements in this condition.

   Security for the requirements of this condition shall be provided in the amount of $9,131,527.00 if the project owner elects to use the REAT Account with NFWF pursuant to paragraph 4 of this condition, below). The Security is calculated in part from the items that follow but adjusted as specified below (consult **Biological Resources Tables 3.2-2** for the complete breakdown of estimated costs). However, regardless of the amount of the security or actual cost of implementation, the project owner shall be responsible for implementing all aspects of this condition.

i. land acquisition costs for compensation land, calculated at $10,000/acre;

ii. Site assessments, appraisals, biological surveys, transaction closing and escrow costs, calculated as $18,000 total per parcel (presuming 60 acres per parcel)

iii. Initial site clean-up, restoration, or enhancement, calculated at $250/acre;

iv. Third-party and agency administrative transaction costs and overhead, calculated as percentages of land cost;

v. Long-term management and maintenance fund, calculated at $1,450 per acre;

vi. NFWF fees to establish a project-specific account; manage the sub-account for acquisition and initial site work; and manage the sub-account for long term management and maintenance.

2. The project owner may elect to comply with some or all of the requirements in this condition by providing funds to implement the requirements into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs of implementing the requirement (as set forth in the Security section of this condition, paragraph 3, above). If the actual cost of the acquisition, initial protection and habitat improvements, long-term funding or other cost is more than the estimated amount initially paid by the project owner, the project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, the long-term funding requirements as established in an approved PAR or PAR-like analysis, or the other actual costs that are estimated in the table. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the project owner.

3. The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the project.

4. The project owner may request the CPM to provide it with all available information about any funds held by the Energy Commission, CDFG or NFWF as project security, or funds held in a NFWF sub-account for this project, or other project-specific account held by a third party. The CPM

shall also fully cooperate with any independent audit that the project owner may choose to perform on any of these funds.

Verification: The project owner shall provide the CPM with either the results of the nesting surveys or written verification that the project owner shall assume presence no less than 60 days prior to ground disturbance or site mobilization. on the project site.

If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner shall provide verification to the CPM and CDFG that an approved Security has been established in accordance with this condition of certification no later than 30 days prior to beginning Project ground-disturbing activities. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security. The project owner, or an approved third party, shall complete and provide written verification to the CPM and CDFG of the compensation lands acquisition and transfer within 18 months of the start of Project ground-disturbing activities.

No later than 12 months after the start of any ground-disturbing project activities, the project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase, and shall obtain approval from the CPM, in consultation with CDFG prior to the acquisition. If NFWF or another approved third party is handling the acquisition, the project owner shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM and CDFG of such completion, no later than 18 months after the issuance of the Energy Commission Decision.

The project owner shall complete and submit to the CPM a PAR or PAR-like analysis no later than 60 days after the CPM approves compensation lands for acquisition associated with any phase of construction. The project owner shall fully fund the required amount for long-term maintenance and management of the compensation lands for that phase of construction no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. Written verification shall be provided to the CPM and CDFG to confirm payment of the long-term maintenance and management funds.

No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands for any phase of construction, the project owner shall make funding available for those activities and provide written verification to the CPM of what funds are available and how costs will be paid. Initial protection and habitat improvement activities on the compensation lands for that phase of construction shall be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands.

The project owner, or an approved third party, shall provide the CPM and CDFG with a management plan for the compensation lands associated with any phase of construction within 180 days of the land or easement purchase, as determined by the

date on the title. The CPM, in consultation with CDFG shall approve the management plan after its content is acceptable to the CPM.

Within 90 days after completion of all project related ground disturbance, the project owner shall provide to the CPM and CDFG an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction. If this analysis shows that more lands were disturbed than was anticipated in this condition, the project owner shall provide the Energy Commission with additional compensation lands and funding commensurate with the added impacts and applicable mitigation ratios set forth in this condition. A final analysis of all project related ground disturbance may not result in a reduction of compensation requirements if the deadlines established under this condition for transfer of compensation lands and funding have passed prior to completion of the analysis.

MOHAVE GROUND SQUIRREL HABITAT COMPENSATORY MITIGATION

BIO-20 The project owner shall provide compensatory mitigation acreage of 665 acres of Mohave ground squirrel habitat lands, adjusted to reflect the final project footprint, as specified in this condition. In addition, the project owner shall provide funding for initial improvement and long-term maintenance, enhancement, and management of the acquired lands for protection and enhancement Mohave ground squirrel populations, and comply with other related requirements of this condition.

This mitigation ratio is based on a 2:1 ratio for the power plant site and a 1:1 ratio for the transmission line route. Costs of these requirements are estimated to be $8,867,755.00 (see **Biological Resources Table 3.2-3** for a complete breakdown of costs and acreage). All costs are best estimates as of fall 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation based on changing land costs or management fees. Regardless of the estimates, the project owner is responsible for providing adequate funding to implement the required mitigation.

In lieu of acquiring lands itself, the project owner may satisfy the requirements of this condition by depositing funds into a Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described below. If the Project owner elects to establish a REAT NFWF Account and have NFWF and the agencies complete the required habitat compensation, then the total estimated cost of complying with this condition is $9,158,358.00. The amount of security or NFWF deposit shall be adjusted up or down to reflect any revised cost estimates recommended by REAT.

The actual costs to comply with this condition will vary depending on the final footprint of the project, the costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a Property Analysis Report or similar analysis (below). The 601 acre habitat requirement, and associated funding requirements based on that acreage, shall be adjusted up or down if there are

changes in the final footprint of the project or the associated costs of evaluation, acquisition, management, and other factors listed in **Biological Resources Table 3.2-3**. Regardless of actual cost, the project owner shall be responsible for funding all requirements of this condition.

COMPENSATORY MITIGATION LAND ACQUISITION

1. Method of Acquisition. Compensation lands shall be acquired by either of the two options listed below. Regardless of the method of acquisition, the transaction shall be complete only upon completion of all terms and conditions described in this Condition of Certification.

a. The project owner shall acquire lands and transfer title and/or conservation easement to a state or federal land management agency or to a third-party non-profit land management organization, as approved by the CPM in consultation with CDFG; or

b. The project owner shall deposit funds into a project-specific subaccount within the REAT Account established with the NFWF, in the amount as indicated in **Biological Resources Table 3.2-3** (adjusted to reflect final project footprint and any applicable REAT adjustments to costs).

2. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition shall:

   a. Be in the western Mojave Desert;

   b. Provide moderate to good quality habitat for Mohave ground squirrel with capacity to improve in quality and value for this species;

   c. Be a contiguous block of land (preferably) or located so they result in a contiguous block of protected habitat;

   d. Be adjacent to larger blocks of lands that are already protected, or be in a location approved by the CDFG, such that there is connectivity between the acquired lands and the protected lands;

   e. Be connected to lands for which there is reasonable evidence (for example, recent [<15 years] CNDDB occurrences on or immediately adjacent to the proposed lands) suggesting current occupation by Mohave ground squirrel, ideally with populations that are stable, recovering, or likely to recover;

   f. Not have a history of intensive recreational use, grazing, or other disturbance that might make habitat recovery and restoration infeasible;

   g. Not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration; and

h. Not be encumbered by easements or uses that would preclude fencing of the site or preclude or unacceptably constrain management of the site for the primary benefit of the species and their habitat for which mitigation lands were secured.

3. Review and Approval of Compensation Lands Prior to Acquisition. The project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for Mohave ground squirrel in relation to the criteria listed above and must be approved by the CPM. The CPM will share the proposal with and consult with CDFG before deciding whether to approve or disapprove the proposed acquisition.

4. Compensation Lands Acquisition Conditions: The project owner shall comply with the following conditions relating to acquisition of the compensation lands after the CPM, in consultation with CDFG approved the proposed compensation lands:

   a. Preliminary Report: The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM, in consultation with CDFG. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

   b. Title/Conveyance: The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM in consultation with CDFG. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to other public agency approved by the CPM in consultation with CDFG. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM, in consultation with CDFG, of the terms of any transfer of fee title or conservation easement to the compensation lands.

   c. Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term

maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM, in consultation with CDFG, before it can be used to establish funding levels or management activities for the compensation lands.

5. Compensation Lands Acquisition Costs: The Project owner shall pay all other costs related to acquisition of compensation lands and conservation easements. In addition to actual land costs, these acquisition costs shall include but shall not be limited to the items listed below. Management costs including site cleanup measures are described separately, in the following section.

   a. Level 1 Environmental Site Assessment;
   b. Appraisal;
   c. Title and document review costs;
   d. Expenses incurred from other state, federal, or local agency reviews;
   e. Closing and escrow costs;
   f. Overhead costs related to providing compensation lands to CDFG or an approved third party;
   g. Biological survey(s) to determine mitigation value of the land; and
   h. Agency costs to accept the land (e.g., writing and recording of conservation easements; title transfer).

COMPENSATORY MITIGATION LAND IMPROVEMENT

1. Land Improvement Requirements: The Project owner shall fund activities that the CPM, in consultation with the CDFG requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include surveys of boundaries and property lines, installation of signs, trash removal and other site cleanup measures, construction and repair of fences, invasive plant removal, removal of roads, and similar measures to protect habitat and improve habitat quality on the compensation lands.

   The costs of these activities are estimated at $250 an acre, but will vary depending on the measures that are required for the compensation lands. A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

COMPENSATORY MITIGATION LAND LONG-TERM MANAGEMENT

1. Long-term Management Requirements: Long-term management is required to ensure that the compensation lands are managed and maintained to protect and enhance habitat for desert tortoise. Management activities may include maintenance of signs, fences, removal of invasive weeds, monitoring, security and enforcement, and control or elimination of unauthorized use.

2. Long-term Management Plan. The project owner shall pay for the preparation of a Management Plan for the compensation lands. The Management Plan shall reflect site-specific enhancement measures on the acquired compensation lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG.

3. Long-Term Maintenance and Management Funding. The Project owner shall provide money to establish an account with a non-wasting capital that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. The amount of required funding is initially estimated to be $1,450 for every acre of compensation lands. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the Project owner shall provide initial payment of $8,867,755.00 calculated at $1,450 an acre for each compensation acre, as shown in **Biological Resources Table 3.2-3** (above) into an account for long-term maintenance and management of compensation lands. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project footprint as described above. If an initial payment is made based on the estimated per-acre costs, the project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $1,450 an acre will be required for long-term maintenance and management, the excess paid will be returned to the Project owner.

   The project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with the project owner and CDFG before deciding whether to approve an entity to hold the project's long-term maintenance and management funds on any lands. The CPM, in consultation with the project owner and CDFG, may designate another state agency or non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity.

   If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity

such as NFWF to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following conditions:

i. Interest. Interest generated from the initial capital shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by CDFG designed to protect or improve the habitat values of the compensation lands.

ii. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFG designates NFWF or another entity to manage the long-term maintenance and management fee for CDFG.

iii. Pooling Funds. A CPM- approved non-profit organization qualified to hold long-term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the fund with other funds for the operation, management, and protection of the compensation lands for local populations of desert tortoise. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CDFG and CPM.

iv. Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State or State-approved federal agency reviews; and overhead related to providing compensation lands.

COMPENSATORY MITIGATION LAND SECURITY

1. Compensation Mitigation Security: The project owner shall provide security sufficient for funding acquisition, improvement, and long-term management of desert tortoise compensation land. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security.

   The security amount shall be based on the estimates provided in **Biological Resources Table 3.2-3.** This amount shall be updated and

verified prior to payment and shall be adjusted to reflect actual costs or more current estimates as agreed upon by the REAT agencies.

The Project owner shall provide verification that financial assurances have been established to the CPM with copies of the document(s) to CDFG, to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing activities described in Section A of this condition.

In the event that the project owner defaults on the Security, the CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition. Any amount of the Security that is not used to carry out mitigation shall be returned to the Project owner upon successful completion of the associated requirements in this condition.

Security for the requirements of this condition shall be provided in the amount of $9,158,358.00 if the project owner elects to use the REAT Account with NFWF pursuant to paragraph 4 of this condition, below). The Security is calculated in part from the items that follow but adjusted as specified below (consult **Biological Resources Table 3.2-3** for the complete breakdown of estimated costs). However, regardless of the amount of the security or actual cost of implementation, the project owner shall be responsible for implementing all aspects of this condition.

i. land acquisition costs for compensation land, calculated at $10,000/acre;

ii. Site assessments, appraisals, biological surveys, transaction closing and escrow costs, calculated as $18,000 total per parcel (presuming 60 acres per parcel);

iii. Initial site clean-up, restoration, or enhancement, calculated at $250/acre;

iv. Third-party and agency administrative transaction costs and overhead, calculated as percentages of land cost;

v. Long-term management and maintenance fund, calculated at $1,450 per acre; and

vi. NFWF fees to establish a project-specific account; manage the sub-account for acquisition and initial site work; and manage the sub-account for long term management and maintenance.

2. The project owner may elect to comply with some or all of the requirements in this condition by providing funds to implement the requirements into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs of implementing the requirement (as set forth in the Security section of this condition,

paragraph 3, above). If the actual cost of the acquisition, initial protection and habitat improvements, long-term funding or other cost is more than the estimated amount initially paid by the project owner, the project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, the long-term funding requirements as established in an approved PAR or PAR-like analysis, or the other actual costs that are estimated in the table. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the project owner.

3. The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the start of project related ground disturbance.
4. The project owner may request the CPM to provide it with all available information about any funds held by the Energy Commission, CDFG or NFWF as project security, or funds held in a NFWF sub-account for this project, or other project-specific account held by a third party. The CPM shall also fully cooperate with any independent audit that the project owner may choose to perform on any of these funds.

Verification: The project owner shall provide the CPM with written notice of intent to start ground disturbance at least 30 days prior to the start of ground-disturbing activities on the project site.

If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner shall provide verification to the CPM and CDFG that an approved Security has been established in accordance with this condition of certification no later than 30 days prior to beginning Project ground-disturbing activities. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security. The project owner, or an approved third party, shall complete and provide written verification to the CPM and CDFG of the compensation lands acquisition and transfer within 18 months of the start of Project ground-disturbing activities.

No later than 12 months after the start of any phase of ground-disturbing project activities, the project owner shall submit a formal acquisition proposal to the CPM describing the parcels intended for purchase, and shall obtain approval from the CPM, in consultation with CDFG prior to the acquisition. If NFWF or another approved third party is handling the acquisition, the project owner shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The project owner or an approved third party shall complete the acquisition and all required transfers of the

compensation lands, and provide written verification to the CPM and CDFG of such completion, no later than 18 months after the start of project related ground disturbance activities. If NFWF or another approved third party is being used for all or part of the acquisition, the project owner shall ensure that funds needed to accomplish the acquisition are transferred in timely manner to facilitate the planned acquisition and to ensure the land can be acquired and transferred prior to the 18-month deadline.

The project owner shall complete and submit to the CPM a PAR or PAR-like analysis no later than 60 days after the CPM approves compensation lands for acquisition associated with any phase of construction. The project owner shall fully fund the required amount for long-term maintenance and management of the compensation lands for that phase of construction no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. Written verification shall be provided to the CPM and CDFG to confirm payment of the long-term maintenance and management funds.

No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands for any phase of construction, the project owner shall make funding available for those activities and provide written verification to the CPM of what funds are available and how costs will be paid. Initial protection and habitat improvement activities on the compensation lands for that phase of construction shall be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands.

The project owner, or an approved third party, shall provide the CPM and CDFG with a management plan for the compensation lands associated with any phase of construction within180 days of the land or easement purchase, as determined by the date on the title. The CPM, in consultation with CDFG shall approve the management plan after its content is acceptable to the CPM.

Within 90 days after completion of all project related ground disturbance, the project owner shall provide to the CPM and CDFG an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction. If this analysis shows that more lands were disturbed than was anticipated in this condition, the project owner shall provide the Energy Commission with additional compensation lands and funding commensurate with the added impacts and applicable mitigation ratios set forth in this condition. A final analysis of all project related ground disturbance may not result in a reduction of compensation requirements if the deadlines established under this condition for transfer of compensation lands and funding have passed prior to completion of the analysis.

Alternative Route 4 - Partial Underground Transmission Line

Vegetation Impacts

Alternative Route 4 would result in the same types of impacts to vegetation as described in the FSA. The underground component of this alternative would share the route with the proposed fuel gas supply line and reclaimed water supply line, and as the transmission line would be installed in the same trench area as the proposed gas

pipeline, impacts would be the same as described for the pipeline in the FSA. This area supports some native and ruderal vegetation but is located adjacent to Sierra Highway in disturbed habitat. The remaining components are located within existing roadways that occur in largely urbanized settings. The overhead portion of this alternative would be the same as Alternative Route 5 south of East Avenue S. Therefore, impacts along this section would be the same as described above for Alternative Route 5.

Impacts to native plant communities would be the same as described in the FSA; but as described above, this disturbance would occur largely in ruderal, disturbed, and developed road shoulders and existing right-of-ways.

Implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-8, BIO-10**, and **BIO-20** would reduce impacts to native plant communities to less-than-significant levels for Alternative Route 4, and no new mitigation is required.

Impacts to Special-Status Plants

Similar to Alternative Route 5, the Alternative Route 4 alignment has not been surveyed for special-status plant species. However, as described for Alternative Route 5, this alternative's transmission line route occurs largely in ruderal and disturbed road edges and ROWs. Potential for special-status species to occur along this route is considered low, but some potential habitat for species such as the short-joint beavertail cactus does occur in portions of the route.

As discussed above, impacts to special-status species, should they occur, would be significant absent mitigation. Implementation of Condition of Certification **BIO-11** would reduce impacts to special-status plant species to less than significant. No additional mitigation is required for this alternative.

Impacts to Common Wildlife

Direct and indirect impacts to common wildlife from implementation of Alternative Route 4 are the same as described in the FSA. With the exception of disturbance tolerant birds that nest within the city; common wildlife are not expected to be prevalent within the urbanized portions of alignment. As described above many native species of wildlife are not well adapted to persist in urban areas or have reduced survivorship/ reproductive output when found in developed and urbanized regions. Where this alternative joins the above ground portion at Sierra Highway, natural lands in this area including Una Lake, provides habitat for these species. In this area staff concludes that, absent mitigation, adverse impacts to common wildlife would remain significant under CEQA. Staff concludes that these impacts can be mitigated below a level of significance by implementing staff's proposed Conditions of Certification **BIO-1** through **BIO-9**. No new mitigation has been proposed for this alternative.

Impacts to Special-Status Invertebrates

Impacts to special status invertebrates would be the same as described for Alternative Route 5. Implementation of staff's proposed Condition of Certification **BIO-8** would reduce impacts to a level that is less than significant. No new mitigation has been proposed for this alternative.

Impacts to Special-Status Amphibians

Habitat for arroyo toads and mountain yellow-legged frogs is not present along or near Alternative Route 4. Therefore, under this alternative, no impacts to these special-status amphibians would occur and no mitigation is required.

Impacts to spadefoot toads would be the same as Alternative Route 5. If present, staff considers these impacts to be significant absent mitigation. Implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9** would reduce impacts to this species to a less than significant level. No additional mitigation is required for this alternative.

Impacts to Special-Status Reptiles

As discussed in **Section 4.2** of the FSA, six special-status reptile species have been reported from the vicinity of the project and have some potential to occur along Alternative Route 4. These include desert tortoise, silvery legless lizard, San Diego coast horned lizard, California coast horned lizard, southwestern pond turtle, and two-striped garter snake. With the exception of the PHPP project site and short section of pipeline alignment that occurs in natural lands, sensitive reptiles are not expected to occur in the developed areas of the underground alignment.

Impacts to Southwestern pond turtle and two-striped garter snake would be the same as Alternative Route 5. Coast horned lizards and silvery legless lizards may occur in the areas where Alternative Route 4 transitions to the above ground transmission line alignment at Sierra Highway. However, based on the level of disturbance for most of the alignment these species have a low potential to occur within the urban portions of the proposed transmission line alternative. Although staff recognizes much of the alignment is disturbed; impacts to these species should they occur would be significant absent mitigation. Implementation of staff's recommended Conditions of Certification **BIO-1** through **BIO-9** (as presented in the FSA) would reduce impacts to western pond turtles, coast horned lizards and silvery legless lizards, if present, to less than significant levels. No additional mitigation is required for this alternative.

Desert Tortoise

Desert tortoise potentially occurs along the northern portion of the underground segment of Alternative Route 4, west and south of the PHPP site. Impacts to this species in this area would be the same as described in the FSA, as this portion of the line would be co-located with the gas pipeline analyzed as part of the proposed project. As described in the FSA, this area is considered to have a low potential to support the species due to the fact that most of the remaining open space is highly degraded and fragmented. In addition these parcels are confined by development and are further fragmented by Sierra Highway and the existing air force plant. Therefore, direct and indirect effects to the species, as described in the FSA, would have a low potential to occur. Nonetheless, any impacts to this species, if present, would be considered significant.

Regional Approach to Raven Control

The regional approach to raven management is described in the FSA. To mitigate the project's contribution to cumulative and indirect impacts on desert tortoise from raven predation, staff proposes that the applicant contribute toward implementation of the Regional Raven Management Program (USFWS 2010), as described in staff's proposed Condition of Certification **BIO-14**.

To mitigate for the regional effects of ravens on desert tortoise for this alternative, the applicant shall provide a onetime fee in the amount of $105.00 per acre through the REAT Account held by the National Fish and Wildlife Foundation (NFWF). The PHPP will result in the loss of 333 acres of native vegetation at the power plant site, 50 acres at the adjacent laydown area, and approximately one acre along the proposed Overhead Transmission line alternative south of East Avenue S. For the purposes of this alternative, staff is requiring compensatory mitigation for the PHPP power plant site, linear facilities north of the air force plant, and the area south of East Avenue S. Because a large portion of the underground portion is located within city streets staff does not consider these areas to contribute to the tortoise predation risk. This totals approximately 384 acres of potential desert tortoise habitat disturbed by the project. This payment of $40,320.00would support the regional raven management plan activities focused within the Mojave Desert Recovery Unit, which would be adversely affected by increases in raven subsidies attributable to the proposed project. The fees contributed by the applicant would fund the raven removal actions, education and outreach efforts, and surveying and monitoring activities identified in the federal Environmental Assessment (USFWS 2008b). Staff has concluded that implementation of these actions would be an effective means of reducing the project's cumulative contributions to desert tortoise predation from increased raven numbers; would reduce the impacts below a level of significance; and would satisfy the requirements of the CDFG for full mitigation pursuant to CESA.

To reduce impacts to desert tortoise staff has recommended proposed Conditions of Certification **BIO-1** through **BIO-9**, **BIO-13** and **BIO-14.** Implementation of these conditions would reduce impacts to desert tortoise, if present, to less-than-significant levels and would also satisfy the California Department of Fish and Game's requirements under Fish and Game Code Section 2081. No further mitigation is required for this alternative.

Impacts to Migratory/Special-Status Bird Species

Alternative Route 4 has not been surveyed for rare birds. However, with the exception of where this alternative joins Alternative Route 5, rare birds are not expected to occur within the urban setting.

As described for Alternative Route 5, numerous riparian song birds, shore birds, and other avian species are known to occur at Palmdale Lake and Una Lake. In addition, native vegetation communities occur adjacent to the alignment between East Avenue S and the Vincent substation. However, much of the route is located either adjacent to existing disturbed habitat, urban areas, residential streets, or the Sierra Highway. Nonetheless, as described for Alternative Route 5, impacts to sensitive birds could occur absent mitigation.

Implementation of staff's recommended Conditions of Certification **BIO-15** would reduce impacts to nesting birds to less than significant levels. No additional mitigation is required for this alternative.

Swainson's Hawk

Habitat for the Swainson's hawk (state-listed Threatened) is limited to the portions of the alignment that were analyzed in the FSA and is considered present for the PHPP power plant site. Alternative Route 4 is located primarily in an urban setting within existing roadways. Where the line merges with Alternative Route 5, this area is largely disturbed and construction would be limited to disturbed road shoulders. Due to the level of disturbance that occurs in this area staff considers this alternative to have a low potential for nesting.

Impacts to this species would be the same as described in the FSA and would be considered significant absent mitigation. Construction of the PHPP and Alternative Route 4 would result in the removal of approximately 300 acres of foraging habitat. This includes 116.55 acres of Mojave creosote bush scrub, and 183.15 acres of Joshua tree woodland.

Under this alternative, impacts to habitat would be limited to Joshua tree woodland, creosote bush scrub, and rabbit bush scrub communities. Staff considers the dedication of mitigation lands for Mohave ground squirrel to adequately compensate for impacts to Swainson's hawk from the loss of native plant communities if they are located within 15 miles of known Swainson's hawk nest sites. Otherwise the applicant would be required to dedicate other native lands to mitigate the loss of foraging habitat for this species.

Calculation of Security for Swainson's Hawk Compensatory Mitigation

Text describing the requirements in order for the applicant to comply with Section 2081 of the California Endangered Species Act are described in the FSA.

As described in Condition of Certification **BIO-17,** this condition would require that the project owner provide financial assurances to guarantee an adequate level of funding to implement the compensation measures described above. Depending on the location and habitat type of the proposed Mohave ground squirrel mitigation lands (described below) it is possible that some or all of the compensation required under **BIO-17** would be achieved through implementation of Mohave ground squirrel habitat compensation. Should lands identified under Condition of Certification **BIO-20** (Compensation for Mohave Ground Squirrel) provide the habitat types and mitigation acreage required the funds dedicated for Condition of Certification **BIO-17** would be returned. Staff's calculation of the security amount includes estimates of all transaction and management fees required for land acquisition and management. These calculations are presented in **Biological Resources Table 3.2-4**.

Biological Resources Table 3.2-4
Swainson's Hawk Compensation Cost Estimate[1]

	Task	Cost
1.	Land Acquisition 300 acres at 2:1 ratio=600 acres	$10,000 per acre[2]
2.	Level 1 Environmental Site Assessment	$3000 per parcel[3]

	Task	Cost
3.	Appraisal	$5000 per parcel
4.	Initial site work - clean-up, enhancement , restoration	$250 per acre[4]
5.	Closing and Escrow Costs – 1 transaction includes landowner to 3rd party and 3rd party to agency	$5000 per transaction
6.	Biological survey for determining mitigation value of land (habitat based with species specific augmentation)	$5000 per parcel
7.	3rd party administrative costs - includes staff time to work with agencies and landowners; develop management plan; oversee land transaction; organizational reporting and due diligence; review of acquisition documents; assembling acres to acquire….	10% of land acquisition cost (#1)
8.	Agency costs to review and determine accepting land donation - includes 2 physical inspections; review and approval of the Level 1 ESA assessment; review of all title documents; drafting deed and deed restrictions; issue escrow instructions; mapping the parcels….	15% of land acquisition costs (#1) × 1.17 (17% of the 15% for overhead)
	SUBTOTAL *- Acquisition & Initial Site Work*	***$7,983,000.00***
9.	Long-term Management and Maintenance (LTMM) Fund - includes land management; enforcement and defense of easement or title [short and long term]; monitoring….	$1450 per acre[5]
	SUBTOTAL *- Acquisition, Initial Site Work, & LTMM*	***$8,853,000.00***
	NFWF Fees	
10.	Establish the project specific account	n/a (presumes establishment of Mohave ground squirrel account for project)
11.	NFWF management fee for acquisition & initial site work	3% of SUBTOTAL
12.	NFWF Management fee for LTMM Fund	1% of LTMM Fund
13.	Call for and Process Pre-Proposal Modified RFP	n/a (presumes establishment of Mohave ground squirrel account for project)
	TOTAL *for deposit in REAT-NFWF Project Specific Account*	***$9,101,190.00***

1. 1-5. See FSA.

By the implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9, BIO-16** and **BIO-17**potential impacts to Swainson's hawk would be reduced to less-than-significant levels and the project would be in compliance with the California Department of Fish and Game's requirements to fully mitigate under section 2081 of California's Fish and Game Code.

Burrowing Owls

Surveys for burrowing owl have not been completed for Alternative Route 4. Burrowing owls are not expected to occur in areas subject to disturbance (i.e., existing roadways) however this species may be present in adjacent fields that border 10th Avenue East between Blackbird Lane and East Avenue Q. However, because of the disturbance that occurs in the area the potential for occurrence is low.

Impacts to burrowing owls would be the same as described in the FSA. With the implementation of staff's proposed Condition of Certification **BIO-18**, potential impacts to burrowing owls would be reduced to less-than-significant levels. No additional mitigation is required for this alternative.

Golden Eagles

Golden eagles have limited potential to occur within the urbanized portion of Alternative Route 4. These species may occur along portions of the alignment south of where the two alternatives merge at Sierra Highway near Palmdale Lake and near the southern terminus of the transmission line as it nears the Vincent substation. Nest sites or breeding activity was not observed on the site and the project does not support nesting habitat. However, potential nesting habitat is present south of the project in the San Gabriel Mountains; however this alignment is not located adjacent to these areas. While large trees do occur in the project area the proximity to residential and urban development, Highway 14, Sierra Highway and the railroad limit the likelihood of nesting for this species. Based on this staff concluded that project construction activities are not likely to potentially injure or disturb golden eagles.

Impacts to golden eagles are described in the FSA and are not expected to occur from the construction of this alternative. However, the new transmission line structures will introduce a collision risk between Palmdale Lake and Una Lake.

The implementation of staff's proposed Conditions of Certification **BIO-1** through **BIO-9, BIO-15, BIO-20,** and **BIO-24** would be expected to reduce potential impacts to golden eagles to less-than-significant levels under CEQA, and the project would be compliance with the California Department of Fish and Game's provision for no take of the State Fully Protected Species under Section 3511 of California's Fish and Game Code. No new mitigation has been proposed for this alternative.

Impacts to Special-Status Mammals

Mohave Ground Squirrel

Potential habitat for the Mohave ground squirrel is limited to the PHPP power plant site and underground utilities corridor between the PHPP power plant site and the Air Force plant. Habitat for this species is not expected to occur within the highly urbanized setting of the Alternative Route 4 alignment. Trapping was not conducted along this alignment.

For Alternative Route 4, most of the habitat along the alignment is degraded, disturbed areas or adjacent to urban development. In addition, most of the alignment either occurs along disturbed habitat, road shoulders, or in areas not suitable for this species. Further, these areas have been fragmented by road construction and residential development.

In total, approximately 300 acres of permanent habitat loss is expected to occur for this species at the power plant site. Because trapping for this species has not occurred, staff has chosen to assume presence of Mohave ground squirrel for portions of Alternative Route 4. This includes the area between West Avenue M and East Avenue P and between East Avenue S and the California Aqueduct. Impacts to suitable habitat within these areas will require compensatory mitigation.

Impacts to Mohave ground squirrel have been described in the FSA and would be considered significant, if present. Staff recognizes the reduced habitat quality within the Alternative Route 4 alignment and has proposed compensatory mitigation in consideration of the habitat, level of disturbance, and urban setting. Staff concludes that a ratio of 2:1 for the power plant site. This would require the project owner to acquire

600 acres of compensatory mitigation. These ratios and the applicant's impact avoidance, minimization, and compensation measures provided in the Incidental Take Permit application have been incorporated into staff's proposed Conditions of Certification **BIO-19** and **BIO-20**. Implementation of these conditions would reduce impacts to Mohave ground squirrel to less-than-significant levels and would also satisfy the CDFG's requirements under Fish and Game Code Section 2081.

Calculation of Security for Mohave Ground Squirrel Compensatory Mitigation

Text describing the requirements in order for the applicant to comply with Section 2081 of the California Endangered Species Act, are described in the FSA.

Condition of Certification **BIO-20** would require that the project owner provide financial assurances to guarantee an adequate level of funding to implement the compensation measures described above. Because there are several suitable options available to the applicant to satisfy the compensation requirement, and because mitigation requirements must satisfy the requirements of the State Endangered Species Act, staff's calculation of the security amount includes estimates of all transaction and management fees described above. These calculations are presented in **Biological Resources Table 3.2-5**.

Biological Resources Table 3.2-5
Mohave Ground Squirrel Compensation Cost Estimate[1]

	Task	Cost
1.	Land Acquisition (total of 600 acres) 2:1 ratio on power plant site Compensatory mitigation is not required for the transmission line right-of-way	$10,000 per acre[2]
2.	Level 1 Environmental Site Assessment	$3000 per parcel[3]
3.	Appraisal	$5000 per parcel
4.	Initial site work - clean-up, enhancement , restoration	$250 per acre[4]
5.	Closing and Escrow Costs – 1 transaction includes landowner to 3rd party and 3rd party to agency	$5000 per transaction
6.	Biological survey for determining mitigation value of land (habitat based with species specific augmentation)	$5000 per parcel
7.	3rd party administrative costs - includes staff time to work with agencies and landowners; develop management plan; oversee land transaction; organizational reporting and due diligence; review of acquisition documents; assembling acres to acquire….	10% of land acquisition cost (#1)
8.	Agency costs to review and determine accepting land donation - includes 2 physical inspections; review and approval of the Level 1 ESA assessment; review of all title documents; drafting deed and deed restrictions; issue escrow instructions; mapping the parcels….	15% of land acquisition costs (#1) × 1.17 (17% of the 15% for overhead)
	SUBTOTAL *- Acquisition & Initial Site Work*	***$7,983,000.00***
9.	Long-term Management and Maintenance (LTMM) Fund - includes land management; enforcement and defense of easement or title [short and long term]; monitoring….	$1450 per acre[5]
	SUBTOTAL *- Acquisition, Initial Site Work, & LTMM*	***$8,853,000.00***
	NFWF Fees	
10.	Establish the project specific account	$12,000

	Task	Cost
11.	NFWF management fee for acquisition & initial site work	3% of SUBTOTAL
12.	NFWF Management fee for LTMM Fund	1% of LTMM Fund
13.	Call for and Process Pre-Proposal Modified RFP	$30,000
	***TOTAL** for deposit in REAT-NFWF Project Specific Account*	***$9,143,190.00***

1. 1-5 See FSA.

American Badger and Desert Kit Fox

Under this alternative habitat for American badgers and desert kit fox is limited as much of the project right-of-way is located within or adjacent to existing city streets or Sierra Highway. These factors limit the potential for these species to occur in the Alternative Route 4 project area. It is likely that American badgers and kit fox have been excluded from much of the urban environment but likely occur in low numbers across the more natural areas of the alignment south of East Avenue S.

Impacts to these species would be the same as described in the FSA and would be significant absent mitigation. Implementation of **BIO-21** would reduce impacts to the American badger and desert kit fox to a less-than-significant level.

Pallid San Diego Pocket Mouse and Southern Grasshopper Mouse

Impacts to the Pallid San Diego pocket mouse and southern grasshopper mouse would be the same as described in Section 4.2 of the FSA. However, these species have a limited potential to occur in the Alternative Route 4 alignment and these species are likely not associated with urban areas and disturbed road edges along the Sierra Highway. However, suitable habitat occurs to a limited degree adjacent to the proposed alignment and there is potential for direct loss of these species.

Implementation of **BIO-1** through **BIO-9, and BIO-20** would reduce impacts to these species to a less-than-significant level.

Special-Status Bats

Impacts to special status bats on the PHPP power plant site would be the same as described in Section 4.2 of the FSA. Bats may also occur along portions of the Alternative Route 4 alignment near Una Lake. However, this alternative does not support large rock outcrops, bridges, or tunnels.

Implementation of **BIO-22** would reduce impacts to these species to a less-than-significant level.

Impacts to Wildlife Movement Corridors or Native Wildlife Nursery Sites

Impacts to wildlife movement corridors or native nursery sites would be the same as described in Section 4.2 of the FSA and are considered less than significant. Construction of Alternative Route 4 or the proposed project identified in the FSA would not result in significant impacts to wildlife movement.

Impacts to Waters of the State

A jurisdictional delineation for the Alternative Route 4 alignment has not been conducted and if selected the applicant would be required to complete this action prior

to ground disturbance. Most of the project area is located within or adjacent to existing city streets and impacts to jurisdictional drainages is expected to be low. A review of aerial photography of the proposed alignment and reconnaissance level surveys of the right-of-way identified a series of potential State jurisdictional waters. Most of these features are ephemeral, lack riparian vegetation and consist of small swales, gullies, culverts, and drainages that cross the transmission line alignment between Blackbird Lane and East Avenue P. A large drainage crosses the proposed underground alignment through a culvert that bisects 10th Street east in this area. Una Lake and Palmdale Lake, both known jurisdictional features, border Sierra Highway but would not be directly impacted by the proposed alternative. Small drainages that support riparian vegetation were also noted south of East Avenue S and near Una Lake.

Potential impacts would be the same as described for the proposed project and Alternative Route 5. Impacts to these features would be considered significant and warrant mitigation.

With the implementation of staff's proposed Condition of Certification **BIO-23**, temporary impacts to State waters would be mitigated to less-than-significant levels. This condition would require the completion of a jurisdictional delineation to fulfill the requirements of CDFG's Lake and Streambed Alteration Agreement program pursuant to Fish and Game Code Section 1600 et seq. The USACE has indicated that although waters of the United States do occur, the proposed project would not be regulated provided work is conducted outside the ordinary high water mark for areas designated as waters of the United States. Condition of Certification **BIO-23** includes language requiring the applicant to avoid permanent impacts to all waters of the United States.

Operation Impacts and Mitigation

Potential impacts to biological resources from the operation of the project are the same as described in the FSA. These impacts are discussed below.

Ravens

The operational impacts to desert tortoise are described in the FSA.

Cumulative/Regional Impacts of Ravens

Staff considers that the construction and operation of the alternative to be the same as described for the proposed project and Alternative Route 5. However, most of the Alternative Route 4 alignment is located in close proximity to urban areas and the risk of further subsidies to ravens is considered low. To reduce this effect, staff has proposed Condition of Certification **BIO-8** and **BIO-14.** Implementation of these conditions would reduce impacts to less than significant levels.

Other Predators

Direct and indirect impacts to from increased predation or dogs would be the same as described in the FSA and for Alternative Route 5.

Most of this alternative alignment is located in close proximity to urban areas and tortoises are not expected to occur. Implementation of staff's proposed Condition of

Certification **BIO-6**, and Condition of Certification **BIO-8** would reduce the potential for these impacts to less than significant levels.

Increased Risk from Roads/Traffic

Direct and indirect impacts to from increased road traffic would be the same as described in the FSA and for Alternative Route 5. To minimize the risks of increased traffic fatality and other hazards associated with roads at the PHPP project site, the applicant has proposed a variety of impact minimization measures which staff has incorporated into staff's proposed Condition of Certification **BIO-8**. No new mitigation has been proposed for this alternative.

Noise

Direct and indirect impacts to from noise would be the same as described in the FSA for the proposed PHPP power plant site and for Alternative Route 5. Impacts from operational noise from this alternative on surrounding wildlife are expected to be less than significant.

Bird Collisions and Electrocution

Bird collision and electrocution risk are the same as described in the FSA and Alternative Route 5. In addition, this alternative would result in fewer miles of overhead transmission line. However, because this alternative would result in the introduction of a new transmission line that bisects potential flight paths between Una Lake and Palmdale Lake; this alternative could result in elevated collision risks for shore birds and other avian species that are associated with these lakes.

Staff's proposed Condition of Certification **BIO-8** requires transmission lines and all electrical components to be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Mitigating Bird Collisions with Power Lines* (APLIC 2004) to reduce the likelihood of large bird electrocutions and collisions. With the proposed mitigation addressed in staff's proposed Condition of Certification **BIO-8**, impacts would be considered less than significant.

Lighting

Project impacts from night lighting would be the same as described in the FSA and for Alternative Route 5. Implementation of staff's proposed Condition of Certification **VIS-3** and **VIS-4** would reduce impacts to wildlife from night lighting to less than significant levels.

Glare

Project impacts from glare would be the same as described in the FSA and for Alternative Route 5. Staff recommends Condition of Certification **BIO-24** to monitor and minimize potential bird mortality due to glare. Staff concludes that the implementation of Condition of Certification **BIO-24** would effectively determine rates of bird and bat mortality and would result in implementation of further feasible measures as needed to mitigate significant bird collisions, if they should occur, below a level of significance.

Proposed Conditions of Certification – Partial Underground Transmission Line Alternative

No new Conditions of Certification are proposed for Alternative Route 4. However, the impact acreages associated with Conditions of Certification **BIO-14**, **BIO-17**, and **BIO-20** have been revised to reflect the reduced acreages subject to project impacts

RAVEN FEE, MONITORING, MANAGEMENT, AND CONTROL PLAN

BIO-14 The project owner shall design and implement a Raven Monitoring, Management, and Control Plan (Raven Plan) that is consistent with the most current USFWS-approved raven management guidelines and that meets the approval of the USFWS, CDFG, and the CPM. Any subsequent modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG. The Raven Plan shall include but not be limited to a program to monitor increased raven presence in the Project vicinity and to implement raven control measures as needed based on that monitoring. The purpose of the plan is to avoid any Project-related increases in raven numbers during construction, operation, and decommissioning. The threshold for implementation of raven control measures shall be any increases in raven numbers from baseline conditions, as detected by monitoring to be proposed in the Raven Plan. Regardless of raven monitoring results, the project owner shall be responsible for all other aspects of the Raven Plan, including avoidance and minimization of project-related trash, water sources, or perch/roost sites that could contribute to increased raven numbers. In addition, to offset the cumulative contributions of the Project to desert tortoise from increased raven numbers, the Project owner shall also contribute to the USFWS Regional Raven Management Program. The Project owner shall do all of the following:

3. Prepare and Implement a Raven Management Plan that includes the following:
    a. Identify conditions associated with the Project that might provide raven subsidies or attractants;
    b. Describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities;
    c. Describe control practices for ravens;
    d. Address monitoring and nest removal during construction and for the life of the Project, and;
    e. Discuss reporting requirements.
4. Contribute to the REAT Regional Raven Management Program. The project owner shall submit payment to the project sub-account of the REAT Account held by the National Fish and Wildlife Foundation (NFWF) to support the REAT Regional Raven Management Program. The amount shall be a one-time payment of $105 per acre (384 acres) of permanent disturbance fee $40,320.

Verification: No later than 30 days prior to any construction-related ground disturbance activities, the Project owner shall provide the CPM, USFWS, and CDFG with the final version of a Raven Plan. All modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG.No later than 60 days prior to the start of construction, the project owner shall provide written verification to the CPM that NFWF has received and accepted payment into the project's sub-account of the REAT Account to support the USFWS Regional Raven Management Program. On January 31st of each year following construction, the Designated Biologist shall provide a report to the CPM that includes: a summary of the results of raven management and control activities for the year; a discussion of whether raven control and management goals for the year were met; and recommendations for raven management activities for the upcoming year.

SWAINSON'S HAWK HABITAT COMPENSATORY MITIGATION

BIO-17 The project owner shall either assume that Swainson's hawk nest within five miles of the project site and provide compensatory mitigation as described below or complete CFDG protocol surveys within five miles of project facilities that result in permanent impacts to Swainson's hawk foraging habitat. If surveys are completed they shall include the following components.

The survey periods shall follow a specified schedule: Period I occurs from 1 January to 31 March, Period II occurs from 1 April to 30 April, Period III occurs from 1 may to 30 May, and Period IV occurs from 1 June to 15 July. No fewer than three surveys per period in at least two survey periods shall be completed immediately prior to the start of project construction. All nest sites shall be recorded, mapped using GIS and provided to the CPM and CDFG. Compensatory mitigation at a 2:1 ratio shall be required for permanent impacts. If active Swainson's hawk nests (i.e., any nest active within five years) are not detected within 5 miles of the project site or linear facilities, the project owner will not be required to provide compensatory mitigation

If the project owner assumes presence, the project owner shall provide compensatory mitigation acreage for 600 acres of Swainson's hawk habitat lands, adjusted to reflect the final project footprint, as specified in this condition. In addition, the project owner shall provide funding for initial improvement and long-term maintenance, enhancement, and management of the acquired lands for protection and enhancement Swainson's hawk populations, and comply with other related requirements of this condition.

a. Loss of foraging habitat for Swainson's hawks shall be mitigated by providing Habitat Management (HM) lands at a ratio of 2:1 for any foraging habitat impacted within a 5-mile radius of active Swainson's hawk nest(s) (CDFG considers a nest active if it was used one or more times within the last 5 years). Foraging habitat includes but is not limited to alfalfa; fallow fields; beet, tomato, onions, and other low-growing row or field crops; dry-land and irrigated pasture; and cereal grain crops (including corn after harvest). Joshua tree woodland shall be considered foraging habitat in the Antelope Valley.

b. Lands which are currently in urban use or lands that have no existing or potential value for foraging Swainson's hawks will not require mitigation. The project owner will provide the CPM and CDFG a report of potential foraging lands impacted by the proposed project as determined by consultation with the CDFG and recent site-specific surveys conducted by a CDFG-qualified raptor biologist.

This acreage was calculated as follows: a ratio of 2:1 for the PHPP power plant site (600 acres). Costs of these requirements are estimated to be $7,983,000.00 (see **Biological Resources Tables 3.2-4** for a complete breakdown of costs and acreage). All costs are best estimates as of fall 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation based on changing land costs or management fees. Regardless of the estimates, the project owner is responsible for providing adequate funding to implement the required mitigation.

These impact acreages shall be adjusted to reflect the final project footprint. For purposes of this condition, the Project footprint means all lands disturbed in the construction and operation of the Palmdale Hybrid Power Plant Project Site.

This compensation acreage may be included ("nested") within the acreage acquired and managed as Mohave ground squirrel habitat compensation (Condition of Certification **BIO-20**) only if:

c. A minimum of 600 acres of habitat including a minimum of 366.3 acres of Joshua tree woodland, 233.1 acres of Mojave creosote bush scrub.

d. The Mohave ground squirrel habitat compensation lands are acquired and dedicated as permanent conservation lands within 18 months of the start of project construction.

If these two criteria are not met, then the project owner shall provide the required number of acres of Swainson's hawk habitat compensation lands, adjusted to reflect the final project footprint and additional delineation of suitable habitat, independent of any compensation land required under other conditions of certification, and shall also provide funding for the initial improvement and long-term maintenance and management of the acquired lands, and shall comply with other related requirements this condition.

The project owner shall provide financial assurances as described below in the amount of $8,853,000.00. In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by depositing funds into a Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described below. If the Project owner elects to establish a REAT NFWF Account and have NFWF and the agencies complete the required habitat compensation, then the total estimated cost of complying with this condition is $9,101,190.00. The amount of security or NFWF deposit shall be adjusted up or down to reflect any revised cost estimates recommended by REAT.

The actual costs to comply with this condition will vary depending on the final footprint of the project, the costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a Property Analysis Report or similar analysis (below). The 600 acre habitat requirement, and associated funding requirements based on that acreage, shall be adjusted up or down if there are changes in the final footprint of the project or the associated costs of evaluation, acquisition, management, and other factors listed in **Biological Resources Tables 3.2-4**. Regardless of actual cost, the project owner shall be responsible for funding all requirements of this condition.

COMPENSATORY MITIGATION LAND ACQUISITION

1. Method of Acquisition. Compensation lands shall be acquired by either of the two options listed below. Regardless of the method of acquisition, the transaction shall be complete only upon completion of all terms and conditions described in this Condition of Certification.

a. The project owner shall acquire lands and transfer title and/or conservation easement to a state or federal land management agency or to a third-party non-profit land management organization, as approved by the CPM in consultation with CDFG; or

b. The Project owner shall deposit funds into a project-specific subaccount within the REAT Account established with the NFWF, in the amount as indicated in **Biological Resources Tables 3.2-4** (adjusted to reflect final project footprint and any applicable REAT adjustments to costs).

2. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition to meet Energy Commission and CESA requirements shall be equal to or better than the quality and function of the habitat impacted and:

   a. Be within the Western Mojave Desert;

   b. Provide moderate to good quality foraging habitat for Swainson's hawk with capacity to improve in quality and value for this species; and

   c. Be near lands for which there is reasonable evidence (for example, recent (<15 years) CNDDB occurrences on or immediately adjacent to the proposed lands) suggesting current occupation by Swainson's hawk ideally with populations that are stable, recovering, or likely to recover.

   d. be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;

e. not have a history of intensive recreational use or other disturbance that might cause future erosional damage or other habitat damage, and make habitat recovery and restoration infeasible;

f. not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration; and

g. not contain hazardous wastes that cannot be removed to the extent that the site could not provide suitable habitat; and

h. have water and mineral rights included as part of the acquisition, unless the CPM, in consultation with CDFG, agrees in writing to the acceptability of land without these rights.

3. Review and Approval of Compensation Lands Prior to Acquisition. The project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for Swainson's hawk in relation to the criteria listed above and must be approved by the CPM. The CPM will share the proposal with and consult with CDFG before deciding whether to approve or disapprove the proposed acquisition.

4. Compensation Lands Acquisition Conditions: The project owner shall comply with the following conditions relating to acquisition of the compensation lands after the CPM, in consultation with CDFG approved the proposed compensation lands:

   a. Preliminary Report: The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM, in consultation with CDFG. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

   b. Title/Conveyance: The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM in consultation with CDFG. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to other public agency approved by the CPM in consultation with CDFG. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If an entity

other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM, in consultation with CDFG, of the terms of any transfer of fee title or conservation easement to the compensation lands.

c. Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM, in consultation with CDFG, before it can be used to establish funding levels or management activities for the compensation lands.

5. Compensation Lands Acquisition Costs: The Project owner shall pay all other costs related to acquisition of compensation lands and conservation easements. In addition to actual land costs, these acquisition costs shall include but shall not be limited to the items listed below. Management costs including site cleanup measures are described separately, in the following section.

   a. Level 1 Environmental Site Assessment;

   b. Appraisal;

   c. Title and document review costs;

   d. Expenses incurred from other state, federal, or local agency reviews;

   e. Closing and escrow costs;

   f. Overhead costs related to providing compensation lands to CDFG or an approved third party;

   g. Biological survey(s) to determine mitigation value of the land; and

   h. Agency costs to accept the land (e.g., writing and recording of conservation easements; title transfer).

COMPENSATORY MITIGATION LAND IMPROVEMENT

1. Land Improvement Requirements: The Project owner shall fund activities that the CPM, in consultation with the CDFG, requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include surveys of boundaries and property lines, installation of signs, trash removal and other site cleanup measures, construction and repair of fences, invasive plant removal, removal of roads, and similar measures to protect habitat and improve habitat quality on the compensation lands.

   The costs of these activities are estimated at $250 an acre, but will vary depending on the measures that are required for the compensation lands.

A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

COMPENSATORY MITIGATION LAND LONG-TERM MANAGEMENT

1. Long-term Management Requirements: Long-term management is required to ensure that the compensation lands are managed and maintained to protect and enhance habitat for desert tortoise. Management activities may include maintenance of signs, fences, removal of invasive weeds, monitoring, security and enforcement, and control or elimination of unauthorized use.

2. Long-term Management Plan. The project owner shall pay for the preparation of a Management Plan for the compensation lands. The Management Plan shall reflect site-specific enhancement measures on the acquired compensation lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG.

3. Long-Term Maintenance and Management Funding. The Project owner shall provide money to establish an account with a non-wasting capital that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. The amount of required funding is initially estimated to be $1,450 for every acre of compensation lands. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the Project owner shall provide initial payment of $870,000.00 calculated at $1,450 an acre for each compensation acre, as shown in **Biological Resources Tables 3.2-4** (above) into an account for long-term maintenance and management of compensation lands. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project footprint as described above. If an initial payment is made based on the estimated per-acre costs, the project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $1,450 an acre will be required for long-term maintenance and management, the excess paid will be returned to the Project owner.

   The project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with the project owner and

CDFG before deciding whether to approve an entity to hold the project's long-term maintenance and management funds on any lands. The CPM, in consultation with the project owner and CDFG, may designate another state agency or non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity.

If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity such as NFWF to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following conditions:

i. Interest. Interest generated from the initial capital shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by CDFG designed to protect or improve the habitat values of the compensation lands.

ii. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFG designates NFWF or another entity to manage the long-term maintenance and management fee for CDFG.

iii. Pooling Funds. A CPM- approved non-profit organization qualified to hold long-term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the fund with other funds for the operation, management, and protection of the compensation lands for local populations of desert tortoise. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CDFG and CPM.

iv. Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State or State-approved federal agency reviews; and overhead related to providing compensation lands.

COMPENSATORY MITIGATION LAND SECURITY

1. Compensation Mitigation Security: The project owner shall provide security sufficient for funding acquisition, improvement, and long-term management of Swainson's hawk compensation land. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security.

   The security amount shall be based on the estimates provided in **Biological Resources Tables 3.2-4.** This amount shall be updated and verified prior to payment and shall be adjusted to reflect actual costs or more current estimates as agreed upon by the REAT agencies.

   The Project owner shall provide verification that financial assurances have been established to the CPM with copies of the document(s) to CDFG, to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing activities described in Section A of this condition.

   In the event that the project owner defaults on the Security, the CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition. Any amount of the Security that is not used to carry out mitigation shall be returned to the Project owner upon successful completion of the associated requirements in this condition.

   Security for the requirements of this condition shall be provided in the amount of $9,101,190.00 if the project owner elects to use the REAT Account with NFWF pursuant to paragraph 4 of this condition, below). The Security is calculated in part from the items that follow but adjusted as specified below (consult **Biological Resources Tables 3.2-4** for the complete breakdown of estimated costs). However, regardless of the amount of the security or actual cost of implementation, the project owner shall be responsible for implementing all aspects of this condition.

   i. land acquisition costs for compensation land, calculated at $10,000/acre;

   ii. Site assessments, appraisals, biological surveys, transaction closing and escrow costs, calculated as $18,000 total per parcel (presuming 60 acres per parcel)

   iii. Initial site clean-up, restoration, or enhancement, calculated at $250/acre;

   iv. Third-party and agency administrative transaction costs and overhead, calculated as percentages of land cost;

v. Long-term management and maintenance fund, calculated at $1,450 per acre;

vi. NFWF fees to establish a project-specific account; manage the sub-account for acquisition and initial site work; and manage the sub-account for long term management and maintenance.

2. The project owner may elect to comply with some or all of the requirements in this condition by providing funds to implement the requirements into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs of implementing the requirement (as set forth in the Security section of this condition, paragraph 3, above). If the actual cost of the acquisition, initial protection and habitat improvements, long-term funding or other cost is more than the estimated amount initially paid by the project owner, the project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, the long-term funding requirements as established in an approved PAR or PAR-like analysis, or the other actual costs that are estimated in the table. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the project owner.

3. The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the project.

4. The project owner may request the CPM to provide it with all available information about any funds held by the Energy Commission, CDFG or NFWF as project security, or funds held in a NFWF sub-account for this project, or other project-specific account held by a third party. The CPM shall also fully cooperate with any independent audit that the project owner may choose to perform on any of these funds.

Verification: The project owner shall provide the CPM with either the results of the nesting surveys or written verification that the project owner shall assume presence no less than 60 days prior to ground disturbance or site mobilization. on the project site.

If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner shall provide verification to the CPM and CDFG that an approved Security has been established in accordance with this condition of certification no later than 30 days prior to beginning Project ground-disturbing activities. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of

security ("Security"). Prior to submitting the Security to the CPM, the project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security. The project owner, or an approved third party, shall complete and provide written verification to the CPM and CDFG of the compensation lands acquisition and transfer within 18 months of the start of Project ground-disturbing activities.

No later than 12 months after the start of any ground-disturbing project activities, the project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase, and shall obtain approval from the CPM, in consultation with CDFG prior to the acquisition. If NFWF or another approved third party is handling the acquisition, the project owner shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM and CDFG of such completion, no later than 18 months after the issuance of the Energy Commission Decision.

The project owner shall complete and submit to the CPM a PAR or PAR-like analysis no later than 60 days after the CPM approves compensation lands for acquisition associated with any phase of construction. The project owner shall fully fund the required amount for long-term maintenance and management of the compensation lands for that phase of construction no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. Written verification shall be provided to the CPM and CDFG to confirm payment of the long-term maintenance and management funds.

No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands for any phase of construction, the project owner shall make funding available for those activities and provide written verification to the CPM of what funds are available and how costs will be paid. Initial protection and habitat improvement activities on the compensation lands for that phase of construction shall be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands.

The project owner, or an approved third party, shall provide the CPM and CDFG with a management plan for the compensation lands associated with any phase of construction within 180 days of the land or easement purchase, as determined by the date on the title. The CPM, in consultation with CDFG shall approve the management plan after its content is acceptable to the CPM.

Within 90 days after completion of all project related ground disturbance, the project owner shall provide to the CPM and CDFG an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction. If this analysis shows that more lands were disturbed than was anticipated in this condition, the project owner shall provide the Energy Commission with additional compensation lands and funding commensurate with the added impacts and applicable mitigation ratios set forth in this condition. A final analysis of all project related ground disturbance may not result in a reduction of compensation requirements if the deadlines

established under this condition for transfer of compensation lands and funding have passed prior to completion of the analysis.

MOHAVE GROUND SQUIRREL HABITAT COMPENSATORY MITIGATION

BIO-20 The project owner shall provide compensatory mitigation acreage of 600 acres of Mohave ground squirrel habitat lands, adjusted to reflect the final project footprint, as specified in this condition. In addition, the project owner shall provide funding for initial improvement and long-term maintenance, enhancement, and management of the acquired lands for protection and enhancement Mohave ground squirrel populations, and comply with other related requirements of this condition.

This mitigation ratio is based on a 2:1 ratio for the power plant site. Costs of these requirements are estimated to be $8,853,000.00 (see **Biological Resources Table 3.2-5** for a complete breakdown of costs and acreage). All costs are best estimates as of fall 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation based on changing land costs or management fees. Regardless of the estimates, the project owner is responsible for providing adequate funding to implement the required mitigation.

In lieu of acquiring lands itself, the project owner may satisfy the requirements of this condition by depositing funds into a Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described below. If the Project owner elects to establish a REAT NFWF Account and have NFWF and the agencies complete the required habitat compensation, then the total estimated cost of complying with this condition is $9,143,190.00. The amount of security or NFWF deposit shall be adjusted up or down to reflect any revised cost estimates recommended by REAT.

The actual costs to comply with this condition will vary depending on the final footprint of the project, the costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a Property Analysis Report or similar analysis (below). The 600 acre habitat requirement, and associated funding requirements based on that acreage, shall be adjusted up or down if there are changes in the final footprint of the project or the associated costs of evaluation, acquisition, management, and other factors listed in **Biological Resources Table 3.2-5**. Regardless of actual cost, the project owner shall be responsible for funding all requirements of this condition.

COMPENSATORY MITIGATION LAND ACQUISITION

1. Method of Acquisition. Compensation lands shall be acquired by either of the two options listed below. Regardless of the method of acquisition, the transaction shall be complete only upon completion of all terms and conditions described in this Condition of Certification.

a. The project owner shall acquire lands and transfer title and/or conservation easement to a state or federal land management agency or to a third-party non-profit land management organization, as approved by the CPM in consultation with CDFG; or

b. The project owner shall deposit funds into a project-specific subaccount within the REAT Account established with the NFWF, in the amount as indicated in **Biological Resources Table 3.2-5** (adjusted to reflect final project footprint and any applicable REAT adjustments to costs).

2. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition shall:

   a. Be in the western Mojave Desert;

   b. Provide moderate to good quality habitat for Mohave ground squirrel with capacity to improve in quality and value for this species;

   c. Be a contiguous block of land (preferably) or located so they result in a contiguous block of protected habitat;

   d. Be adjacent to larger blocks of lands that are already protected, or be in a location approved by the CDFG, such that there is connectivity between the acquired lands and the protected lands;

   e. Be connected to lands for which there is reasonable evidence (for example, recent [<15 years] CNDDB occurrences on or immediately adjacent to the proposed lands) suggesting current occupation by Mohave ground squirrel, ideally with populations that are stable, recovering, or likely to recover;

   f. Not have a history of intensive recreational use, grazing, or other disturbance that might make habitat recovery and restoration infeasible;

   g. Not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration; and

   h. Not be encumbered by easements or uses that would preclude fencing of the site or preclude or unacceptably constrain management of the site for the primary benefit of the species and their habitat for which mitigation lands were secured.

3. Review and Approval of Compensation Lands Prior to Acquisition. The project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for Mohave ground squirrel in relation to the criteria listed above

and must be approved by the CPM. The CPM will share the proposal with and consult with CDFG before deciding whether to approve or disapprove the proposed acquisition.

4. Compensation Lands Acquisition Conditions: The project owner shall comply with the following conditions relating to acquisition of the compensation lands after the CPM, in consultation with CDFG approved the proposed compensation lands:

   a. Preliminary Report: The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM, in consultation with CDFG. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

   b. Title/Conveyance: The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM in consultation with CDFG. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to other public agency approved by the CPM in consultation with CDFG. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner shall obtain approval of the CPM, in consultation with CDFG, of the terms of any transfer of fee title or conservation easement to the compensation lands.

   c. Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM, in consultation with CDFG, before it can be used to establish funding levels or management activities for the compensation lands.

5. Compensation Lands Acquisition Costs: The Project owner shall pay all other costs related to acquisition of compensation lands and conservation easements. In addition to actual land costs, these acquisition costs shall

include but shall not be limited to the items listed below. Management costs including site cleanup measures are described separately, in the following section.

a. Level 1 Environmental Site Assessment;

b. Appraisal;

c. Title and document review costs;

d. Expenses incurred from other state, federal, or local agency reviews;

e. Closing and escrow costs;

f. Overhead costs related to providing compensation lands to CDFG or an approved third party;

g. Biological survey(s) to determine mitigation value of the land; and

h. Agency costs to accept the land (e.g., writing and recording of conservation easements; title transfer).

COMPENSATORY MITIGATION LAND IMPROVEMENT

1. Land Improvement Requirements: The Project owner shall fund activities that the CPM, in consultation with the CDFG requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include surveys of boundaries and property lines, installation of signs, trash removal and other site cleanup measures, construction and repair of fences, invasive plant removal, removal of roads, and similar measures to protect habitat and improve habitat quality on the compensation lands.

   The costs of these activities are estimated at $250 an acre, but will vary depending on the measures that are required for the compensation lands. A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

COMPENSATORY MITIGATION LAND LONG-TERM MANAGEMENT

1. Long-term Management Requirements: Long-term management is required to ensure that the compensation lands are managed and maintained to protect and enhance habitat for desert tortoise. Management activities may include maintenance of signs, fences, removal of invasive weeds, monitoring, security and enforcement, and control or elimination of unauthorized use.

2. Long-term Management Plan. The project owner shall pay for the preparation of a Management Plan for the compensation lands. The

Management Plan shall reflect site-specific enhancement measures on the acquired compensation lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG.

3. Long-Term Maintenance and Management Funding. The Project owner shall provide money to establish an account with a non-wasting capital that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. The amount of required funding is initially estimated to be $1,450 for every acre of compensation lands. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the Project owner shall provide initial payment of $870,000.00 calculated at $1,450 an acre for each compensation acre, as shown in **Biological Resources Table 3.2-5** (above) into an account for long-term maintenance and management of compensation lands. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project footprint as described above. If an initial payment is made based on the estimated per-acre costs, the project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than $1,450 an acre will be required for long-term maintenance and management, the excess paid will be returned to the Project owner.

   The project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with the project owner and CDFG before deciding whether to approve an entity to hold the project's long-term maintenance and management funds on any lands. The CPM, in consultation with the project owner and CDFG, may designate another state agency or non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity.

   If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity such as NFWF to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

   The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following conditions:

   i. Interest. Interest generated from the initial capital shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring,

improvements to carrying capacity, law enforcement measures, and any other action approved by CDFG designed to protect or improve the habitat values of the compensation lands.

ii. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFG designates NFWF or another entity to manage the long-term maintenance and management fee for CDFG.

iii. Pooling Funds. A CPM- approved non-profit organization qualified to hold long-term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the fund with other funds for the operation, management, and protection of the compensation lands for local populations of desert tortoise. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CDFG and CPM.

iv. Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State or State-approved federal agency reviews; and overhead related to providing compensation lands.

COMPENSATORY MITIGATION LAND SECURITY

1. Compensation Mitigation Security: The project owner shall provide security sufficient for funding acquisition, improvement, and long-term management of desert tortoise compensation land. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security.

   The security amount shall be based on the estimates provided in **Biological Resources Table 3.2-6.** This amount shall be updated and verified prior to payment and shall be adjusted to reflect actual costs or more current estimates as agreed upon by the REAT agencies.

   The Project owner shall provide verification that financial assurances have been established to the CPM with copies of the document(s) to CDFG, to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing activities described in Section A of this condition.

In the event that the project owner defaults on the Security, the CPM may use money from the Security solely for implementation of the requirements of this condition. The CPM's use of the security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition. Any amount of the Security that is not used to carry out mitigation shall be returned to the Project owner upon successful completion of the associated requirements in this condition.

Security for the requirements of this condition shall be provided in the amount of $9,143,190.00 if the project owner elects to use the REAT Account with NFWF pursuant to paragraph 4 of this condition, below). The Security is calculated in part from the items that follow but adjusted as specified below (consult **Biological Resources Table 3.2-5** for the complete breakdown of estimated costs). However, regardless of the amount of the security or actual cost of implementation, the project owner shall be responsible for implementing all aspects of this condition.

i. land acquisition costs for compensation land, calculated at $10,000/acre;

ii. Site assessments, appraisals, biological surveys, transaction closing and escrow costs, calculated as $18,000 total per parcel (presuming 60 acres per parcel);

iii. Initial site clean-up, restoration, or enhancement, calculated at $250/acre;

iv. Third-party and agency administrative transaction costs and overhead, calculated as percentages of land cost;

v. Long-term management and maintenance fund, calculated at $1,450 per acre; and

vi. NFWF fees to establish a project-specific account; manage the sub-account for acquisition and initial site work; and manage the sub-account for long term management and maintenance.

2. The project owner may elect to comply with some or all of the requirements in this condition by providing funds to implement the requirements into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs of implementing the requirement (as set forth in the Security section of this condition, paragraph 3, above). If the actual cost of the acquisition, initial protection and habitat improvements, long-term funding or other cost is more than the estimated amount initially paid by the project owner, the project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, the long-term funding requirements as established in an approved PAR or PAR-like analysis, or the other actual costs that are estimated in the table. If those actual costs

or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the project owner.

3. The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the start of project related ground disturbance.
4. The project owner may request the CPM to provide it with all available information about any funds held by the Energy Commission, CDFG or NFWF as project security, or funds held in a NFWF sub-account for this project, or other project-specific account held by a third party. The CPM shall also fully cooperate with any independent audit that the project owner may choose to perform on any of these funds.

Verification: The project owner shall provide the CPM with written notice of intent to start ground disturbance at least 30 days prior to the start of ground-disturbing activities on the project site.

If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner shall provide verification to the CPM and CDFG that an approved Security has been established in accordance with this condition of certification no later than 30 days prior to beginning Project ground-disturbing activities. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the CPM, the project owner shall obtain the CPM's approval, in consultation with CDFG of the form of the Security. The project owner, or an approved third party, shall complete and provide written verification to the CPM and CDFG of the compensation lands acquisition and transfer within 18 months of the start of Project ground-disturbing activities.

No later than 12 months after the start of any phase of ground-disturbing project activities, the project owner shall submit a formal acquisition proposal to the CPM describing the parcels intended for purchase, and shall obtain approval from the CPM, in consultation with CDFG prior to the acquisition. If NFWF or another approved third party is handling the acquisition, the project owner shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM and CDFG of such completion, no later than 18 months after the start of project related ground disturbance activities. If NFWF or another approved third party is being used for all or part of the acquisition, the project owner shall ensure that funds needed to accomplish the acquisition are transferred in timely manner to facilitate the planned acquisition and to ensure the land can be acquired and transferred prior to the 18-month deadline.

The project owner shall complete and submit to the CPM a PAR or PAR-like analysis no later than 60 days after the CPM approves compensation lands for acquisition associated with any phase of construction. The project owner shall fully fund the required amount for long-term maintenance and management of the compensation lands for that phase of construction no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. Written verification shall be provided to the CPM and CDFG to confirm payment of the long-term maintenance and management funds.

No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands for any phase of construction, the project owner shall make funding available for those activities and provide written verification to the CPM of what funds are available and how costs will be paid. Initial protection and habitat improvement activities on the compensation lands for that phase of construction shall be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands.

The project owner, or an approved third party, shall provide the CPM and CDFG with a management plan for the compensation lands associated with any phase of construction within180 days of the land or easement purchase, as determined by the date on the title. The CPM, in consultation with CDFG shall approve the management plan after its content is acceptable to the CPM.

Within 90 days after completion of all project related ground disturbance, the project owner shall provide to the CPM and CDFG an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction. If this analysis shows that more lands were disturbed than was anticipated in this condition, the project owner shall provide the Energy Commission with additional compensation lands and funding commensurate with the added impacts and applicable mitigation ratios set forth in this condition. A final analysis of all project related ground disturbance may not result in a reduction of compensation requirements if the deadlines established under this condition for transfer of compensation lands and funding have passed prior to completion of the analysis.

Comparison of Proposed Alternative Transmission Line Routes

Alternative Route 4 - Partial Underground Transmission Line

Vegetation Impacts

Construction of Alternative Route 4 would result in fewer impacts to native vegetation communities and would avoid the construction and development of extensive transmission line right-of-ways in relatively undisturbed desert habitat. By constructing in disturbed environments and within existing city streets, this alternative reduces both direct and indirect impacts to native vegetation. Therefore, this alternative would have less environmental impacts than the proposed PHPP.

Impacts to Special-Status Plants

Construction of Alternative Route 4 would result in fewer impacts to native vegetation communities and would primarily be located in more disturbed plant communities and within existing city streets. Because of the urban setting, (i.e., road shoulders, ruderal plant communities, and barren areas), potential impacts to rare plants would be lower than the proposed project. In addition, the shorter length of the project, coupled with the reduced development footprint would further minimize potential impacts to rare plants.

Impacts to Common Wildlife

Construction of Alternative Route 4 would result in fewer impacts to native vegetation communities and would primarily be located in or along existing roadways through largely urbanized areas. These areas support fewer native wildlife species and habitat along the urban interface has been degraded. While urban tolerant species likely occur, native species are less common in urban settings. Because of the lower potential for common wildlife to occur, the shorter length of the transmission line, and its location in the urban setting, impacts of this alternative would be lower than the proposed project.

Impacts to Special-Status Invertebrates

Construction of Alternative Route 4 would result in the same types of potential impacts to San Emigdio blue butterfly as the proposed project. However, the location where this species may occur is physically separated from the proposed right-of-way at Una Lake. This alternative would also avoid the potential habitat for this species that occurs adjacent to Little Rock Creek near Mt. Emma Road. Because of the avoidance of the Little Rock Creek and lower potential for this species to occur in the urban setting, impacts of this alternative would be lower than the proposed project.

Impacts to Special-Status Amphibians

With the exception of the PHPP power plant site, construction of Alternative Route 4 would largely be constructed within existing roadways and disturbed right-of-ways and would avoid most of the potential habitat that could support sensitive amphibians. By avoiding Little Rock Creek, the system of washes that would be crossed along the proposed Segment 1 and Segment 2 transmission line alignments, and by constructing in more disturbed habitats; impacts to amphibians would be reduced when compared to the proposed project.

Impacts to Special-Status Reptiles

Construction of Alternative Route 4 would avoid most of the habitat that could support desert tortoise and other sensitive reptiles. For this alternative, potential habitat for desert tortoise is primarily located on the PHPP power plant site, although this species is not expected to occur in that location. Specifically, this alternative would avoid the large open areas of creosote bush scrub and other desert communities that occur along the proposed Segment 1 and Segment 2 transmission line alignments. This alternative would primarily be located in more disturbed plant communities and within existing roadways largely within the context of an urbanized setting.

Because of the urban setting of most of the alignment, this alternatives contribution to increased raven subsidies would also be greatly reduced when compared to the

proposed project and would this alternative would result in reduced impacts to desert tortoise.

The urban setting of this transmission line alignment would also avoid most of the direct impacts to species such as the two stripped garter snake, western pond turtle, horned lizards, and silver legless lizards.

Impacts to Migratory/Special-Status Bird Species

Construction of Alternative Route 4 would have the lowest potential to impact sensitive birds including Swainson's hawk nesting and foraging habitat. For this alternative, potential habitat for the Swainson's hawk is primarily located on the PHPP power plant site. As most of this alignment has been located within existing city streets, most direct impacts to birds would not occur. Although this alignment passes adjacent to Una Lake and Palmdale Lake, which support a more varied suite of sensitive birds than the proposed project alone, this area would not be directly impacted and is adjacent to an existing highway and rail road. This alternative also avoids Little Rock Creek, a known nesting site for least Bell's vireo and other song birds.

Construction of this alternative would also reduce potential impacts to burrowing owls and golden eagles when compared to the proposed project Alternative Route 5. Most of this alternative occurs in an urban setting where these species are typically not found. In addition, the native vegetation that is present largely occurs adjacent to highways, residential housing, and urban areas. Therefore, this alternative would have less environmental impacts than the proposed PHPP.

Impacts to Special-Status Mammals

Construction of Alternative Route 4 would result in the least impacts to native vegetation communities that could support sensitive mammals and would primarily be located in existing roadways within an urban setting. Potential habitat for the Mohave ground squirrel is located on the PHPP power plant site, between the PHPP power plant site and the Air Force plant, and along portions of the right-of-way between East Avenue S and the California Aqueduct. This would result in a substantial reduction to potential impacts to this species and would avoid constructing a new transmission line and associated access roads in potential habitat for this species.

This alternative would also reduce potential impacts to American badgers, desert kit fox, pallid San Diego pocket mouse and the southern grasshopper mouse. As described previously, because of the urban setting (i.e., road shoulders, ruderal plant communities, and barren areas), potential impacts to these species would be lower than the proposed project.

Construction of Alternative Route 4 would result in fewer impacts to habitat for sensitive bats and would avoid most of the habitat that could support roosting habitat for bats. This alternative avoids most of the rocky outcrops, tunnels associated with the Palmdale ditch and large riparian areas that occur on the Segment 1 and Segment 2 alignment. Although foraging could occur near Una Lake, this alternative would not directly impact this area. Therefore, this alternative would have less environmental impacts than the proposed PHPP.

Impacts to Wildlife Movement Corridors or Native Wildlife Nursery Sites

Construction of Alternative Route 4 or the proposed project identified in the FSA would not result in significant impacts to wildlife movement. However, because so much of Alternative Route 4 is located within existing roadways in urbanized areas and this alternative has the shortest transmission line route, impacts to wildlife and their ability to move through the landscape would be lower that the proposed project. Therefore, although neither project would result in significant impacts, this alternative would have fewer environmental impacts compared to the proposed PHPP.

Impacts to Waters of the State

Construction of Alternative Route 4 would reduce when compared to the proposed project. Although a jurisdictional delineation has not been completed for this alternative and several drainages are bisected by the alignment, most of these drainages occur in culverts, on well established access roads or within areas that would not be subject to project disturbance. Therefore, this alternative would have less environmental impacts than the proposed PHPP.

Operation Impacts and Mitigation

Construction of Alternative Route 4 would have many of the same operational impacts as the proposed project. Most of the operational impacts are associated with the power plant site and include glare, noise, lighting, and collision. Because this alternative would have a shorter transmission line, commencing at Sierra Highway and Palmdale Boulevard, collision risks are lower than the proposed project. However, there remains a collision risk associated with Una Lake and Palmdale Lake, an area known to support a variety of shore birds and other avian species. Because of this risk, this alternative does not substantially reduce collision risks to birds when compared to the proposed project.

Alternative Route 5 - Overhead Division Street Transmission Line

Vegetation Impacts

Construction of Alternative Route 5 would result in fewer impacts to native vegetation communities and would avoid the construction and development of extensive transmission line right-of-ways in relatively undisturbed desert habitat. By constructing in disturbed environments, this alternative reduces both direct and indirect impacts to native vegetation. Therefore, from a habitat perspective, this alternative would be preferred over the proposed PHPP.

Impacts to Special-Status Plants

Construction of Alternative Route 5 would result in fewer impacts to native vegetation communities and would primarily be located in more disturbed plant communities. Because of the urban setting (i.e., road shoulders, ruderal plant communities, and barren areas), potential impacts to rare plants would be lower than the proposed project. In addition, the shorter length of the project, coupled with the reduced development footprint would further minimize potential impacts to rare plants. Therefore, this alternative would be preferred over the proposed PHPP.

Impacts to Common Wildlife

Construction of Alternative Route 5 would result in fewer impacts to native vegetation communities and would primarily be located in more disturbed plant communities. These areas support fewer native wildlife species and habitat along the urban interface has been degraded. Because of the lower potential for common wildlife to occur, the shorter length of the transmission line, and its location in the urban setting impacts of this alternative would be lower than the proposed project.

Impacts to Special-Status Invertebrates

Construction of Alternative Route 5 would result in the same types of potential impacts to San Emigdio blue butterfly as the proposed project. However, the location where this species may occur is physically separated from the proposed right-of-way at Una Lake. This alternative would also avoid the potential habitat for this species that occurs adjacent to Little Rock Creek near Mt. Emma Road. Because of the avoidance of the Little Rock Creek and lower potential for this species to occur in the urban setting, impacts of this alternative would be lower than the proposed project.

Impacts to Special-Status Amphibians

Construction of Alternative Route 5 would avoid most of the potential habitat that could support sensitive amphibians. By avoiding Little Rock Creek, the system of washes that would be crossed along the proposed Segment 1 and Segment 2 transmission line alignments, and by constructing in more disturbed habitats; impacts to amphibians would be reduced when compared to the proposed project.

Impacts to Special-Status Reptiles

Construction of Alternative Route 5 would result in fewer impacts to native vegetation communities that could support desert tortoise and other sensitive reptiles. Specifically, this alternative would avoid the large open areas of creosote bush scrub and other desert communities that occur along the proposed Segment 1 and Segment 2 transmission line alignments. This alternative would primarily be located in more disturbed plant communities largely within the context of an urbanized setting.

For this alignment, native habitat that could support desert tortoise is limited to between West Avenue M and West Avenue O. However, this habitat is crossed by a network of dirt roads, trails, utility rights of ways, and foot paths that support various off highway vehicle use, residential traffic, and illegal dumping. Both of these parcels are confined by development and are further fragmented by Highway 14 and Sierra Highway, two well traveled arterial roadways that border the parcels on the east and west. Because of the urban setting of most of the alignment; this alternatives contribution to increased raven subsidies would also be greatly reduced when compared to the proposed project. When compared to the proposed project, this alternative would result in reduced impacts to desert tortoise. The urban setting of this transmission line alignment would also avoid most of the direct impacts to species such as the two stripped garter snake, western pond turtle, horned lizards and silver legless lizards.

Impacts to Migratory/Special-Status Bird Species

Construction of Alternative Route 5 would result in fewer impacts to habitat that could support sensitive birds including Swainson's hawk nesting and foraging habitat. Although this alignment passes adjacent to Una Lake and Palmdale Lake, which support a more varied suite of sensitive birds than the proposed project alone, this area would not be directly impacted and is adjacent to an existing highway and rail road. This alternative also avoids Little Rock Creek a known nesting site for least Bell's vireo and other song birds.

Construction of this alternative would also reduce potential impacts to burrowing owls and golden eagles when compared to the proposed project. Most of this alternative occurs in an urban setting where these species are typically not found. In addition, the native vegetation that is present largely occurs adjacent to highways, residential housing, and urban areas.

Impacts to Special-Status Mammals

Construction of Alternative Route 5 would result in fewer impacts to native vegetation communities that could support sensitive mammals and would primarily be located in more disturbed plant communities. Potential habitat for the Mohave ground squirrel is located on the PHPP power plant site, and along an approximately three-mile portion of the Alternative Route 5 right-of-way between West Avenue M and East Avenue P and portions of the right-of-way between East Avenue S and the California Aqueduct. This would result in a substantial reduction to potential impacts to this species and would avoid constructing a new transmission line and associated access roads in potential habitat for this species.

This alternative would also reduce potential impacts to American badgers, desert kit fox, pallid San Diego pocket mouse and the southern grasshopper mouse. As described previously because of the urban setting, (i.e., road shoulders, ruderal plant communities, and barren areas) potential impacts to these species would be lower than the proposed project.

Construction Alternative Route 5 would result in fewer impacts to habitat for sensitive bats and would avoid most of the habitat that could support roosting habitat for bats. This alternative avoids most of the rocky outcrops, tunnels associated with the Palmdale ditch and large riparian areas that occur on the Segment 1 and Segment 2 alignment. Although foraging bats on Alternative Route 5 could occur near Una Lake, this alternative would not directly impact this area.

Impacts to Wildlife Movement Corridors or Native Wildlife Nursery Sites

Construction of Alternative Route 5 or the proposed project identified in the FSA would not result in significant impacts to wildlife movement. However, the shorter transmission line route associated with this alternative, coupled with the more disturbed and urbanized setting, have lower intrinsic impacts to wildlife and their ability to move through the landscape. Therefore, although neither project would result in significant impacts, impacts from this alternative would be less.

Impacts to Waters of the State

Construction of Alternative Route 5 would reduce impacts to the many small ephemeral drainages that would be crossed by the Segment 1 and Segment 2 transmission line alignments. Although a jurisdictional delineation has not been completed for this alternative and several small drainages are bisected by the alignment, most of these drainages occur on well established access roads or within areas that would not be subject to project disturbance. Therefore, this alternative would have fewer impacts compared to the proposed PHPP.

Operation Impacts and Mitigation

Construction of Alternative Route 5 would have many of the same operational impacts as the proposed project. Most of the operational impacts are associated with the power plant site and include glare, noise, lighting, and collision. Because this alternative would have a shorter transmission line that largely avoids natural habitat potential, collision risks are somewhat lower than the proposed project. However, there remains a collision risk associated with Una Lake and Palmdale Lake, an area known to support a variety of shore birds and other avian species. Because of this risk, this alternative does not reduce collision risks to birds when compared to the proposed project.

3.3 CULTURAL RESOURCES

Setting and Existing Conditions

The setting for the proposed underground and overhead alternatives analyzed in this section is the same as the setting in the Cultural Resources section of the FSA.

Alternative Route 4 - Partial Underground Transmission Line

Alternative Route 4, shown in **Alternatives Appendix A Figure 2**, is the most direct route between the proposed PHPP site and the Vincent Substation and includes an underground section following the PHPP fuel gas supply from the project site to Sierra Highway. Approximately 6.75 miles would be undergrounded and the remaining 6.05 miles would follow the overhead transmission line alternative route.

The underground portion of Alternative Route 4 would be constructed in city streets as described in Section 2.1. At the intersection of East Avenue S and Sierra Highway, the line would cross to the east side of Sierra Highway and would follow the same route as identified in the Alternative Route 5 discussion presented below.

Alternative Route 5 - Overhead Division Street Transmission Line

Alternative Route 5, shown in **Alternatives Appendix A Figure 2**, would exit the proposed site to the west along East Avenue M in Palmdale, remaining in the disturbed road shoulder, for less than one mile, until reaching Division Street.

The line would turn south on Division Street and follow the Division Street 66 kilovolt (kV) transmission corridor for 5 miles until reaching East Avenue R. Division Street is unpaved for approximately 2 miles between East Avenue M and East Avenue O, and again for approximately 0.5 mile between East Avenue P and Technology Drive. The eastern side of the unpaved portion of Division Street has been impacted by the

construction of underground utilities, and the transmission line should be located within this disturbed right-of-way to avoid additional environmental impacts. Although the area west of unpaved Division Street is generally undisturbed by previous construction activity, the entire area is divided by a road grid and shows long-term historic and modern trash disposal. The western and eastern sides of Division Street are generally undeveloped except for an area between Avenue O and Avenue P and some development at East Palmdale Boulevard and at Avenue R.

To avoid running through a residential area along Division Street, between Avenue O and Avenue P, the route would turn east for 0.15 mile, then south for 0.5 mile, then west for 0.15 mile back to join Division Street once again. This diversion route has been cleared of vegetation and mechanically disturbed for fire protection.

Prior to reaching East Avenue R, the line would cross to the west side of Division Street to avoid the Palmdale Learning Center and proceed on the east side of Division Street on vacant land until reaching East Avenue R. It would then remain on the northern side of East Avenue R until reaching Sierra Highway. This area also shows signs of historic and modern trash disposal, as well as extensive dumping of soils and construction spoils.

At the East Avenue R/Sierra Highway intersection, the line would cross to the east side of Sierra Highway (there are two intersections of E. Barrel Springs Road and Sierra Highway – this is the northern intersection) and would follow the highway south to avoid co-location along existing distribution line right-of-way (ROW). This area shows signs of extensive dumping of excavated spoils and is criss-crossed by numerous dirt roads. The transmission line would continue overhead along the east side of the highway, past Una Lake, for a total of approximately 3.6 miles.

Approximately 300 feet north of the northern intersection of E. Barrel Springs Road and Sierra Highway, the transmission line would cross to the west side of Sierra Highway and proceed for approximately 0.45 mile between the railroad ROW and Sierra Highway to provide additional separation from residential housing. Just before the community of Alpine, the transmission line would once again cross to the east side of Sierra Highway and continue along that route until reaching the intersection of Sierra Highway and Pearblossom Highway. The area between E. Barrel Springs Road and Pearblossom Highway is extensively disturbed by grading, dumping, and development, including several salvage yards. The area near Pearblossom Highway shows signs of extensive disturbance, possibly related to road construction.

The transmission line route would cross the intersection of Sierra Highway and Pearblossom Highway and proceed to the southwest on the southeastern side of Sierra Highway for approximately 1.15 miles to the intersection of Sierra Highway and Highway 14 (Antelope Valley Freeway). The transmission line would then diverge from Sierra Highway and proceed overland to the southeast for approximately 0.80 miles to intersect with the applicant's proposed transmission line route, crossing the existing railroad ROW and East Carson Mesa Road. Alternative Route #2 would then follow the applicant's proposed route into the Vincent Substation. The segment between the intersection of Pearblossom Highway and Sierra Highway and the overland route to the applicant's proposed alignment has been generally disturbed by both highway and

railroad construction. There are, however, some isolated areas where disturbance appears to be limited.

Laws, Ordinances, Regulations, and Standards (LORS)

The LORS for Alternative Route 4 and Alternative Route 5 are the same as those in Table 1 of the Cultural Resources section of the FSA.

Prehistoric, Ethnographic and Historic Background

The prehistoric, ethnographic and historic backgrounds for the proposed underground and overhead alternatives analyzed in this section are the same as those identified in the Cultural Resources section of the FSA.

Background Inventory Research

Various repositories in California hold compilations of information on the locations and descriptions of cultural resources older than 45 years that have been identified and recorded in past cultural resources surveys. The Energy Commission's Data Adequacy Regulations require applicants to acquire information specific to the vicinity of their project from certain repositories and to provide it to staff as part of the AFC. Additionally, to acquire further information on potential cultural resources in the vicinity of a proposed project, the applicant is required to make inquiries of knowledgeable individuals in local agencies and organizations and to consult Native Americans who have expressed an interest in being informed about development projects in areas to which they have traditional ties. Energy Commission staff may also make additional requests for information from the applicant, cultural resources repositories, historical organizations, and other sources as needed to complete their analysis of the project.

CHRIS Records Search

The California Historical Resources Information System, or CHRIS, is a federation of 11 independent cultural resources data repositories overseen by the California State Office of Historic Preservation (OHP). These centers are located around the state, and each holds information about the cultural resources of several surrounding counties. Qualified cultural resources specialists obtain data on known resources from these centers and, in turn, submit new data from their ongoing research to the centers.

Results of CHRIS Records Search

On November 8, 2010, Energy Commission staff commissioned a literature search from the South Central Coastal Information Center (SCCIC), located at California State University, Fullerton. The parameters of the literature search were a review of all previously recorded cultural resources within a one-quarter mile radius of the proposed alternative transmission line routes analyzed in this Appendix, as well as a review of all cultural resource technical reports for investigations conducted within the one-quarter mile records search radius. Additionally, review of the California Points of Historical Interest (PHI), the California Historical Landmarks (CHL), the California Register of Historical Resources (CRHR), the National Register of Historic Places (NRHP), and California State Historic Resources Inventory (HRI) listings were also requested.

The SCCIC reported that 60 prior cultural resource investigations have been conducted within the one-quarter mile records search radius. Of these, 27 studies have been conducted within or partially within the current study area. It is estimated that approximately 5 miles of the proposed transmission line project area has been subject to a previous cultural resources survey, while the remainder has not been previously investigated.

The CHRIS records search identified 18 previously recorded isolates[2] (16 prehistoric isolates and 2 historic isolates), 18 previously recorded archaeological sites (13 historic trash dumps and 5 small prehistoric sites), and 11 previously recorded historic built-environment resources (9 residential or commercial buildings and 2 water conveyance facilities) within the one-quarter mile records search radius. Among the previously recorded resources, 2 historical archaeological sites and 2 historic built-environment resources are located within or adjacent to the transmission line project area, including CA-LAN-2909H (Historic-era trash dump); CA-LAN-2371 (Historic-era trash dump); CA-LAN-1534H (the Palmdale Ditch); and CA-LAN-4154H (the California Aqueduct). None of the previously recorded isolates were found to occur within the project area. The Palmdale Ditch (CA-LAN-1534H) has been previously evaluated and determined eligible for the CRHR (see discussion of this resource in the CRHR Evaluation section of the FSA). The site record for the California Aqueduct (CA-LAN-4154H) (K. Anderson 2009) indicates that it has been previously evaluated and determined eligible for the NRHP; however, according to SCCIC staff, no record containing the previous evaluation is on file at the SCCIC and this resource is not currently listed in the CRHR or NRHP.

Native American Consultation

The Native American Heritage Commission (NAHC) maintains two databases to assist cultural resources specialists in identifying cultural resources of concern to California Native Americans, referred to by staff as Native American ethnographic resources. The NAHC's Sacred Lands database has records for places and objects that Native Americans consider sacred or otherwise important, such as cemeteries and gathering places for traditional foods and materials. Their Contacts database has the names and contact information for individuals, representing a group or themselves, who have expressed an interest in being contacted about development projects in specified areas. Both applicants and Energy Commission staff request information on the presence of sacred lands in the vicinity of a proposed project and a list of Native Americans to whom inquiries will be made to identify both additional cultural resources and any concerns the Native Americans may have about a proposed project.

Energy Commission staff contacted the NAHC on November 8, 2010, requesting pertinent information regarding prehistoric, historic and/or ethnographic land use and sites of Native American traditional or cultural value that might be known to exist in the project area or at least within a one-quarter mile radius of the alternative transmission line project vicinity, as depicted in the Sacred Lands database or other files under NAHC jurisdiction. A list of representatives of the Native American community who have traditional ties to the project area, and who wish to be contacted concerning development activities was also requested. The NAHC responded on November 10,

[2] An isolate is generally defined as a feature that does not have any other features within a 100-meter (325 feet) diameter.

2010, indicating that the Sacred Lands file search was negative for known Native American cultural resources within one-quarter mile of the project area. The NAHC also provided a list of local Native American representatives. Energy Commission staff is in the process of preparing letters to the Native American representatives on this list to seek their feedback regarding any concerns they may have concerning the proposed alternative transmission line routes.

Field Inventory Investigations

Both the applicant and Energy Commission staff have performed cultural resource surveys in the project area. The applicant surveyed the project site, as well as the proposed route of the linear facilities presented in the AFC. Those portions of the applicant's survey efforts that overlap with either of the transmission line alternative survey areas analyzed here have been summarized below. A complete summary of the applicant's survey results can be found in the Cultural Resources section of the FSA.

Although Energy Commission staff was able to rely, to some extent, on the applicant's cultural resource survey information for the portions of the alternative transmission line routes that overlap with the applicant's study area, as presented in the AFC, staff performed an independent cultural resource investigation to address those areas that lie outside the applicant's prior study area.

Staff generally surveyed a 200-foot-wide corridor along the proposed alternative transmission line routes to allow for a typical 230 kV construction ROW and a 50-foot buffer. Wider alignments were surveyed on specific portions of Division Street to allow for minor shifting of the route to avoid engineering or environmental constraints. Ground visibility was generally greater than 50 percent; however, small areas near the community of Alpine and around Una Lake were densely vegetated, impacting the effectiveness of the survey. It should be noted that much of these densely vegetated areas appeared to be disturbed, either by roadway construction, grading/earth-moving activities, or other development. In addition, small portions of the proposed overhead alignment or buffer were on fenced private property and inaccessible to Energy Commission staff.

Results of Applicant's Pedestrian Archaeological Survey

Between June 25 and June 29, 2008, the applicant conducted a pedestrian, archaeological surface survey of several project features, including 100-foot-wide corridors along the routes of the recycled water pipeline, natural gas pipeline, and proposed transmission line. Portions of both the overhead and the partial underground alternatives analyzed in this document were covered by this effort.

The applicant's survey entailed walking these areas at 20-meter intervals looking for archaeological remains (COP 2008a, vol. 1, p. 5.4-22). The surveyors sought to relocate previously recorded sites and assess their current condition. The surveyors undertook no ground disturbance and collected no artifacts, but took digital photographs of sites and topography. They used a Trimble GeoXT handheld GPS receiver to plot the locations of features, sites, and artifacts to submeter accuracy and to obtain GIS shapefiles for forms and reports. Finally, they recorded all sites and architectural resources over 45 years of age on Department of Parks and Recreation (DPR) series

523 forms. Several factors limited the survey, including conditions that obscured ground visibility, such as paving and vegetation (landscaping), restricted access to private property, and steep terrain along the southern end of the gen-tie route (COP 2008a, vol. 2, app. I, pp. 54–55).

As a result of these pedestrian archaeological surveys, the applicant relocated three previously known historical archaeological sites (19-3703, 19-3704, and 19-3705, all refuse deposits) on the reclaimed water pipeline route. The applicant reported that no artifacts remained at the latter site (WSA 2009a, table 1). One historical archaeological site (CA-LAN-2774), a refuse deposit, located on the natural gas pipeline route, could not be located during the applicant's survey. The applicant concluded that this site had been destroyed by development activities (WSA 2008a, table 10). The applicant ultimately determined that only three previously known archaeological sites (19-3703, 19-3704, and 19-3705) could be subject to project impacts. No cultural remains were reported on the approximately 1.75-mile section of the applicant's proposed transmission line route shared with the Energy Commission's proposed alternative routes.

With the addition of 9 new archaeological sites, recorded by the applicant (PHP-1, PHP-2, PHP-3, PHP-4, PHP-5, PHP-6, PHP-7, PHP-8, and PHP-9), to the 13 known archaeological sites (listed in **Cultural Resources Table 2**, in the FSA), 22 archaeological sites could be present in or near the project areas. The applicant's field verification of the 13 known sites determined that 3 (CA-LAN-1332, 19-2713, and CA-LAN-2774) are no longer extant, 2 sites (CA-LAN-2723 and CA-LAN-2726) could not be field verified due to access restrictions, and 5 sites (CA-LAN-805, CA-LAN-878, 19-1709, 19-2717, and CA-LAN-2772) were identified by the applicant as not potentially subject to impacts and so were not field verified.

Consequently, Energy Commission staff must address the CRHR eligibility of 12 archaeological sites in or near the project areas: 19-3703, 19-3704, 19-3705 (on or near the natural gas and reclaimed water pipelines), PHP-1 (on the plant site), and PHP-2, PHP-3, PHP-4, PHP-5, PHP-6, PHP-7, PHP-8, and PHP-9 (all on or near the applicant's proposed gen-tie route).

Results of Energy Commission Staff's Pedestrian Archaeological Survey

Energy Commission staff conducted a pedestrian archaeological survey of the overhead alternative during a three day period from November 15th to November 17th, 2010. Staff did not survey the underground portion of the partial underground alternative as this section overlaps with the applicant's proposed route for the natural gas and reclaimed water pipelines and was analyzed in the FSA.

A total of 13 archaeological resources, primarily refuse deposits, were discovered by Energy Commission staff along the overhead transmission line alternative route, including a previously recorded refuse deposit (CA-LAN-2371), a feature of the Palmdale Ditch (CA-LAN-1534H), and the California Aqueduct (CA-LAN-4154). In addition to the nine previously unidentified refuse deposits, staff identified three concrete foundations and an apparent historic homestead site. The concrete pads, all of which are similar in size, shape, and material, appear to be the foundations of single-room residential dwellings (possibly agricultural worker housing, related to the adjacent

remnants of an olive orchard). The historic homestead may be related to the historic colony of Harold.

Results of Windshield Survey for Built-Environment Resources

On November 8, 2010, Energy Commission staff conducted a windshield survey for built-environment resources along the proposed alternative transmission line routes. Staff used the Los Angeles County Assessor's records to determine dates of construction for buildings in the transmission line project area. The survey examined built resources within one parcel distance of the proposed transmission line route. The area is a mix of mid- to late twentieth century properties and late twentieth century planned housing development, industrial and commercial development, transmission line corridors and a transportation corridor.

Energy Commission staff identified a total of 40 built-environment resources in the project area of analysis that met or appeared to meet the CRHR age requirement of 45 years (1965) or older. They include 32 residential structures and eight commercial/industrial buildings. The northern portion of the alternative overhead transmission line route, adjacent to Division Street; between Rancho Vista Boulevard and East Avenue R on Pictorial; East Avenues P1, P2, P3, and P4; Carolside Avenue; and Division Street, consists of post-World War II residential neighborhoods. The structures were constructed between 1956 and 1965, with most being constructed in 1957-1958, and are Minimal Traditional-style. These residential structures are modest single-story homes with attached garages. They are predominantly stucco-clad with wood trim or decorative elements. The majority of residences have undergone major modifications, including loss of trim and decorative elements, window and door replacements, garage renovations, and new cladding.

Residential development along Sierra Highway, adjacent to and near Barrel Springs Road, also occurred after World War II and includes a mobile home park and single family homes interspersed with light industrial development. This is the site of the community of Harold, also known as Alpine Station or Trejo Post Office. Harold was established at the crossroads of the Southern Pacific Railroad and Fort Tejon Road (now Barrel Springs Road). The community was abandoned when the railroad moved the site of its booster engine station to a new location north of the site (WSA 2008a, p. 18). There does not appear to be any built-environment remains of the community of Harold. The existing residential development is a combination of modern construction and historic-era Ranch-style houses (36065 and 36145 Sierra Highway). The Alpine Springs mobile home park, located at 36223 Sierra Highway, was established in 1953 and consists of approximately 50 modern prefabricated homes, an office building (currently unused) and what appears to be the remains of a water tower. The prefabricated homes may have been arranged in neat rows at one time; however the addition of further mobile homes has altered the alignment.

The residence located at 36065 Sierra Highway was constructed in 1953. There are multiple structures on the property, including a house, garage, and sheds. The house is a Minimal Traditional-style structure with a side-gable roof. There is also a front-facing gable with a large chimney on the east elevation. Windows are modern metal sliding windows, and the doors appear to have been replaced.

The residence located at 36145 Sierra Highway is a one-story Ranch-style structure constructed in 1953. It has a side-gable roof that has been extended over the front porch, which partially spans the front elevation. The porch is supported by brick piers and is enclosed by a partial-height brick wall. The windows have been recently replaced with sliding vinyl windows.

Commercial development extends east along East Avenue R to Sierra Highway and continues south along Sierra Highway. Commercial uses include small retail and light industrial, such as a storage facility and automotive-related businesses. Historic-period buildings include an auto repair shop; a warehouse building currently used by Bekins; and a multi-structure property that includes a strip mall, a gas station, and several industrial buildings.

The structure at 37959 6th Street East is a one-story, flat-roofed automotive repair shop with two roll-up bays. The building is clad with stucco and a brick wainscoting. The lot is paved with asphalt and a vehicle lift has been installed outside, adjacent to the structure.

The Bekins building, located at 602 East Avenue R, is identified in the Palmdale General Plan as a “potential historic structure.” The General Plan notes that the building was constructed in 1918 (L.A. County Assessor Database states 1923) and that it was originally used for storing ice and fruit (Palmdale General Plan, p. ER-41). There are two very simplified Art Deco-style structures on the property, the main structure facing the street and another concurrent structure located at the southern edge of the property. The main structure is constructed of poured-in-place concrete and oriented in north-south direction along the adjacent railroad tracks. The rear building is constructed of the same material and oriented east-west. Both buildings are divided into “bays” by vertical decorative facing piers that provide relief and interest to the otherwise utilitarian structures. The main structure also includes decorative scuppers and lintel-like horizontal banding at the roof line, and an integrated loading dock with a shed roof. The building was likely associated with the adjacent railroad on the east side, and several openings on that elevation have been closed off. Based on the location of the openings, there was also likely a loading dock.

The structure located at 37940 Sierra Highway is a small one-story stucco building with a parapet roof that steps down as it moves toward the rear of the building. A large, two-lite non-original storefront window with a brick surround dominates the north half of the front elevation. A smaller non-original window is located on the south half of the front elevation. The building has been heavily altered.

The property at 36153 Sierra Highway is a multiple structure property, including a retail building, a heavily altered residential structure, and a barn. The Assessor’s records identify the property as commercial/industrial with an effective construction date of 1963. The residential structure appears to have been a commercial or storage building prior to modification and it is likely that this is the retail structure identified in the Assessor’s record. The barn appears to be the most recent structure on the property. The retail building is a long, narrow, one-story structure with a flat roof oriented in an east-west direction on the south edge of the property. It houses three businesses; however, it is unclear from the modifications if this was the original configuration of the

retail spaces. The doors and windows have been replaced and/or relocated. The residential structure is a one-story structure with a shed roof. The building is set back on the lot and faces the road (east). The front windows have been boarded over; those that are visible are modern vinyl windows. There is a simple covered entry extending from the main entrance and a patio on the north half of the front elevation, with a lattice screen. The barn is a two-story structure with a Dutch colonial roof.

The gas station, located at 36147 Sierra Highway, was constructed in 1949. It is a small, one-story building with a gable roof, a very simple version of the “house with canopy” style gas station (Jakle 1994, p. 134). The canopy that extends out over the original gas pumps is an extension of the gable roof. The building is clad with stucco that has been scored at the top half to resemble siding. The gas pumps are on a concrete island, and there is a concrete landing that extends the length of the building at the same level as the pump island. The original windows and door have been replaced, and the building is currently fenced and vacant. There is also a modern garage at the rear of the property.

The structure located at 35724 Sierra Highway is a small, one-story, stucco-clad structure with a gable roof. It has a side-gable roof, modern metal sliding windows, and a modern door. There is a smaller addition in the rear, with a brick and terra cotta pipe chimney protruding from it. It is located inside a fenced industrial storage yard.

There are multiple structures on the property located at 35656 Sierra Highway, which is noted in the Assessor’s record as a commercial/industrial property with a 640-square-foot structure constructed in 1955. The property, currently used as an industrial storage yard, is fenced. The structure visible from the road is a small, painted brick commercial building with a shed roof. The door is centered and there are a pairs of metal single-hung windows on either side of the front elevation. There is a small addition on the north side of the building with a shed roof. Behind this building and only partially visible are two one-story structures with gable roofs and what appear to be Tudoresque details.

The property located at 35470 Sierra Highway is noted in the Assessor’s records as a 270-square-foot structure constructed in 1961. The property is completely fenced and the only structure visible is a small rectangular building with a gable roof and sliding metal window. A small awning roof covers what is probably the entrance to the building, on the north side. Only the front (west) elevation of the building is visible.

The structures at 35464, 35462, and 35452 Sierra Highway appear to be owned by a single owner, and the majority of the property is fenced. The Assessor’s records note that 35452 (1955) and 35462 (1950) Sierra Highway are single family residences, only one of which (35462) is partially visible from the street. The structure at 35462 Sierra Highway appears to be a one-story Ranch-style home with a gable roof. The building at 35464 Sierra Highway (1956) is a one-story, rectangular commercial building clad with vertical siding, a parapet roof, and a tiled shed roof across the front of the building. There are two large, fixed windows on either side of the central door, which both have security bars over them. It has a lower, flat-roofed section with sliding metal windows at the south end of the building, part of which may be an addition as the roof is stepped down and exposed rafter tails are visible. A mature cypress tree grows at the southern corner of the main elevation.

Summary of Identified Cultural Resources

As a result of the above searches and inquiries, the applicant identified the following previously known cultural resources, located within or near the applicant's proposed project components:

- 10 prehistoric archaeological sites (WSA 2008a, p. 42; WSA 2009a, p. 3; fig. 1);
- 65 historical archaeological sites (WSA 2008a, p. 42; WSA 2009a, p. 3);
- 80 built-environment resources (WSA 2008b, pp. 23, 26, 28; WSA 2009a, p. 3); and
- 0 ethnographic resources.

Previously identified resources include the Palmdale Ditch, Southern Pacific Railroad, Eagle Rock-Pardee Transmission line, and Angeles National Forest Highway. All of these resources have been discussed in the FSA.

As a result of the November 2010 archaeological surveys conducted by Energy Commission staff, the following cultural resources were identified on or adjacent to Alternative Route 5:

- 0 prehistoric archaeological sites;
- 14 historical archaeological sites;
- 40 built-environment resources; and
- 0 ethnographic resources.

Cultural Resources Table 3.3-1
Known Cultural Resources Located in or Near the Project Areas of the Proposed PHPP Project and Proposed or Alternative Linear Facilities

Resource Type and Designation	Type of Resource	Project Area	Information Source
Prehistoric Archaeological Resources			
CA-LAN-805	prehistoric archaeological site: sparse scatter of flaking waste	gen-tie corridor	WSA 2008a, table 10; Toren and Wessel 1978
CA-LAN-878	prehistoric archaeological site: milling stones and flaking waste; midden	gas pipeline	WSA 2008a, table 10; Duran 1972
CA-LAN-1332	prehistoric archaeological site: flake, core, and mano	gen-tie corridor	WSA 2009a, pp. 3–4
Historic-Period Archaeological Resources			

Resource Type and Designation	Type of Resource	Project Area	Information Source
19-1709	historical archaeological site: remains of stone house foundation and walls and associated refuse deposit; early 20th century	gas pipeline	WSA 2008a, table 10; Norwood 1990
19-2713	historical archaeological site: refuse deposit	gen-tie corridor	WSA 2008a, table 10; p. 60
19-2717	historical archaeological site: refuse deposit probably associated with a former house site that was bulldozed	gen-tie corridor	WSA 2008a, table 10; Shaver 1996
19-2723	historical archaeological site: refuse deposit	plant site	WSA 2008a, table 10; pp. 58–59
19-2726	historical archaeological site: refuse deposit	plant site	WSA 2008a, table 10; pp. 58–59
CA-LAN-2772	historical archaeological site: refuse deposit	gas pipeline	WSA 2008a, table 10; Ferraro and Maxon 1999
CA-LAN-2774	historical archaeological site: refuse deposit	gas pipeline	WSA 2008a, table 10; p. 60
19-3703	historical archaeological site: refuse deposit	gas or water pipeline	WSA 2008a, table 10; p. 59
19-3704	historical archaeological site: refuse deposit	gas or water pipeline	WSA 2008a, table 10; p. 59
19-3705	historical archaeological site: refuse deposit	gas or water pipeline	WSA 2008a, table 10; p. 59
Site 1H	historical archaeological site: refuse deposit (historic/modern trash scatte)r	overhead transmission alternative	Staff survey
Site 2H	historical archaeological site: refuse deposit	overhead transmission alternative	Staff survey
Site 3H	historical archaeological site: refuse deposit	overhead transmission alternative	Staff survey
Site 4H	historical archaeological site: refuse deposit	overhead transmission alternative	Staff survey
Site 5H	historical archaeological site: refuse deposit	overhead transmission alternative	Staff survey

Resource Type and Designation	Type of Resource	Project Area	Information Source
Site 6H	three concrete foundation pads and remnants of former olive orchard.	overhead transmission alternative	Staff survey
Site 7H	historical archaeological site: refuse deposit (small historic can dump)	overhead transmission alternative	Staff survey
Site 8H	historical archaeological site: historic homestead may be associated with the historic colony of Harold	overhead transmission alternative	Staff survey
Site 9H	historical archaeological site: refuse deposit may be associated with the historic colony of Harold	overhead transmission alternative	Staff survey
Site 10H (CA-LAN-2371) Previously recorded	historical archaeological site: refuse deposit may be associated with the historic colony of Harold	overhead transmission alternative	Staff survey
Site 11H (CA-LAN-1534H) Previously recorded	concrete cased crossing of the Palmdale Ditch	overhead transmission alternative	Staff survey
Site 12H	historical archaeological site: refuse deposit	overhead transmission alternative	Staff survey
CA-LAN-2909H Site 13H Previously Recorded	historical archaeological site: refuse deposit	overhead transmission alternative	Staff survey
Built-Environment Resources			
19-180680	Air Force Plant 42: Building 15(150) (c. 1958) Building 21(145) (c. 1954)	plant site	WSA 2008a, table 10, pp. 63, 76
LAN-1534H	Palmdale Ditch (1918–1919), ditch, bridge, tunnels	gen-tie corridor	WSA 2008a, table 10; pp. 60–61, 76
19-180638	Southern Pacific Railroad (1876), grade, tracks	gen-tie corridor; gas pipeline	WSA 2008a, table 10; p. 59

Resource Type and Designation	Type of Resource	Project Area	Information Source
19-187713	Angeles Forest Highway (1930–1940)	gen-tie corridor	WSA 2008a, table 10; p. 61; WSA 2009a, table 1; p. 4
19-186876	SCE Eagle Rock-Pardee Transmission Line (1928)	gen-tie corridor	WSA 2009b, pp. 2–3; fig. 2
CA-LAN-4154H Previously Recorded	California Aqueduct	overhead transmission alternative	SCCIC

Determining the Historical Significance of Cultural Resources

CEQA requires the Energy Commission, as a lead agency, to evaluate the historical significance of cultural resources by determining whether they meet several sets of specified criteria. Under CEQA, the definition of a historically significant cultural resource is that it is eligible for listing in the CRHR, and such a cultural resource is referred to as a "historical resource," which is a "resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR", or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of section 5024.1 (g) of the Public Resources Code," or "any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record" (Cal. Code Regs., tit. 14, § 15064.5(a)). The term, "historical resource," therefore, indicates a cultural resource that is historically significant and eligible for the CRHR.

Consequently, under the CEQA Guidelines, to be historically significant, a cultural resource must meet the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old,[3] a resource must meet at least one (and may meet more than one) of the following four criteria (Pub. Resources Code, § 5024.1):

- Criterion 1, is associated with events that have made a significant contribution to the broad patterns of our history;
- Criterion 2, is associated with the lives of persons significant in our past;
- Criterion 3, embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values; or
- Criterion 4, has yielded, or may be likely to yield, information important to history or prehistory.

[3] *The Office of Historic Preservation's Instructions for Recording Historical Resources (1995) endorses recording and evaluating resources over 45 years of age to accommodate a potential five-year lag in the planning process.*

Historical resources must also possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance (Cal. Code Regs., tit. 14, § 4852(c)).

Additionally, cultural resources listed in or formally determined eligible for the National Register of Historical Places (NRHP) and California Registered Historical Landmarks numbered No. 770 and up are automatically listed in the CRHR and are therefore also historical resources (Pub. Resources Code, § 5024.1(d)). Even if a cultural resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows a lead agency to make a determination as to whether it is a historical resource (Pub. Resources Code, § 21084.1).

The assessment of potentially significant impacts to historical resources and the mitigation that may be required of a proposed project to ameliorate any such impacts depend on CRHR-eligibility evaluations.

CRHR Evaluations

Under CEQA, only CRHR-eligible cultural resources that the proposed project could potentially impact need be considered in staff's recommendations for mitigation measures for project impacts. Consequently staff seeks CRHR eligibility recommendations for those cultural resources subject to possible project impacts. The existing documentation for previously known cultural resources may include CRHR eligibility recommendations, and the applicant's cultural resources specialists often make CRHR eligibility recommendations for newly identified cultural resources they discover and record in their project-related surveys. Staff considers these prior CRHR eligibility evaluations and may accept them or conclude that additional information is needed before making its own recommendations.

When the available information on known or newly identified resources that could be impacted by the proposed project is not sufficient for staff to make a recommendation on CRHR eligibility, staff may ask an applicant to conduct additional research to gather the information needed to make such a recommendation, or staff may gather the additional information. For an archaeological resource, the additional research usually entails some degree of field excavation, called a "Phase II" investigation. For an ethnographic resource, the additional research may be an ethnographic study. For built-environment resources, the additional research would probably be archival. The object of this additional research is to obtain sufficient information to enable staff to validate or make a recommendation of CRHR eligibility for each cultural resource that the proposed project could impact.

Archaeological Resources, Potentially Subject to Impacts from the Alternative Transmission Routes, Evaluated for Historical Significance

In this section, Energy Commission staff focuses on those resources unique to Alternative Routes 4 and 5. The analysis of resources on the proposed project site, gen-tie, or natural gas pipeline route (shared with the underground portion of Alternative Route 4) addressed in the FSA, has not been repeated in this sub-section.

A total of 13 archaeological resources, including nine previously unidentified refuse deposits, were discovered by staff along the overhead transmission line alternative route and need recommendations of CRHR eligibility, including a previously recorded refuse deposit (CA-LAN-2371), a section of the Palmdale Ditch (CA-LAN-1534H), and the California Aquaduct (CA-LAN-4154). In addition to the nine previously unidentified refuse deposits, staff identified three concrete foundations and an historic homestead. The concrete pads appear to the foundations of single-room residential dwellings, possibly related to the adjacent remnants of an olive orchard. The historic homestead may be related to the historic colony of Harold.

The variation among the nine newly identified refuse deposits (one of which is likely an extension of CA-LAN-2371), exists primarily in the density of the deposit (sparse to dense), in the age range indicated by the artifacts (early-to-mid twentieth century, mid-twentieth century, or mid-to-late twentieth century), in whether a single dumping episode is evidenced or multiple ones, or if there is indication that the dumping is related to railroad activity (Site 9H, Site 10H/CA-LAN-2371, and 12H).

Staff did not conduct test excavations to determine whether a subsurface component existed at any of the above nine refuse deposit sites, but there were no indications that these sites have buried historic features or deposits. No evidence of structural remains was noted at any of these refuse deposit sites, other than a possible foundation at 10H. Since a randomly dumped, anonymous, and probably looted refuse deposit has a poor likelihood of yielding information important to history (CRHR Criterion 4— that historical archaeological sites typically must meet), staff does not recommend CRHR eligibility for any of the refuse deposit sites. Staff recognizes that site 10H is likely an extension of previously recorded site CA-LAN-2371.

Due to the avoidance of the historic homestead site by the alignment and the recommendations concerning the other sites listed above, staff does not need to identify and evaluate project impacts to the sites identified on the alternative transmission line routes.

Built-Environment Resources

Minimal Traditional Residential

The residences located on Pictorial Street; East Avenues P1, P2, P3, and P4; Carolside Avenue; Taintor Avenue; and Division Street, adjacent to Division Street between Rancho Vista Boulevard and East Avenue R, consist of post-World War II Minimal Traditional-style structures. The structures were constructed predominantly between 1957 and 1958. The buildings have been significantly altered, including loss of trim and decorative elements, window and door replacements, garage renovations, and new cladding. Information available to staff did not indicate that the houses were associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1) or associated with the lives of persons important to local, California or national history (Criterion 2). While they display the basic features of the Minimal Traditional style, they are not distinctive examples of the style and would not be eligible under Criterion 3. They are not the type of resource that would have the potential to yield information important to the prehistory or history of the local area, California or the nation, and thus

would not be eligible under Criterion 4. Additionally, the significant alterations to the structures resulted in a loss of historic integrity. Therefore Energy Commission staff has concluded that these residential buildings do not meet any of the eligibility criteria for the CRHR individually or as a historic district, and are not historical resources for the purposes of CEQA.

37940 6th Street East

37959 6th Street East is a one-story, flat-roofed automotive repair shop with two roll-up bays. Information available to staff did not indicate that the building was associated with events (Criterion 1) or persons important to local, California or national history (Criterion 2). It does not display character-defining features of any particular architectural style and would not be eligible under Criterion 3. It is not the type of resource that would be eligible under Criterion 4. Therefore, Energy Commission staff has concluded that this commercial structure does not meet any of the eligibility criteria for the CRHR, and is not a historical resource for the purposes of CEQA.

602 East Avenue R

The Bekins building, located at 602 East Avenue R, is identified in the Palmdale General Plan as a "potential historic structure." The General Plan notes that the building was constructed in 1918 (L.A. County Assessor Database states 1923) and that it was originally used for storing ice and fruit (Palmdale General Plan, p. ER-41). It was likely associated with the agricultural industry in Palmdale and the railroad, which is immediately adjacent to the building. The Antelope Valley Historical Society developed the list of potential historic structures, which was included in the Palmdale General Plan and adopted by the Palmdale City Council in 1993. Thus, the building would qualify as a historic resource listed in a local register of historical resources as defined in PRC §5020.1(k) and would therefore be a historical resource for the purposes of CEQA.

37940 Sierra Highway

The structure located at 37940 Sierra Highway is a small one-story stucco building with a parapet roof that steps down as it moves toward the rear of the building. Information available to staff did not indicate that the building was associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1) or associated with the lives of persons important to local, California or national history (Criterion 2). It does not display character-defining features of any particular architectural style and would not be eligible under Criterion 3. It is not the type of resource that would be eligible under Criterion 4. Additionally, the significant alterations to the structure resulted in a loss of historic integrity. Therefore staff has concluded that this commercial structure does not meet any of the eligibility criteria for the CRHR, and is not a historical resource for the purposes of CEQA.

36223 Sierra Highway

The Alpine Springs mobile home park, located at 36223 Sierra Highway, was established in 1953 and consists of approximately 50 modern prefabricated homes, an office building (currently unused) and what appears to be the remains of a water tower. While the mobile home park was established over 45 years ago, the majority of

structures are modern. The only two remaining historic-era structures visible from the street are an office structure and the remains of a water tower. Information available to staff did not indicate that the mobile home park was associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1) or associated with the lives of persons important to local, California or national history (Criterion 2). Mobile homes are a modern type of architecture and not of a type considered eligible for the CRHR. It is not the type of resource that would be eligible under Criterion 4. Additionally, the significant alterations to the layout of mobile homes and deterioration of the office structure and water tower, which are both vacant and in poor condition, has resulted in a loss of historic integrity. Therefore, Energy Commission staff has concluded that the Alpine Springs mobile home park does not meet any of the eligibility criteria for the CRHR, and is not a historical resource for the purposes of CEQA.

36153 Sierra Highway

The property at 36153 Sierra Highway is a multiple structure property including a retail building, a heavily altered residential structure, and a barn. Information available to staff did not indicate that the property was associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1) or associated with the lives of persons important to local, California or national history (Criterion 2). It no longer displays character-defining features of any particular architectural style and would not be eligible under Criterion 3. It is not the type of resource that would be eligible under Criterion 4. Additionally, the significant alterations to the structures have resulted in a loss of historic integrity. Therefore, Energy Commission staff concludes that this commercial property does not meet any of the eligibility criteria for the CRHR, and is not a historical resource for the purposes of CEQA.

36147 Sierra Highway

The “house with canopy” gas station located at 36147 Sierra Highway was constructed in 1949. Information available to staff did not indicate that the building was associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1) or associated with the lives of persons important to local, California or national history (Criterion 2). While it is an identifiable style of gas station, it is a very simple version and does not display the features that would make it eligible under Criterion 3. It is not the type of resource that would be eligible under Criterion 4. Additionally, the significant alterations to the structure—replacement of doors and windows—has resulted in a loss of historic integrity. Therefore staff concludes that this structure does not meet any of the eligibility criteria for the CRHR, and is not a historical resource for the purposes of CEQA.

36145 Sierra Highway

The residence located at 36145 Sierra Highway is a one-story Ranch-style structure constructed in 1953. Information available to staff did not indicate that the building was associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1) or associated with the lives of persons important to local, California or

national history (Criterion 2). While it displays elements of Ranch-style architecture, it is a very simple version and does not display the features that would make it eligible under Criterion 3. It is not the type of resource that would be eligible under Criterion 4. Additionally, the significant alterations to the structure have resulted in a loss of historic integrity. Therefore, Energy Commission staff concludes that this structure does not meet any of the eligibility criteria for the CRHR, and is not a historical resource for the purposes of CEQA.

36065 Sierra Highway

The Minimal Traditional-style residence located at 36065 Sierra Highway was constructed in 1953. Information available to staff did not indicate that the building was associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1) or associated with the lives of persons important to local, California or national history (Criterion 2). While it displays elements of Minimal Traditional-style architecture, it has been altered and does not display the features that would make it eligible under Criterion 3. It is not the type of resource that would be eligible under Criterion 4. Additionally, the alterations to the structure have resulted in a loss of historic integrity. Therefore, Energy Commission staff concludes that this structure does not meet any of the eligibility criteria for the CRHR, and is not a historical resource for the purposes of CEQA.

35724 Sierra Highway

The structure located at 35724 Sierra Highway is a small, one-story structure inside an industrial storage yard. Information available to staff did not indicate that the building was associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1) or associated with the lives of persons important to local, California or national history (Criterion 2). It no longer displays character-defining features of any particular architectural style and would not be eligible under Criterion 3. It is not the type of resource that would be eligible under Criterion 4. Additionally, the alterations to the structure have resulted in a loss of historic integrity. Therefore, Energy Commission staff concludes that this structure does not meet any of the eligibility criteria for the CRHR, and is not a historical resource for the purposes of CEQA.

35656 Sierra Highway

The multiple-structure industrial storage yard located at 35656 Sierra Highway is noted in the Assessor’s record as a commercial/industrial property with a 640-square-foot structure constructed in 1955. Information available to staff did not indicate that the building was associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1) or associated with the lives of persons important to local, California or national history (Criterion 2). It is a utilitarian structure and would not be eligible under Criterion 3. It is not the type of resource that would be eligible under Criterion 4. Therefore, Energy Commission staff concludes that this structure does not meet any of the eligibility criteria for the CRHR, and is not a historical resource for the purposes of CEQA.

35470 Sierra Highway

The property located at 35470 Sierra Highway was inaccessible. Information available to staff did not indicate that the building was associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1) or associated with the lives of persons important to local, California or national history (Criterion 2). It is a utilitarian structure and would not be eligible under Criterion 3. It is not the type of resource that would be eligible under Criterion 4. Therefore, Energy Commission staff concludes that this structure does not meet any of the eligibility criteria for the CRHR, and is not a historical resource for the purposes of CEQA.

35464, 35462, and 35452 Sierra Highway

The property 35464, 35462, and 35452 Sierra Highway has commercial and residential structures, and the majority of the property is fenced. Information available to staff did not indicate that the property was associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1) or associated with the lives of persons important to local, California or national history (Criterion 2). The visible buildings do not display characteristics that would make them definitive examples of their types and would not be eligible under Criterion 3. It is not the type of resource that would be eligible under Criterion 4. Therefore, Energy Commission staff has concluded that this property does not meet any of the eligibility criteria for the CRHR, and is not a historical resource for the purposes of CEQA.

All CRHR-Eligible Resources Subject To Alternative Route Impacts

In the FSA, Energy Commission staff identified two CRHR-eligible built-environment resources and recommended three additional built-environment resources as potentially CRHR eligible. Staff has identified one additional CRHR-eligible built-environment resource, the Bekins building, in this alternatives analysis. The eligibility of the six built-environment resources is summarized in **Cultural Resources Table 3.3-2**.

Cultural Resources Table 3.3-2
CRHR-Eligible Cultural Resources Potentially Subject to Alternative Transmission Line Route Impacts

Resource Designation	Resource	CRHR Eligibility	Integrity
19-180680	Air Force Plant 42: Building 15(150) (circa 1958)	NRHP eligible and CRHR Eligible	Yes
LAN-1534H	Palmdale Ditch (1918–1919)	CRHR listed	Yes
19-180638	Southern Pacific Railroad (1876)	NRHP eligible and CRHR Eligible	Yes
19-187713	Angeles Forest Highway (1930–1940)	CRHR eligible	Yes
19-186876	SCE Eagle Rock-Pardee Transmission Line (1928)	NRHP eligible and CRHR Eligible	Yes
	Bekins Building (1918)	CRHR Eligible	Yes

Assessment of Impacts and Discussion of Mitigation

Method and Threshold for Determining Significance of Impacts to Historical Resources

Under CEQA, "a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment" (Pub. Resources Code, § 21084.1). Thus, Energy Commission staff analyzes whether a proposed project would cause a substantial adverse change in the significance of all historical resources identified in the Cultural Resources Inventory. The degree of significance of an impact depends on:

- The cultural resource impacted;
- The nature of the resource's historical significance;
- How the resource's historical significance is manifested physically and perceptually;
- Appraisals of those aspects of the resource's integrity that figure importantly in the manifestation of the resource's historical significance; and
- How much the impact will change those integrity appraisals.

Direct and Indirect Impacts

In the abstract, direct impacts to cultural resources are those associated with project development, construction, and co-existence. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. Construction can have direct impacts on historic built-environment resources when those structures must be removed to make way for new structures or when the vibrations of construction impair the stability of historic structures nearby. New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, and when the new structures produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Generally speaking, indirect impacts to archaeological resources are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction causes obsolescence and demolition or creates improved accessibility, making vandalism or greater weather exposure possible.

Ground disturbance accompanying construction at a proposed plant site, along proposed linear facilities, and at a proposed laydown area has the potential to directly impact archaeological resources, unidentified at this time. The potential direct, physical impacts of the proposed construction on unknown archaeological resources are commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. Placing the proposed plant into this particular setting could have a direct impact on the integrity of association, setting, and feeling of nearby standing historic structures.

Identification and Assessment of Direct Impacts and Recommended Mitigation

Archaeological Resources

Because staff determined that all the known archaeological sites potentially impacted by construction of the alternative transmission lines are not historically significant under CEQA, none of the impacts on known archaeological sites would be significant and, therefore, no mitigation for those impacts would be required.

Construction, however, generally entails the subsurface disturbance of the ground, which can affect unidentified, potentially significant, buried archaeological resources (eligible under CRHR Criterion 4: “likely to yield information important in history or prehistory”). Consequently, ground disturbance accompanying construction along the alternative transmission line routes has the potential to directly impact archaeological resources, buried in the sediments of the project areas and unidentified at this time,

Because of the possibility that archaeological deposits could be encountered during construction, CEQA recommends that a lead agency make provisions to protect archaeological resources unexpectedly encountered during construction. A project owner may be required to train workers to recognize cultural resources, fund mitigation, and delay construction in the area of the find (Pub. Resources Code, § 21083.2; Cal. Code Regs., tit. 14, §§ 15064.5(f) and 15126.4(b)). Consequently, staff recommends that the same conditions of certification recommended in the FSA for identifying, evaluating, and mitigating impacts to archaeological resources discovered during construction be required for either alternative transmission line route.

Built-Environment Resources

Five of the six built-environment resources identified by the applicant and/or Energy Commission staff as historically significant under CEQA would not be significantly impacted by the proposed project. Significant physical impacts on the remaining resource, the Palmdale Ditch, could occur. Staff proposes that the applicant avoid such impacts, but if impacts cannot be avoided, Energy Commission staff recommends implementation of Condition of Certification **CUL-6** to reduce any impacts to a less than significant level.

Air Force Plant 42 Building 15 (150)

Building 15 (150) would not be physically impacted by the alternatives as the transmission lines are located outside the fenced boundary of the secure military facility. The building’s integrities of setting and feeling would not be reduced by the addition to its setting of the transmission lines because the ambient setting is already an industrial one. Since staff has identified no project impacts to this NRHP-eligible and potentially CRHR-eligible resource, no mitigation would be required.

Palmdale Ditch

A concrete encasement possibly associated with the Palmdale Ditch is located in or near the construction zone of the overhead transmission line, which would cross the Palmdale Ditch at a perpendicular angle. Energy Commission staff expects construction to avoid physical impacts to the ditch and/or encasement by spacing monopoles to span them, limiting construction activity to just the immediate monopole locations. It also is

not expected that the monopole access road would be expanded across the gap that separates the two spanning poles, similar to the avoidance measures proposed in the FSA for the applicant's gen-tie (AECOM 2010b, att. CR-1). The ditch's integrity of setting and integrity of feeling would not be impacted by the placement of power poles and transmission lines because other power lines are already present. Staff finds the transmission line alternatives would have no significant impacts on the Palmdale Ditch, and so no mitigation would be required. **CUL-6** provides a means to mitigate any unanticipated and unavoidable impacts to the Palmdale ditch to a less than significant level.

Southern Pacific Railroad

The proposed project would not physically impact the railroad berm which parallels Sierra Highway, which Energy Commission staff believes to be, at least in part, the original 1876 berm. The applicant would be expected to construct the transmission line using the same avoidance procedures discussed for the natural gas and reclaimed water pipelines in the FSA. Consequently, any impact to the berm from the installation of the partial underground alternative would not be significant. As a result, the project would have no significant impacts on the Southern Pacific Railroad, and, therefore, no mitigation would be required.

Eagle Rock-Pardee Transmission Line

In its documentation of this built-environment resource, the applicant indicated that the two H-frame supports located near the place where the applicant's proposed gen-tie transmission line would enter the Vincent Substation are not original to the 1928 Vincent Line, but were installed in 1967 (WSA 2009a, pp. 2–3). As a result, the project would physically impact only a part of the old transmission line that already lacks integrity of materials, integrity of design, and integrity of workmanship. The applicant's proposed new gen-tie and the two alternative transmission line routes analyzed here would share the same alignment. Therefore, impacts to the old transmission line's integrity of setting and integrity of feeling would be negligible because the setting already includes infrastructure. Staff finds that neither of the transmission line alternatives would have a significant impact on the Eagle Rock-Pardee Transmission Line and, therefore, no mitigation would be required.

Angeles Forest Highway

In its approach to the Vincent Substation, the portions of the transmission line shared by the applicant's gen-tie and the two alternatives analyzed here proceed up to the Angeles Forest Highway's ROW from the east and turns south, then west, to cross the highway before turning north to enter the substation (WSA 2009a, fig. 1, map 11). The transmission lines would have no physical impact on the highway. The transmission lines' impacts to the highway's integrity of setting and integrity of feeling would be negligible because the setting already includes similar infrastructure. Staff finds that the shared transmission alignment would have no significant impacts on the Angeles Forest Highway and, therefore, no mitigation would be required.

The Bekins Building

The Bekins Building would not be physically impacted by Alternative Routes 4 and 5 as

the transmission lines are located in front of the building rather than over it, and the monopoles would be placed to provide the greatest separation possible. The building's integrities of setting and feeling would not be reduced by the addition of the transmission lines to its setting because the ambient setting is already an industrial one. Since staff has identified no project impacts to this potentially CRHR-eligible resource, no mitigation would be required.

Ethnographic Resources

No ethnographic resources were identified by Energy Commission staff, so no mitigation measures for alternative transmission line impacts would be required for this type of cultural resources.

Indirect Impacts

Energy Commission staff did not identify any indirect impacts to any identified cultural resources in the project areas of the transmission line alternatives and, therefore, no mitigation measures for indirect impacts would be required for any class of cultural resources.

Summary of Significant Impacts Requiring Mitigation

Energy Commission staff identified no significant impacts to known archaeological resources, ethnographic resources, or built-environment resources. No mitigation for transmission line alternative construction impacts to known resources would be required. Staff has recommended the adoption of conditions of certification that would provide for the appropriate treatment of any cultural resources encountered during construction and for the mitigation of unanticipated cultural resources impacts occurring during construction.

Operation Impacts and Mitigation

Energy Commission staff has identified no cultural resources that would be impacted by the normal operation of Alternative Routes 4 and 5. Consequently, at this time, staff has recommended no conditions of certification addressing operational impacts. If, during operation along either of the transmission line alternatives (if chosen), the owner should plan any changes or additions entailing ground disturbance, the owner would have to petition the Energy Commission to review the environmental impacts of those activities and approve the plan. Cultural resources staff would then determine if previously undisturbed sediments would be affected by the planned activities and, if so, recommend the application of existing conditions or recommend new ones to mitigate any impacts to known or newly identified significant historical resources resources.

Cumulative Impacts and Mitigation

A cumulative impact refers to a proposed project's incremental effects considered over time and together with those of other, nearby, past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code sec. 21083; Cal. Code Regs., tit. 14, secs. 15064(h), 15065(a)(3), 15130, and 15355). Cumulative impacts to cultural resources in the PHPP vicinity could occur if any other existing or proposed projects, in conjunction with the proposed PHPP, had or would have impacts on cultural resources

that, considered together, would be significant. The previous ground disturbance from prior projects and the ground disturbance related to the future construction of the PHPP and other proposed projects in the vicinity could have a cumulatively considerable effect on subsurface archaeological deposits, both prehistoric and historic. The alteration of the PHPP setting which could be caused by the construction and operation of the proposed PHPP and other proposed projects in the vicinity could be cumulatively considerable, but may or may not result in a significant impact, depending on the integrity of the ambient setting.

The applicant identified four reasonably foreseeable projects within a three-mile radius around the plant site (COP 2008a, pp. 5.1-2–5.1-3) that could contribute to a cumulatively considerable impact on cultural resources. Staff has not identified any additional projects that would add to the cumulative impacts due to the overhead alternative (see Cumulative Impacts discussion of the FSA's Cultural Resources section for additional information).

The FSA has identified cultural resources near the proposed PHPP site, assessed potential PHPP impacts to these cultural resources, and recommended conditions of certification to mitigate any significant impacts to known historically significant resources so that the construction of the proposed PHPP would not result in any significant impacts to historical resources, as defined in CEQA. Staff has also provided conditions of certification in the FSA to mitigate any significant impacts to significant archaeological resources discovered during PHPP construction. Proponents of future projects in the vicinity of PHPP may be able to mitigate impacts to as yet undiscovered historically significant, subsurface archaeological resources to less than significant levels by requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery. Impacts to human remains may also be mitigated by following the protocols established by state law in Public Resources Code section 5097.98.

Since any impacts from the proposed PHPP, including either transmission line alternative, to significant cultural resources discovered during construction would be mitigated to a less than significant level by the project's compliance with the proposed Conditions of Certification **CUL-1** through **CUL-8**, and since similar protocols can be applied to other current and future projects in the area, staff does not expect the incremental effects of either of the transmission line alternatives to be cumulatively considerable, when viewed in conjunction with other projects.

Proposed Conditions of Certification

Energy Commission staff does not recommend any additional conditions of certification for either the overhead transmission line alternative or the partial underground transmission line alternative. Conditions of Certification **CUL-1** through **CUL-8**, as identified in the FSA, would apply for either Alternative Route 4 of Alternative Route 5, if adopted.

Comparison to Proposed Transmission Line Route

Similar to the proposed project analyzed in the FSA, staff identified no known cultural resources that the construction or operation of the alternative transmission lines would

significantly impact. **Cultural Resources Table 3.3-3** compares the transmission line routes.

Cultural Resources Table 3.3-3
Comparison of Cultural Resources among Transmission Line Alternatives

	Applicant's Proposed Gen-Tie	Alternative Route 4	Alternative Route 5
Prehistoric Archaeological Resources	2	1	0
Historic-Period Archaeological Resources	2	11*	12*
Built-Environment Resources	4	1	4

* Includes historic homestead site 8H avoided by alignment modification

Alternative Route 4 - Partial Underground Transmission Line

It is very important to note that staff found no *increase* in impacts related to the underground portion of the partial underground alternative, when compared to the applicant's proposed use of this route for the natural gas and reclaimed water pipelines. The widening of the right-of-way did not change the impacts identified for proposed alignment in the FSA. However, there were historic period archaeological resources discovered along the overhead portion of this alternative.

Alternative Route 5 - Overhead Division Street Transmission Line

The overhead transmission line alternative includes nine refuse deposits that staff has determined are not historically significant under CEQA. Although not identified as potentially eligible, historic homestead site 8H would be avoided due to a minor shift in the proposed alignment.

3.4 HAZARDOUS MATERIALS

Setting and Existing Conditions

The project site is located in the City of Palmdale, California. Land in the vicinity of the proposed project is designated for Light Industry, Commercial, Office, and Business Park. There are several residential uses within a one-mile radius of the power plant site and sensitive receptors and residences in the project vicinity (within a 3-mile radius) are listed in **Appendix G.7** and shown in **Figure 5.10-2** of the AFC. The residences to the Alternative Route 4, which shares the route of the proposed natural gas pipeline, are located directly along the proposed natural gas on East Avenue S and 10th Street East. The nearest residences to the Alternative Route 5 would be located along Division Street between Avenue O and Avenue P. The nearest sensitive receptor to Alternative Route 4 is the Palmdale School District office on the west side of 10th Street south of Avenue P. The nearest sensitive receptor to the Alternative Route 5 is the Palmdale Learning Center, approximately 250 feet from the route on Division Street.

Assessment of Impacts and Discussion of Mitigation

During the construction phase of the project, the only hazardous materials proposed for use include paint, cleaners, solvents, gasoline, diesel fuel, motor oil, and lubricants. Any impact of spills or other releases of these materials would be limited to the location because of the small quantities involved, the infrequent use and hence 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 all have very low volatility and would represent limited off-site hazards, even in larger quantities. The amounts and type of hazardous materials used during construction of overhead transmission lines would be a fraction of that used during the construction of the power plant and solar arrays. However, this may not be the case with an underground transmission line as additional hazardous materials might be used.

Alternative Route 4 – Partial Underground Transmission Line

The construction of underground transmission lines would involve the presence, use, and temporary storage of small amounts of gasoline, diesel fuel, motor oil, lubricants, and perhaps paint, cleaners, and solvents for short periods of time (days) along the entire route. These small amounts, although needed for large heavy directional boring and trenching equipment, would present a less than significant risk to the off-site public. However, an underground transmission line must be insulated from the ground to achieve meaningful power flow. This is achieved by encapsulating the transmission line with an insulator fluid, solid, or gas such as insulating oil, a non-conducting dielectric polymer such as cross-linked polyethylene (XLPE), or sulfur hexafluoride (SF6). Thus, the underground option may result in the presence of additional materials of varying hazardous nature.

During operations, a minimal need will exist for the use of hazardous materials for maintenance and repair of underground transmission lines. However, it should be noted that the California Department of Education has established setback guidelines between the “usable, unrestricted portions” of any California school site and underground transmission lines of 25 feet for 50 to 133 kV line; 37.5 feet for 220 to 230 kV line; and 87.5 feet for 500 to 550 kV line. Since the transmission line will be 230 kv, it must not be located underground closer than 37.5 feet from the schools located along the undergrounding route. One such school exists; the Palmdale School District office on the west side of 10th south of Avenue P. The district office apparently has a day-care facility which therefore might qualify this location as a “school” and thus require the underground transmission line to be placed at least 37.5 feet from the fenceline of the day care area. Because the underground route would most likely remain on the east side of 10th Street to avoid the County ROW, the route would remain 37.5 feet from the day care area.

Alternative Route 5 - Overhead Division Street Transmission Line

The construction of overhead transmission lines would involve the presence, use, and temporary storage of small amounts of gasoline, diesel fuel, motor oil, lubricants, and perhaps paint, cleaners, and solvents for short periods of time (days) along the entire route. These small amounts would present a less-than-significant risk to the off-site public. Although a longer transmission line route would result in a higher chance of spills

and leaks of hazardous materials along the route simply as a function of time and distance, the risks from any route would be less than significant.

During operations, a minimal need will exist for the use of hazardous materials for maintenance and repair of overhead transmission lines.

In the **Socioeconomics** section of this Appendix, staff presents census information that shows that there are minority populations within a three-mile buffer of the project. Since staff has added conditions of certification that would reduce the risk associated with hazardous materials to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the alternative transmission lines on minority populations. Therefore, there are no environmental justice issues for Hazardous Materials.

Comparison to Proposed Transmission Line Route

The applicant's proposed interconnection point for the PHPP with the SCE electrical transmission system is at SCE's existing Vincent Substation south of Palmdale. Although the Vincent Substation is approximately 11 miles south-southwest of the PHPP plant site as the crow flies, to accommodate the needs of Palmdale's aviation community (Air Force Plant 42 and LAWA), the applicant has proposed a circuitous transmission line route that is 35.6 miles long and that extends north and east from the plant site, then south and back to the west.

As stated above, the construction of a 35.6 mile 230 kv overhead transmission line will result in proportional greater use, presence, and temporary storage of hazardous materials along the route than either Alternative Route 4 or Alternative Route 5. Since the chance of a hazardous materials spill is directly proportional to the length of the transmission line and the time it takes to complete construction, the applicant's proposed route would pose a greater risk of a hazardous material release than the overhead or underground alternatives. However, staff believes that all risks to the public from the use and temporary storage of hazardous materials during construction of all three proposed routes would be less than significant and no additional Conditions of Certification other than those already proposed by staff are necessary.

During operations, the use if an insulating material for the underground alternative would raise the chances of a release of materials depending upon the insulating material chosen. Insulting oil, such as XLPE, could pose a risk of fire and smoke while a solid non-conducting dielectric polymer would not pose such a risk. The use of a gas, either nitrogen or SF6, would not pose any increased risk because nitrogen is an inert gas and SF6 is colorless, odorless, non-toxic, and non-flammable.

3.5 LAND USE

Setting and Existing Conditions

Alternative Route 4 - Partial Underground Transmission Line

Laws, Ordinances, Regulations, and Standards (LORS)

Land use LORS directly applicable to this alternative include a federal plan for Air Force Plant 42 and the city of Palmdale's General Plan and Zoning Ordinance, which includes the Trade and Commerce Center Specific Plan. Refer to **Land Use Table 1** in the FSA which provides a general description of applicable LORS documents. The alternatives' consistency with these LORS is discussed in **Land Use Table 3.5-5**.

Transmission Line Route

This alternative route would be 6.75 miles of underground transmission line. In general, existing land use uses that would be traversed by and adjacent to this alternative route would be undeveloped and industrial land, with dense areas of commercial, residential development within the city of Palmdale.

The route would exit the proposed project site and head west along East Avenue M-12 until reaching Sierra Highway where the route would turn south, and then east at Lockheed Way until reaching 10th Street East. From the beginning of the route until the intersection of 10th Street East and Rancho Vista Blvd, the area is primarily undeveloped land surrounding Plant 42, with industrial development along Lockheed Way and 10th Street East. Along 10th Street East south of Rancho Vista Blvd the area is dense with residential, commercial, and mixed-use developments. At approximately 0.25 mile past East Avenue R-4, the line would cross a railroad line which would likely require boring under the line. At East Avenue S, the line would turn west for approximately 0.15 mile and then transition to an overhead line at approximately East Avenue S and Sierra Highway.

At Sierra Highway, the line would follow the west side of Sierra Highway and would generally parallel an existing distribution line right-of-way south along Sierra Highway. South of East Avenue R along Sierra Highway until Angeles Forest Highway, the area is largely undeveloped with dispersed residential, commercial and light industrial development. South of East Avenue S, the line would begin to traverse land within unincorporated Los Angeles County. Approximately 0.2 mile south of E. Barrel Springs Road, the line would cross to the east of Sierra Highway and the railroad right-of-way to remain farther from residential housing. Just before the water treatment plant, the transmission line would cross Sierra Highway again and remain on the west side of Sierra Highway until reaching the Angeles Forest Highway. The line would cross Sierra Highway to follow the Angeles Forest Highway until it would join the transmission line route proposed by the applicant for the proposed PHPP project. At this point, the alternative route would follow the applicant's proposed route south until connecting into SCE's Vincent Substation. The area south of the intersection of Sierra Highway and Angeles Forest Highway to Vincent Substation is undeveloped land with the exception of existing transmission line rights-of-way that approach the Vincent Substation.

In addition, the following is a list of sensitive receptors (childcare facilities, hospitals, libraries, or churches) identified within a 0.25-mile radius of Alternative Route 4:

- Tumbleweed Elementary
- Early Childhood Education Preschool
- Guidance Charter School
- True Vine Gospel Church
- Lighthouse Assembly
- First Baptist Church
- Foursquare Church
- Hope Community Preschool
- Eagle Vision Community Church
- Courson Park
- Whosoever Will Christian Church

According to FMMP data (see **Land Use Figure 3.5-1)**, this alternative route would traverse land designated as Urban and Built-Up Land and Other Land. Important Farmland, such as Prime Farmland and Farmland of Statewide Importance, would not be traversed by this alternative route.

Land Use Tables 3.5-1 and **3.5-2** present the land use and zoning designations that would be traversed by Alternative Route 4, respectively. Also refer to **Land Use Figures 3.5-2** and **3.5-3** which illustrate the general plan and zoning designations (respectively) traversed by this alternative. This alternative would traverse the City of Palmdale's Lockheed Specific Plan along Lockheed Way and 10th Street East.

Land Use Table 3.5-1
General Plan Land Use Designations

Jurisdiction	Land Use Designation	Approximate Length (miles)
City of Palmdale	Unknown (roads, highways, etc)	3.66
	SP (Lockheed Specific Plan)	0.75
	AR (Airport and Related Uses)	2.60

Land Use Table 3.5-2
Zoning Designations

Jurisdiction	Land Use Designation	Approximate Length (miles)
City of Palmdale	Unknown (roads, highways, etc)	3.69
	SP (Specific Plan)	0.75
	M-3 (Airport Industrial)	2.58

Alternative Route 5 – Overhead Division Street Transmission Line

Laws, Ordinances, Regulations, and Standards (LORS)

Land use LORS directly applicable to this alternative include the following documents:

- Air Installation Compatible Use Zone (AICUZ) Study – Air Force Plant 42 (AICUZ, 2002)
- City of Palmdale General Plan (City of Palmdale 1993)
- City of Palmdale Lockheed Specific Plan (City of Palmdale 1992)
- City of Palmdale Trade and Commerce Center Specific Plan (City of Palmdale 2010a)
- City of Palmdale Zoning Ordinance (City of Palmdale 1994)
- County of Los Angeles General Plan (LAC 1980)
- Antelope Valley Areawide General Plan, 1986 (LAC 1986)
- County of Los Angeles – County Code, Title 22 Planning and Zoning (LAC 2009a)

Refer to **Land Use Table 1** in the FSA which provides a general description of these land use LORS documents. The alternatives' consistency with these LORS is discussed below in **Land Use Table 3.5-5**.

Transmission Line Route

This alternative route would be a total of 12.8 miles of overhead transmission line within the city of Palmdale and unincorporated Los Angeles County. Existing land uses that would be traversed by and adjacent to this alternative route would primarily be vacant land, road or highway rights-of-way, and dispersed areas of commercial, residential or light industrial development. The route would exit the proposed project site west until reaching Division Street. Along Division Street, the line would generally be adjacent to a 66kV transmission corridor on the west side of the street for approximately five miles until reaching Avenue R. The western side of Division Street is undeveloped except for an area between Avenue O and Avenue P and some development along East Palmdale Boulevard and Avenue R. In addition, along Division Street near Avenue N, the line would be within Plant 42's Accident Potential Zone I (APZ I). Prior to reaching East Avenue R, the line would cross to the west side of Division Street to avoid the Palmdale Learning Center and proceed on the eastern side of Division Street on vacant land until reaching East Avenue R and then would remain on the northern side of East Avenue R until reaching Sierra Highway. Palm Tree Elementary is located on the south side of East Avenue R.

At Sierra Highway, the line would follow the west side of Sierra Highway and would generally parallel an existing distribution line right-of-way south along Sierra Highway. From this point, the route traversed by this transmission line alternative would be the same as the Alternative Route 4.

The following is a list of the sensitive receptors (childcare facilities, hospitals, libraries, or churches) identified within a 0.25-mile radius of Alternative Route 5:

- Palm Tree Elementary
- Palmdale Learning Plaza
- Yucca Elementary
- Childcare Resource Center
- Opportunity for Learning
- The Well Church
- Desert Sands Park
- Holy Cross Antiochen Orthodox
- Jesus is Lord Christian Church
- Tumbleweed Elementary
- Chinese Medical Center

According to the California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP) (see **Land Use Figure 3.5-1)** this alternative transmission line route would traverse land designated as Urban and Built-Up[4] Land and Other Land[5]. Important Farmland, such as Prime Farmland and Farmland of Statewide Importance, would not be traversed by this alternative route.

Land Use Tables 3.5-3 and **3.5-4** present the land use and zoning designations, respectively, that would be traversed by Alternative Route 5. Also refer to **Land Use Figures 3.5-2** and **3.5-3** which illustrate the general plan and zoning designations (respectively) traversed by this alternative.

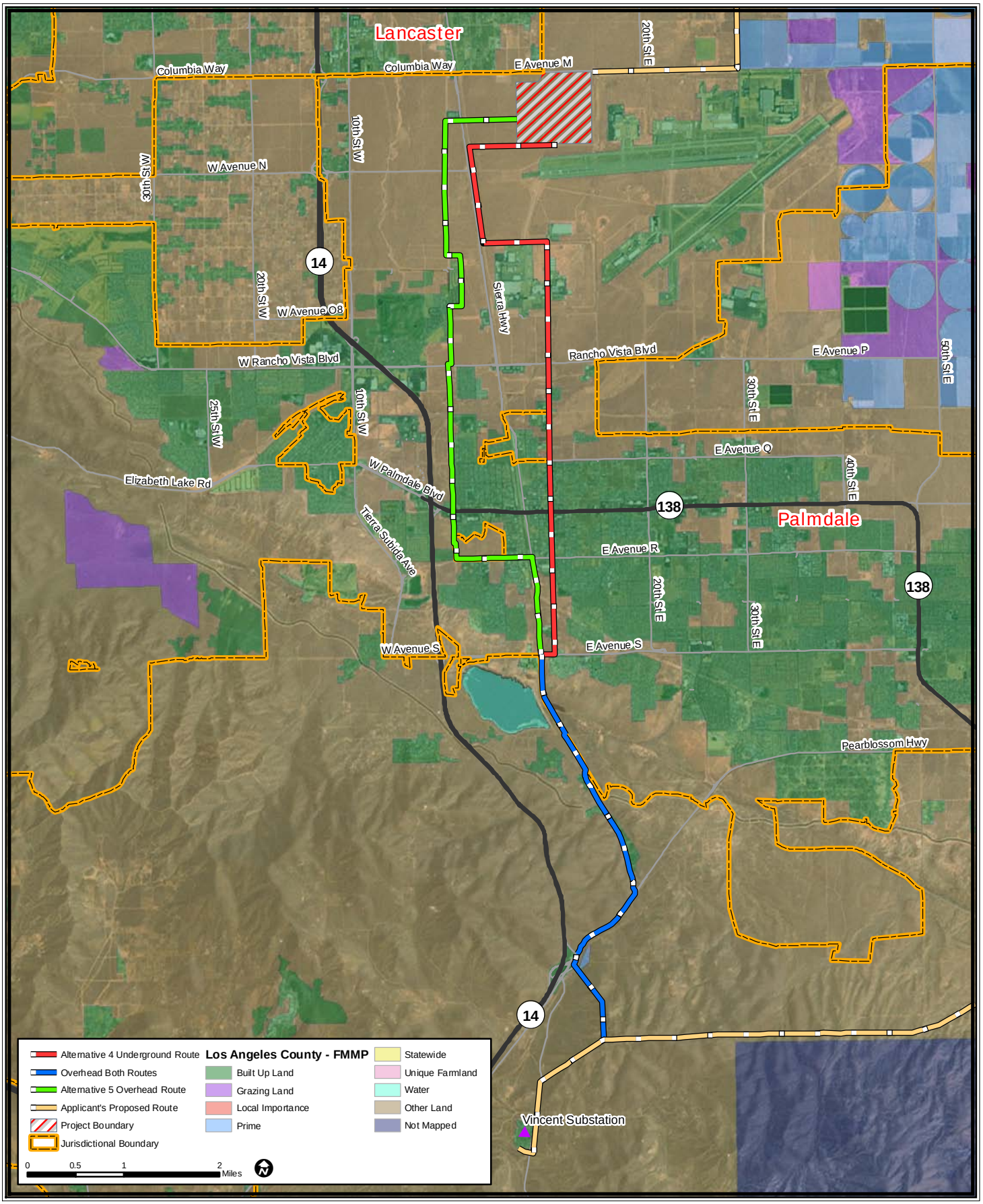
This alternative would traverse the City of Palmdale's Trade and Commerce Center Specific Plan along Division Street. In addition, the entire length of the line within the jurisdiction of unincorporated Los Angeles County would be within land designated by the Antelope Valley Areawide General Plan. The land use designations set forth by this areawide plan supersede the county's General Plan designations. Staff referred to the county's GIS website to identify the land use designations that would be traversed by this alternative (LAC 2010b). However, staff was unable to obtain current GIS data for the Antelope Valley Areawide General Plan; therefore, **Land Use Table 3.5-4** does not include the approximate length of the line within each land use designation.

[4] Urban and Built-Up Land is "land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel" (CDC 2006).

[5] Other Land is "land not included in any other mapping category… [including] vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as other land" (CDC 2006).

ALTERNATIVES - FIGURE 3.5-1

Farmland Mapping and Monitoring Program (FMMP) - Transmission Alternatives

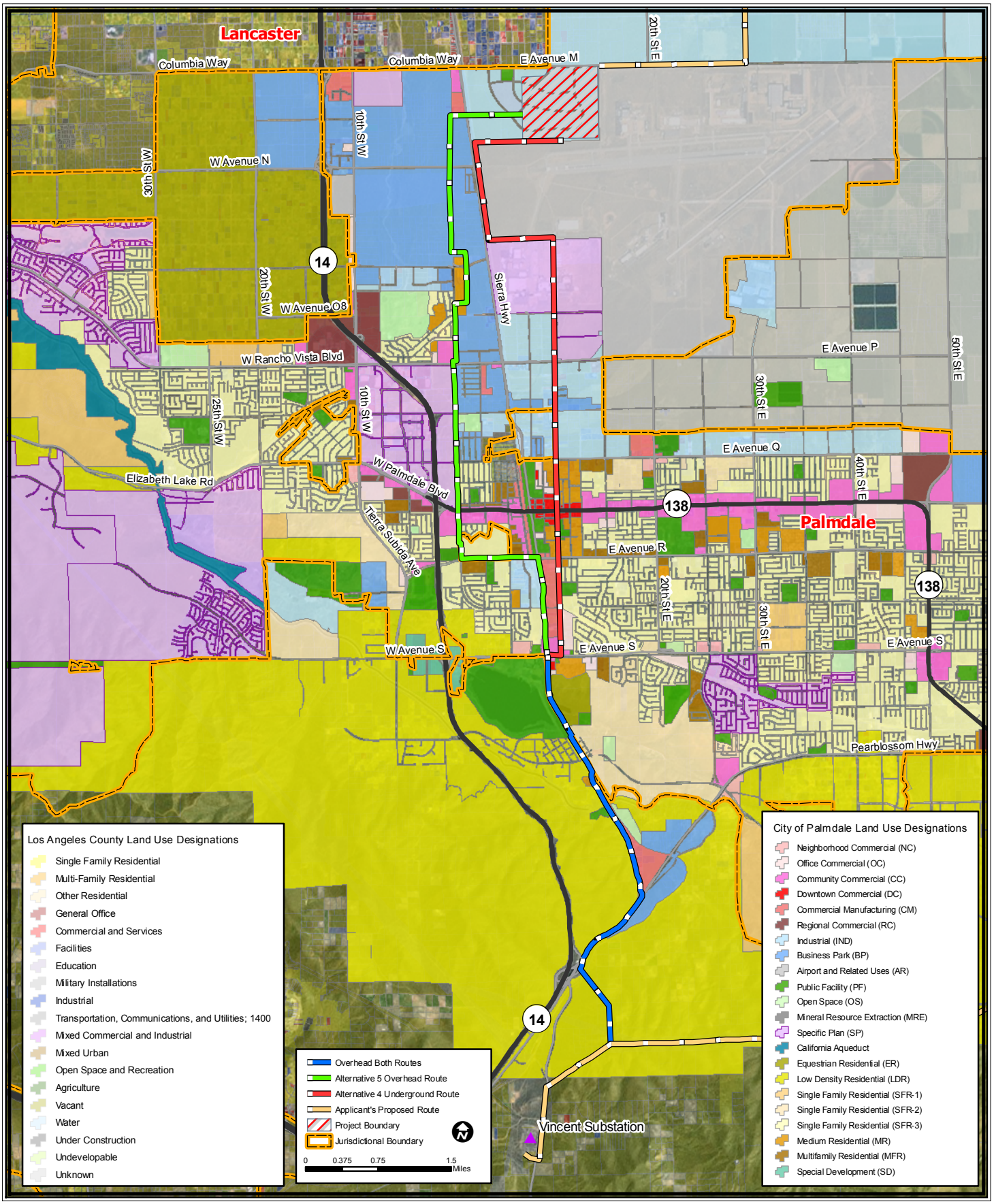


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission, CA Department of Conservation

ALTERNATIVES - FIGURE 3.5-2

General Plan Land Use Designations - Transmission Alternatives

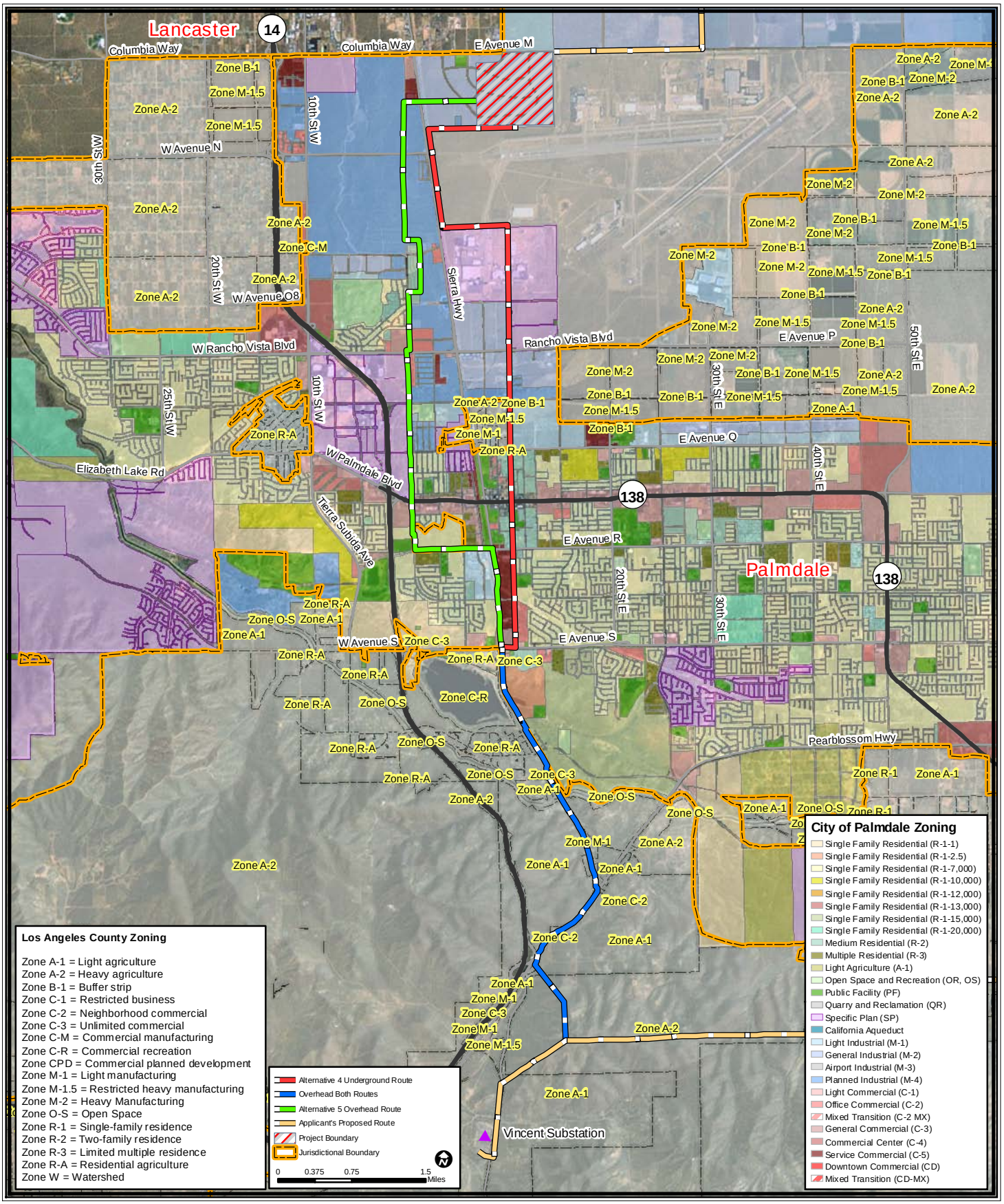


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission, LA County, City of Palmdale

ALTERNATIVES - FIGURE 3.5-3

Zoning Designations - Transmission Alternatives



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission, LA County, City of Palmdale

Land Use Table 3.5-3
General Plan Land Use Designations

Jurisdiction	Land Use Designation	Approximate Length (miles)
City of Palmdale	CC (Community Commercial)	0.31
	DC (Downtown Commercial)	0.08
	OC (Office Commercial)	0.01
	ER (Equestrian Residential)	0.05
	SFR-2 (Single-Family Residential)	0.14
	Unknown (roads, highways, etc)	2.14
	CM (Commercial Manufacturing)	0.61
	PF (Public Facility)	0.02
	MFR (Multiple Family Residential)	0.14
	SFR-3 (Single-Family Residential)	0.72
	SP (Specific Plan)	0.82
	BP (Business Park)	2.46
	MR (Medium Residential)	0.22
	IND (Industrial)	0.50
Los Angeles County-Antelope Valley Areawide General Plan	N2 (Non-Urban 2)	Unknown
	N1 (Non-Urban 1)	Unknown
	O (Open Space)	Unknown

Land Use Table 3.5-4
Zoning Designations

Jurisdiction	Land Use Designation	Approximate Length (miles)
City of Palmdale	Unknown (roads, highways, etc.)	1.97
	R-1-15 (Single Family Residential)	0.41
	R-1-2.5 (Single Family Residential)	0.06
	C-1 (Light Commercial)	0.10
	C-3 (General Commercial)	0.27
	C-5 (Service Commercial)	0.61
	PF (Public Facility)	0.05
	R-3 (Multiple Residential)	0.14
	R-1-7 (Single Family Residential)	0.72
	SP (Trade and Commerce Center Specific Plan)	0.83
	C-2 (Office Commercial)	0.12
	M-4 (Planned Industrial)	2.58
	R-2 (Medium Residential)	0.22
	M-2 (General Industrial)	0.50
Los Angeles County	Unknown (roads, highways, etc.)	3.62
	A-2 (Heavy Agriculture)	0.03
	A-1 (Light Agriculture)	0.10
	M-1 (Light Manufacturing)	0.25
	R-A (Residential Agriculture)	0.38

Assessment of Impacts and Discussion of Mitigation

Energy Commission staff has analyzed Alternative Routes 4 and 5 to determine consistency with applicable land use LORS and the potential to have significant adverse land use-related impacts. In addition, conditions developed by staff to reduce any potential impacts to a less-than-significant level are provided, as well as the feasibility and enforceability of the recommended conditions of approval.

Method and Thresholds for Determining Significance

The significance criteria used for this analysis are based on the CEQA Guidelines (CCR 2006) and thresholds, which are the same as those used for analysis of the proposed project's impacts in the **Land Use** section of the FSA.

Alternative Route 4 - Partial Underground Transmission Line

Conversion of Farmland

According to the FMMP, Alternative Route 4 is located on land defined as "Other Land" and "Urban and Built-Up Land." Therefore, construction of the transmission line would not result in the conversion of Prime Farmland and/or Unique Farmland. In addition, this alternative would not traverse land within an agricultural zoning designation or under Williamson Act contracts.

Physical Disruption or Division of an Existing Community

Existing land uses along this route include undeveloped land, industrial, commercial, residential and mixed-use development. The line would be adjacent to residential development along portions of 10th Street East. However, the majority of this alternative route would parallel existing transmission line corridors or electric distribution line rights-of-way. Therefore, the line would not physically conflict with existing land uses and would not result in the division or disruption of an established community.

Conflict with Any Applicable Land Use Plan, Policy, or Regulation

LAND USE Table 3.5-5 provides the consistency of both alternatives with the applicable land use LORS adopted by the U.S. Air Force and the city of Palmdale, as identified in the LORS setting.

Based on staff's review of the applicable LORS documents, consistency with applicable LORS documents would be contingent upon implementation of Condition of Certification **LAND-2**, which includes a Site Plan Review, as requested by the city (City of Palmdale 2010).

Land Use Compatibility

The area surrounding Alternative Route 4 north of Rancho Vista Blvd is primarily dominated by vacant land and industrial development. South of Rancho Vista Blvd, the areas is dense with commercial, residential and mixed-used development. Several residential properties are scattered amongst the commercial and industrial uses along the transmission line route. As discussed in **LAND USE Table 3.5-5**, the city of Palmdale's Community Design Element requires utility lines to be placed underground.

In addition, placement of the line would be within existing road rights-of-way which are established linear corridors. Therefore, this partial underground alternative would be compatible with the existing land uses.

Sensitive Receptors

A proposed siting location may be considered inappropriate if a new source of pollution or hazard is located within close proximity to a sensitive receptor. From a land use perspective, sensitive receptor sites are those locations where people who would be more adversely affected by pollutants, toxins, noise, dust, or other project-related consequence or activity are likely to live or gather. Children, those who are ill or immune-compromised, and the elderly are generally considered more at risk from environmental pollutants. Therefore, schools, along with day-care facilities, hospitals, nursing homes, and residential areas, are considered to be sensitive receptor sites for the purposes of determining a potentially significant environmental impact. Depending on the applicable code, close proximity is defined as "within 1000 feet" of a school (California Health & Safety Code §§42301.6–9) or within 0.25 mile of a sensitive receptor, under CEQA (CCR 2006; CCR 2008). Proximity is not necessarily the deciding factor for a potentially significant impact, but is the threshold generally used to require further evaluation.

The Early Childhood Education Preschool is located at East Avenue P-8 and 10th Street East, and the property line of this school would be at least 40 feet from the closest boundary of the route. According to guidelines set forth by the CDE, the setbacks for locating any part of a school site property line near underground transmission line easements for 220-230kV lines is 37.5 feet (CDE 2006). Based on this guideline, the siting of this 230kV transmission line alternative would be compatible an established school site.

Given the existing industrial and utility development, this alternative would be compatible with the surrounding land uses. Therefore, the line would be a compatible land use.

Alternative Route 5 – Overhead Division Street Transmission Line

Conversion of Farmland

According to the FMMP, Alternative Route 5 is located on land defined as "Other Land" and "Urban and Built-Up Land." Therefore, construction of this transmission line alternative would not result in the conversion of Important Farmland.

This alternative would traverse a total of approximately 0.51 mile of land zoned as Light Agriculture (A-1), Heavy Agriculture (A-2), and Residential Agriculture (R-A) by the Los Angeles County Zoning Code. As noted in the description of this alternative (Section 2.2), the minimum right-of-way required for siting a 230-kV transmission line is 60 feet wide. Therefore, a total of approximately 3.7 acres of land designated for agriculture would be within the transmission line right-of-way, which currently consists of undeveloped land. In addition, as noted in **LAND USE Table 3.5-5**, transmission lines are not specifically listed within the county's agricultural zones; however, according to the county's comments on the PSA, their Zoning Ordinance does not regulate such

projects and does not require a conditional use permit (LAC 2010a). As such, construction of the line would not result in a conversion of existing agricultural land, and would not conflict with agricultural zoning designations.

In addition, the project site is not located in an area that is under a Williamson Act contract, and therefore, would not result in the conversion of Williamson Act lands to a non-agricultural use.

Physical Disruption or Division of an Existing Community

Existing land uses along this route include vacant land, with dispersed areas of commercial, residential, and industrial development. The line would be adjacent to residential development along portions of Division Street and Sierra Highway. However, the majority of Alternative Route 5 would be parallel to existing transmission line corridors or electric distribution line rights-of-way, or would be placed within road rights-of-way. As such, the line would be within or adjacent to existing linear corridors, and would not result in the physical disruption or division of an established community.

Conflict with Any Applicable Land Use Plan, Policy, or Regulation

As part of the licensing process, the Energy Commission must determine whether a proposed facility complies with all applicable state, regional, and local LORS (Public Resources Code section 25523[d][1]). The Energy Commission must either find that a project conforms to all applicable LORS or make specific findings that a project's approval is justified even where the project is not in conformity with all applicable LORS (Public Resources Code section 25525).

LAND USE Table 3.5-5 (below) provides the consistency of both transmission line alternatives (Alternative Route 4 and Alternative Route 5) with the applicable land use LORS adopted by the U.S. Air Force, the city of Palmdale, and Los Angeles County, as identified in the LORS setting above.

Based on staff's review of the applicable LORS documents, Alternative Route 5 would be inconsistent with the following: the Trade and Commerce Center Specific Plan; the city of Palmdale's Community Design Element; and the county's Antelope Valley Areawide General Plan. In addition, consistency with other applicable LORS documents would be contingent upon implementation of conditions of certification **LAND-2,** which requires a Site Plan Review, as requested by the city (City of Palmdale 2010) for the proposed project; and **LAND-4,** which would ensure that this alternative complies with the minimum design standards set forth by the U.S. Air Force.

Land Use Compatibility

Land use compatibility refers to the physical compatibility of planned and existing land uses. As discussed in the section entitled **Physical Disruption or Division of an Existing Community** and in **LAND USE Table 3.5-5**, the transmission line would be located in an area primarily dominated by vacant land, with dispersed areas of commercial, residential, and industrial development. This alternative has been sited to the greatest extent along existing linear rights-of-way (including roads, highways, transmission line corridors, and distribution lines), and given the existing industrial and

utility development, the proposed project would be compatible with the surrounding and nearby uses. However, as discussed under the Antelope Valley Areawide Plan, the land surrounding Una Lake is within the county of Los Angeles' Open Space designation. Staff has attempted to contact the county to obtain their input regarding their interpretation of the transmission line's consistency with this section of the plan and the intended development of the area. As of the writing of this analysis, staff has not obtained a response from the county regarding this issue. The transmission line corridor is proposed to be sited along the existing utility or road rights-of-way (i.e., Sierra Highway). Therefore, it is possible that the county would view the siting of a transmission line corridor to be a land use type similar to these other rights-of-way and surrounding land uses. Staff will make every attempt to contact the county and will update this consistency determination upon receipt of input from the county

In addition, Condition of Certification **LAND-2** requires compliance with the city's Site Plan Review, and **LAND-4** would ensure that this alternative would comply with the minimum design standards set forth by the U.S. Air Force. Implementation of these conditions further helps ensure physical compatibility with adjacent land uses by applying the land use standards and desired development patterns set forth by local and federal agencies.

In addition, as noted in **LAND USE Tables 3.5-2** and **3.5-4**, approximately 1.97 and 3.62 miles of this alternative route are zoned as "Unknown" (roads, highway, etc) by the city of Palmdale and Los Angeles County, respectively. The zoning designation is unknown because the land consists of roads or highways. Nonetheless, the siting of a transmission line in a road right-of-way would be compatible since the line would be placed within an established linear corridor in areas that have already been disturbed.

Sensitive Receptors

The area surrounding the transmission line route is primarily dominated by vacant land, with dispersed areas of industrial, commercial, and residential uses. Within 0.25 mile of the transmission line route include the following zoning designations: Single-Family to Medium Residential, Commercial, Industrial, Public Facilities and Institutions, and Airport facilities (refer to the "Setting and Existing Conditions" subsection for a list of the sensitive receptors along the transmission line route). Several residential properties are scattered amongst the commercial and industrial uses along Alternative Route 5. However, as discussed above, this alternative has been sited to the greatest extent along existing linear rights-of-way (including roads, highways, transmission line corridors, and distribution lines), and given the existing industrial and utility development, the proposed project would be compatible with the surrounding and nearby uses.

In addition, the Palmdale Learning Plaza is located on the west side of Division Street and the Palm Tree Elementary School is located on the south side of East Avenue R. According to guidelines set forth by the California Department of Education's (CDE) School Site Selection and Approval Guide, the limit for locating any part of a school site property line near the edge of easements for high-voltage power transmission lines is 150 feet from the edge of an easement for a 220-230kV line (CDE 2010). The property lines for both of these sensitive receptors would be at least 150 feet from the closest

boundary of the route. Therefore, based on these guidelines, the siting of this 230kV transmission line alternative would be compatible with established school sites.

From a land use perspective, impacts regarding land use compatibility would not be significant; therefore the siting of this alternative route would be compatible with nearby surrounding land uses.

Land Use Table 3.5-5
Alternatives' Compliance with Adopted Applicable Land Use LORS

<table>
<tr><th>Applicable LORS</th><th>Description of Applicable LORS</th><th>Consistent?</th><th>Basis for Consistency</th></tr>
<tr><td>Federal</td><td></td><td></td><td></td></tr>
<tr><td><u>Air Installation Compatible Use Zone (AICUZ) Study – Air Force Plant 42</u></td><td>4.6.2 Land-Use Compatibility Guidelines
Below are excerpts from Table 4.3 – Land Use Compatibility Guidelines

<table>
<tr><th rowspan="2">Land Use</th><th colspan="2">Accident Potential Zone</th></tr>
<tr><th>APZ I</th><th>APZ II</th></tr>
<tr><td>Utilities</td><td>Y[4]</td><td>Y</td></tr>
</table>

Y (Yes) - Land use and related structures are compatible without restriction

Y[4] (Yes with restrictions)
Note 4. No passenger terminals and no major above ground transmission lines in APZ I</td><td>Yes (Alternative Route 4)

Yes with implementation of LAND-4 (Alternative Route 5)</td><td>Alternative Route 4: Based on Figure 4.8 (Clear Zones and Accident Potential Zones) of the AICUZ Study, this alternative would traverse APZ I and APZ II of Runway 04 along 10th Street E, and APZ I of Runway O7 along Sierra Highway. As noted in Table 4.3 (Land Use Compatibility Guidelines), APZ I allows utilities with restrictions and the APZ II allows utilities without restrictions. The restrictions associated with APZ I include passenger terminals and major above ground transmission lines. As such, the proposed underground route would not conflict with these restrictions.
Alternative Route 5: This alternative would traverse APZ I of Runway 07 and APZ II of Runway 04 along Division Street. APZ I allows utilities with restrictions and APZ II allows utilities without restrictions. The restrictions associated with APZ I include passenger terminals and major above ground transmission lines. Therefore, the overhead transmission line along Division Street would not be consistent with the land use compatibility guidelines set forth by the AICUZ Study. However, in comments regarding the proposed project, the U.S. Air Force states the following:
"It is our understanding that the City of Palmdale intends to restrict all poles… to single pole structures not greater than 120 feet in height, and that the system along Division Street within the military airport airspace would be undergrounded… if the transmission lines are not undergrounded, these poles would have to be restricted to a height of 94 feet above the runway surface elevation of 2543 LSL at the most critical locations." (USAF 2010)
As such, assuming this waiver also applies to the alternative routes, staff recommends LAND-4 which requires the applicant to submit the design plans to the U.S. Air Force for review and comment in order to ensure compliance with the USAF's design standards.</td></tr>
<tr><td></td><td>5.5.1 – Runway 07 Approach Clear Zones and</td><td>Yes</td><td>Alternative Route 4: Alternative Route 4 would traverse</td></tr>
</table>

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	Accident Potential Zones This section describes the existing land uses within the Clear Zone and the APZ I and APZ II zones of Runway 07.	(Alternative Route 4) Yes with implementation of **LAND-4** (Alternative Route 5)	APZ I of Runway 07 along Sierra Highway. As noted in Table 4.3 (Land Use Compatibility Guidelines), APZ I allows utilities with restrictions. The restrictions associated with APZ I include passenger terminals and major above ground transmission lines. Therefore, because this alternative would be underground, it would not conflict with these restrictions. **Alternative Route 5:** Alternative Route 5 would traverse APZ I of Runway 07 along Division Street. As noted in Table 4.3 (Land Use Compatibility Guidelines), APZ I allows utilities with restrictions. The restrictions associated with APZ I include passenger terminals and major above ground transmission lines. Therefore, the overhead transmission line along Division Street would not be consistent with the land use compatibility guidelines set forth by the AICUZ Study. However, as noted above, staff recommends **LAND-4**, which requires the applicant to submit the design plans to the U.S. Air Force for review and comment to ensure compliance with the USAF's design standards.
	5.5.3 – Runway 04 Approach Clear Zones and Accident Potential Zones This section describes the existing land uses within the Clear Zone and the APZ I and APZ II zones of Runway 04.	Yes (Both Alternatives)	**Alternative Route 4:** This alternative would traverse Runway 04 APZ I and APZ II along 10th Street E. As noted in Table 4.3 (Land Use Compatibility Guidelines), restrictions for APZ I prohibit overhead transmission lines; however, this alternative would be underground, and therefore, would be compatible with this zone. **Alternative Route 5:** This alternative would traverse APZ II along Division Street. As noted in Table 4.3 (Land Use Compatibility Guidelines), APZ II allows utilities without restrictions. Therefore, this alternative would be compatible with this zone.
State	None		
Local			
City of Palmdale General Plan – Land Use Element	**Policy L3.1.1:** On the Land Use Map, establish residential land use designations for a range of residential densities as follows: **1. Equestrian Residential:** The Equestrian	Alternative Route 4 (not applicable)	**Alternative Route 4:** This alternative would not traverse any of the residential land use designations. **Alternative Route 5:** This alternative would traverse

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	Residential (ER) designation is intended for single family residential uses at a maximum gross density of .40 du/ac (1 unit per 2½ acres), yielding an estimated population of 800 persons per square mile… Full urban services such as community water and sewer may not be available to these areas, and public improvements may be constructed to rural standards where permitted. **4. Single Family Residential-2 (0-3 du/ac):** The Single Family Residential-2 (SFR-2) designation is intended for single family residential uses with gross densities ranging from 0-3 du/ac and an estimated population of 3,600 persons per square mile. **5. Single Family Residential-3 (3.1 - 6 du/ac):** The Single Family Residential-3 (SFR-3) designation is intended for single family residential uses with gross densities ranging from 3.1-6 du/ac and an estimated population of 9,700 persons per square mile. **6. Medium Residential:** The Medium Residential (MR 6.1 to 10.0 du/ac) designation is intended for residential uses at maximum gross densities ranging from 6.1 to 10 units per acre and an estimated population of 16,200 persons per square mile.	Yes with implementation of **LAND-2** (Alternative Route 5)	approximately 0.05 mile of the ER designation, approximately 0.14 mile of the SFR-2 designation, approximately 0.72 mile of the SFR-3 designation, and approximately 0.22 mile of the MR designation. The residential land use designations do not specifically permit or prohibit utility components. As such, similar to the applicant's proposed transmission line, staff recommends implementation of Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting of the transmission line. As stated in Section 21.01 of the city's Zoning Ordinance, the Site Plan Review "…ensure[s] that the site plan, building layout, size, shape, scale, mass, height, architectural design, architectural components, materials, colors, landscaping and other aspects of the physical plan for the development project are compatible with neighboring developments, are appropriate for the site, and achieve the highest level of design that is feasible for the project" (City of Palmdale 1994). Therefore, with implementation of **LAND-2**, this alternative would be consistent with the requirements of the residential land use designations.
	Policy L4.1.1: On the Land Use Map, establish land use designations to meet the City's long-term commercial needs, as follows: **1. Office Commercial:** The Office Commercial (OC) designation is designed to accommodate a variety of professional office uses, including medical, personal, business, legal, insurance, real estate, financial, and other similar uses. **3. Community Commercial:** The Community Commercial (CC) designation is intended for businesses providing retail and service uses which primarily serve the local market. Representative uses include restaurants, apparel stores, hardware stores, grocery markets, banks, offices, and similar uses. **5. Downtown Commercial:** The Downtown	Alternative Route 4 (not applicable) Yes with implementation of **LAND-2** (Alternative Route 5)	**Alternative Route 4:** This alternative would not traverse any of the commercial land use designations. **Alternative Route 5:** This alternative would traverse approximately 0.01 mile of the OC designation, approximately 0.31 mile of the CC designation, and approximately 0.08 mile of the DC designation. The commercial land use designations do not specifically permit or prohibit utility components. As such, similar to the applicant's proposed transmission line, staff recommends Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting of the transmission line. As stated above, with implementation of **LAND-2**, this alternative would be consistent with the requirements of the commercial land use designations.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	Commercial (DC) designation is intended for the City's traditional retail/service core area, located in proximity to Palmdale Boulevard. Property within this land use category is intended to be subject to the policies and design guidelines contained in the Downtown Revitalization Plan.		
	GOAL L5: Provide opportunities for a wide range of manufacturing and related industrial uses in the City, so as to facilitate expansion and diversification of the City's economic base and provide additional employment opportunities. **Policy L5.1.1:** On the Land Use Map, establish designations to meet the City's long-term industrial and manufacturing needs, as follows: **1. Commercial Manufacturing:** The Commercial Manufacturing (CM) designation is intended to permit mixed use development of lighter industrial uses and the more intensive service, retail and wholesale commercial uses. **2. Business Park:** The Business Park (BP) designation is intended to permit a variety of office, research and development, light assembly and fabrication, and supportive commercial uses within an environment characterized by master-planned complexes maintaining a high quality of design and construction. **3. Industrial:** The Industrial (IND) designation is intended to permit a variety of industrial uses, including the manufacturing and assembly of products and goods, warehousing, distribution, and similar uses… Where possible, industrial designations should be separated from residential areas by natural or manmade barriers, such as major arterials, utility easements, drainage courses or railroad rights-of-way. **4. Airfield and Related Use:** The Airfield and Related Use (A & R) designation is intended to permit public and private airfields and support	Yes (Alternative Route 4) Yes with implementation of **LAND-2** (Alternative Route 5)	**Alternative Route 4:** This alternative would traverse approximately 2.6 miles of the AR designation. As noted above in the consistency analysis for the AICUZ Study, this alternative would not conflict with land use designations set forth for Plant 42, and therefore, would be consistent with this land use designation. **Alternative Route 5:** This alternative would traverse approximately 0.61 mile of the CM designation, approximately 2.46 miles of the BP designation, and approximately 0.50 mile of the IND designation. The industrial land use designations do not specifically permit or prohibit utility components. As such, similar to the applicant's proposed transmission line, staff recommends Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting of the transmission line. As stated above, with implementation of **LAND-2**, this alternative would be consistent with the requirements of the industrial land use designations.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	facilities, aerospace related industries, transportation related industries, and commercial facilities necessary to support military and commercial air traffic. This designation will primarily apply to U.S. Air Force Plant 42 and the Palmdale Regional Airport site as designated by the City of Los Angeles Department of Airports. Future development within this designation will be required to employ appropriate performance standards and design features to minimize impacts on nearby residential neighborhoods.		
City of Palmdale General Plan – Community Design Element	**Objective CD 1.9:** Create an attractive environment for living, working and shopping, through adequate screening of equipment, utilities[6], loading and trash collection areas. **Policy CD 1.9.1:** In single family residential development, utility lines should be placed underground and utility boxes should be placed in inconspicuous locations and screened from adjacent rights-of-way with landscaping. **Policy CD 1.9.2:** In multiple family residential development, utility undergrounding and screening shall be provided in accordance with Policy CD1.9.1. **Policy CD 1.9.3:** In commercial retail and office developments and public/institutional uses compatible with residential and commercials zones, Policies CD1.9.1 and CD1.9.2 shall apply. **Policy CD 1.9.4:** In industrial development and public/ institutional uses compatible with industrial zones… Policies CD 1.9.1 through CD 1.9.3 (inclusive) shall apply.	Yes (Alternative Route 4) No (Alternative Route 5)	**Alternative Route 4:** This alternative would traverse approximately 2.6 miles of the AR (industrial) designation. Policy CD 1.9.4 requires compliance with Policies CD 1.9.1 and CD 1.92, which require utilities to be underground. As such, this partial underground alternative would be consistent with these policies. **Alternative Route 5:** The Alternative Route 5 would traverse land within the single family residential designations, a multiple family residential designation, commercial designations, and industrial designations, which require utility lines to be underground. As such, this alternative would not be consistent with these policies.
	Policy CD 9.1.9: Enhance the streetscapes on major thoroughfares throughout the City, including but not limited to Palmdale Boulevard and Avenue S, by providing landscaping, undergrounding utilities, and	Yes (Alternative Route 4)	**Both Alternatives:** Staff recommends Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting of the transmission line. As stated in Section 21.01 of the city's Zoning Ordinance,

[6] According to the city of Palmdale, this applies to transmission lines of 50kV and above (City of Palmdale 2010b)

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	completing street improvements where necessary. Where opportunities for wider landscaped setbacks exist due to utility easements or seismic setbacks, ensure that these areas are designed and maintained to enhance the streetscape.	No (Alternative Route 5)	the Site Plan Review "…ensure[s] that the site plan, building layout, size, shape, scale, mass, height, architectural design, architectural components, materials, colors, landscaping and other aspects of the physical plan for the development project are compatible with neighboring developments, are appropriate for the site, and achieve the highest level of design that is feasible for the project" (City of Palmdale 1994). Therefore, with implementation of **LAND-2**, the appropriate landscaping and setbacks would be included. Nonetheless, Alternative Route 5 would not be consistent with this policy since the transmission line would not be underground along major thoroughfares including E Avenue M, E Avenue R and Sierra Highway.
	GOAL CD 10: Facilitate creation and expansion of industrial uses within the City to accommodate manufacturing, distribution, and complementary office and support uses in order to expand the City's employment and economic base and improve the jobs/housing balance, while ensuring that such areas are compatible with adjacent uses and minimizing adverse impacts on more restrictive use districts.	Yes (Both Alternatives)	**Both Alternatives:** As noted in the consistency determination for the city's Land Use Element in the FSA, the city considers the proposed PHPP as an opportunity to create short- and long-term construction employment, which would contribute to the expansion of the city's employment and economic base. Therefore, selection of either alternative would facilitate development of the proposed project, and therefore, would be consistent with this goal.
City of Palmdale Lockheed Specific Plan	**4 – Land Use and Development Regulations** Allowable land use designations, purpose and permitted uses are described below: **Manufacturing/Industrial Uses** Purpose – Primary use of the industrial area within the LADC Plant 10 Specific Plan is the research, design, fabrication, test, manufacture and warehousing of aircraft, aeronautical and military systems and related components. Permitted Uses – Industrial 2. All principal land uses and uses by Conditional Use Permit described in the M-2 and M-A Zones, sections 62.02, 65.02 and 65.05 of the City of Palmdale Zoning Ordinance.	Yes with implementation of **LAND-2** (Alternative Route 4) Alternative Route 5 (not	**Alternative Route 4:** The M-2 Zone allows utility facilities with a Site Plan Review. As such, similar to the applicant's proposed transmission line, staff recommends Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting of the transmission line. With implementation of **LAND-2**, this alternative would be consistent with the Manufacturing/Industrial Uses designation. In addition, an underground transmission line would not result in a concentration of persons in an area; therefore this alternative would also be consistent with the Restricted Manufacturing/Industrial Uses designation. **Alternative Route 5:** This alternative would not traverse land within this specific plan area.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	Restricted Manufacturing/Industrial Uses Purpose – Same as Manufacturing/Industrial uses. Permitted Uses – Same as Manufacturing/Industrial with restricted employee concentration due to hazard of potential aircraft accidents. Uses are compatible if they do not result in a concentration of persons in an area that would exceed the limits specified in Palmdale City Council Resolution 91-37.	applicable)	
	General Development Standards Infrastructural and Public Utilities On-site utilities will be place underground except for equipment and structures that will be located above ground. Above ground utility equipment, connections, etc. visible from the public right-of-way will be screened from view using solid block walls or landscape and painted an approved color.	Yes (Alternative Route 4) Alternative Route 5 (not applicable)	**Alternative Route 4:** This alternative would be placed underground, and therefore, would be consistent with this standard. **Alternative Route 5:** This alternative would not traverse land within this specific plan.
City of Palmdale Trade and Commerce Center Specific Plan	**4.2.2 Land Use Plan - Planned Development (PD):** This land use category allows office, commercial and public administrative uses. Some commercial uses, as well as transportation and public utility uses, require a CUP. Manufacturing uses are prohibited in this land use category.	Alternative Route 4 (not applicable) Alternative Route 5 (not applicable)	**Alternative Route 4:** This alternative would not traverse the PD designation. **Alternative Route 5:** This alternative would traverse the PD designation along Division Street. A Conditional Use Permit (CUP) would be required by this designation. However, as noted below in the consistency discussion for Section 22.05 of the city's Zoning Ordnance, the Energy Commission has pre-emptive authority for the licensing of thermal power plants 50 megawatts and larger and their associated linear facilities, such as high-voltage transmission lines that connect the power plant into the electric grid. Given this pre-emptive authority, the Energy Commission would be the "approval authority" for the siting of uses such as the proposed power plant and transmission line. As such, a CUP would not be applicable for the transmission line.
	4.2.2 Land Use Plan - Mixed Use AICUZ Restricted (MX-A): This land use category allows for a majority of the uses permitted and conditionally	Alternative Route 4 (not applicable)	**Alternative Route 4:** This alternative would not traverse the MX-A designation.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	permitted in the Mixed Use land use category. Certain uses which are incompatible with the Air Force Plant 42 Air Installation Compatibility Use Zone #11a, however, are not permitted. Uses are compatible if they do not result in a gathering of individuals in an area that would result in an average density of greater than 25 persons per acre per hour during a 24-hour period, not to exceed 50 persons per acre at any time.	Alternative Route 5 (not applicable)	**Alternative Route 5:** This alternative would traverse the MX-A designation along Division Street. As noted in Table 3 - Palmdale Trade and Commerce Center Land Use Matrix (presented in this policy analysis below), a CUP would be required by this designation. However, as noted below in the consistency discussion for Section 22.05 of the city's Zoning Ordnance, the Energy Commission has pre-emptive authority for the licensing of thermal power plants 50 megawatts and larger and their associated linear facilities, such as high-voltage transmission lines that connect the power plant into the electric grid. Given this pre-emptive authority, the Energy Commission would be the "approval authority" for the siting of uses such as the proposed power plant and transmission line. As such, a CUP would not be applicable for the transmission line.
	4.2.2 Land Use Plan - Public Facility (PF): This land use category may be utilized for a variety of public or institutional uses, including open space, flood control facilities, or community facilities.	Alternative Route 4 (not applicable) No (Alternative Route 5)	**Alternative Route 4:** This alternative would not traverse the PF designation. **Alternative Route 5:** This alternative would traverse the PF designation along Division Street for approximately 0.70 mile. As noted in Table 3 - Palmdale Trade and Commerce Center Land Use Matrix (presented in this policy analysis below), Communications and Public Utilities are an expressly prohibited land use in the PF designation. Therefore, construction of an overhead transmission line would not be consistent. In order for this alternative to be consistent with this zone, the applicant would need to apply to the city of Palmdale for a zone change or variance. Since the city approved a zone change for the proposed project, staff understands the city could conceivably issue a zone change or variance for this alternative route. Regardless, staff needs written documentation from the city stating their position on this issue.
	TABLE 3 - PALMDALE TRADE AND COMMERCE CENTER LAND USE MATRIX **9. COMMUNICATIONS AND PUBLIC UTILITIES** Activities typically include, but are not limited to, the	Alternative Route 4 (not applicable)	**Alternative Route 4:** This alternative would not traverse the PF designation. **Alternative Route 5:** As noted above, the PD and MX-A

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	repair, maintenance, and installation of utilities or communication facilities such as microwave facilities, electrical transmission and generating facilities. Includes communication or utility towers. Minor telecommunication facilities (stealth facilities) may be permitted subject to the provisions and processes as contained in the Palmdale Zoning Ordinance. Zoning Categories MX-A – Conditional Use Permit PD – Conditional Use Permit PF – Prohibited	MX-A and PD zones – Not applicable PF zone - No (Alternative Route 5)	zoning categories require a CUP for the construction of public utilities. However, as noted below in the consistency discussion for Section 22.05 of the city's Zoning Ordnance, the Energy Commission has pre-emptive authority for the licensing of thermal power plants 50 megawatts and larger and their associated linear facilities, such as high-voltage transmission lines that connect the power plant into the electric grid. Given this pre-emptive authority, the Energy Commission would be the "approval authority" for the siting of uses such as the proposed power plant and transmission line. As such, a CUP would not be applicable for the transmission line. In addition, this alternative would traverse the PF zoning category, which explicitly prohibits electrical transmission facilities. Therefore, this alternative would not be consistent with the PF zone.
City of Palmdale Zoning Ordinance	**Section 22.05 Determination by the Approval Authority** The approval authority will determine the merits of the proposed Conditional Use Permit, and its compliance with the principles, standards, policies and goals of the General Plan, Zoning Ordinance and other applicable ordinances and codes adopted by the City of Palmdale, in order to protect the public health, safety and general welfare.	Both Alternatives (not applicable)	Several of the city of Palmdale land use and zoning designations (discussed above and below) traversed by the proposed transmission line routes indicate that utility developments require the issuance of a CUP by the "approval authority" (i.e., the city) whereupon findings would need to be made to determine the consistency of the particular conditional use with the city's intended development pattern. The Energy Commission has pre-emptive authority for the licensing of thermal power plants 50 megawatts and larger and their associated linear facilities, such as high-voltage transmission lines that connect the power plant into the electric grid. Given this pre-emptive authority, the Energy Commission would be the "approval authority" for the siting of uses such as the proposed power plant and transmission line. As such, a CUP would not be applicable for the transmission line. However, in the event that either alternative is chosen, the Energy Commission would need to make a recommendation regarding the transmission line's overall compliance with the city's intended development pattern. It should be noted that selection of the Alternative Route 5 would also require the Energy Commission to consider the inconsistency with the city's Community Design Element CD 1.9, and the city's PF zone, which expressly prohibits maintenance, and installation of utilities such as,

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
			electrical transmission and generating facilities.
	CHAPTER 4 ARTICLE 41 SINGLE FAMILY RESIDENTIAL (ZONE R-1) Section 41.05 Uses Permitted Subject to Site Plan Review Approval The following uses shall require approval pursuant to the provisions of Chapter 2, Article 21 (Site Plan Review). D. Utility facilities, building and equipment, including but not limited to water, natural gas, and sewage facilities, but excluding sewage pump stations or treatment plants and major communication facility. **CHAPTER 4 ARTICLE 42 MEDIUM RESIDENTIAL (ZONE R-2) Section 42.05 Uses Permitted Subject to Site Plan Review Approval** The following uses shall require approval pursuant to the provisions of Chapter 2, Article 21 (Site Plan Review). E. Utility facilities, building and equipment, including but not limited to water, natural gas, and sewage facilities, but excluding sewage pump stations or treatment plants and major communication facility. **CHAPTER 4 ARTICLE 43 MULTIPLE RESIDENTIAL (ZONE R-3) Section 43.05 Uses Permitted Subject to Site Plan Review Approval** The following uses shall require approval pursuant to the provisions of Chapter 2, Article 21 (Site Plan Review). D. Utility facilities, building, and equipment, including, but not limited to water, natural gas, and sewage facilities, but excluding sewage pump stations or treatment plants and major communication facility.	Alternative Route 4 (not applicable) Yes with implementation of **LAND-2** (Alternative Route 5)	**Alternative Route 4:** This alternative would not traverse any residential designations. **Alternative Route 5:** This alternative would traverse approximately 1.19 miles of the R-1 Zone, 0.22 mile of the R-2 Zone, and 0.14 mile in the R-3 Zone. Similar to the applicant's proposed transmission line, staff recommends Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting of the transmission line. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone.
	CHAPTER 5 ARTICLE 51 LIGHT COMMERCIAL (ZONE C-1)Section 51.05 Uses Permitted Subject to Site Plan Review Approval The following uses are permitted in the C-1 Zone subject to Site Plan Review approval… C. Public, quasi-public and institutional uses of a scale compatible and consistent	Alternative Route 4 (not applicable) Yes with implementation of **LAND-2**	**Alternative Route 4:** This alternative would not traverse any commercial designations. **Alternative Route 5:** Alternative Route 5 would traverse the following: approximately 0.10 mile of the C-1 Zone, 0.12 mile of the C-2 Zone, 0.27 mile in the C-3 Zone, and 0.61 mile in the C-5 Zone. Utility facilities are permitted uses within

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	with the intent of the C-1 zone, including: 5. Utility facilities, buildings and equipment, excluding sewage pumping stations and treatment plants and major communication facility. **CHAPTER 5 ARTICLE 52 OFFICE COMMERCIAL (ZONE C-2) Section 52.05 Uses Permitted Subject to Site Plan Review Approval** The following uses are permitted in the C-2 zone subject to Site Plan Review approval… C. Public, quasi-public and institutional uses of a scale compatible and consistent with the intent of the C-2 zone, including: 11. Utility facilities, buildings and equipment, excluding sewage pumping stations and treatment plants and major communication facility. **CHAPTER 5 ARTICLE 53 GENERAL COMMERCIAL** **(ZONE C-3) Section 53.05 Uses Permitted Subject to Site Plan Review Approval** The following uses are permitted in the C-3 zone subject to Site Plan Review approval… D. Public, quasi-public and institutional uses of a scale compatible and consistent with the intent of the C-3 zone, including: 11. Utility facilities, buildings and equipment, excluding sewage pumping stations and treatment plants and major communication facility. **CHAPTER 5 ARTICLE 55 SERVICE COMMERCIAL (ZONE C-5) Section 55.05 Uses Permitted Subject to Site Plan Review Approval** The following uses are permitted in the C-5 zone subject to Site Plan Review approval… D. Public, quasi-public and institutional uses: 9. Utility facilities, excluding major communication facility.	(Alternative Route 5)	commercial zones; however, they are subject to the approval of a Site Plan Review. As such, staff recommends Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting of the transmission line. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone.
	CHAPTER 6 ARTICLE 62 GENERAL INDUSTRIAL (ZONE M-2) Section 62.05 Uses Permitted Subject	Yes with implementation	**Alternative Route 4:** This alternative would traverse the M-3 zone for approximately 2.58 miles. Utility facilities are permitted uses within industrial zones; however, they are

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	to Site Plan Review Approval The following uses are permitted in the M-2 zone subject to Site Plan Review approval… 12. Public, quasi-public and institutional uses: k. Utility facility, excluding major communication facilities. **ARTICLE 63 AIRPORT INDUSTRIAL (ZONE M-3)** **Section 63.05 Uses Permitted Subject to Site Plan Review Approval** **F. Public, quasi-public and institutional uses, including:** 5. Utility facilities, including substations, excluding major communication facilities. **CHAPTER 6 ARTICLE 64** **PLANNED INDUSTRIAL (ZONE M-4)** **Section 64.06 Uses Permitted Subject to Site Plan Review Approval** In conjunction with an approved Master Plan pursuant to Section 64.03, the following uses are permitted in the M-4 zone subject to Site Plan Review approval… K. Public, quasi-public and institutional uses, including: 7. Utility facilities, buildings and equipment, excluding sewage pumping stations and treatment plants, and major communication facilities.	of **LAND-2** (Alternative Route 4) Yes with implementation of **LAND-2** (Alternative Route 5)	subject to the approval of a Site Plan Review. As such, staff recommends Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting of the line. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone. **Alternative Route 5:** This alternative would traverse approximately 0.50 mile of the M-2 Zone and 2.58 miles of the M-4 Zone. Utility facilities are permitted uses within industrial zones; however, they are subject to the approval of a Site Plan Review. As such, staff recommends Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting of the transmission line. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone. In addition, as stated in Section 64.06 (Zone M-4), development of utility facilities in this zone is subject to the Special Development Requirements (Section 64.03) which requires a comprehensive CUP. However, as noted above in the consistency discussion for Section 22.05 of the city's Zoning Ordnance, the Energy Commission has pre-emptive authority for the licensing of thermal power plants 50 megawatts and larger and their associated linear facilities, such as high-voltage transmission lines that connect the power plant into the electric grid. Given this pre-emptive authority, the Energy Commission would be the "approval authority" for the siting of uses such as the proposed power plant and transmission line. As such, a CUP would not be applicable for the transmission line.
	Section 64.03 Special Development Requirements A. In order to meet the intent and purpose of the M-4 zone as stated in Section 64.01, provisions should be made in the planning process for integrated development plans which coordinate the efforts of multiple property owners and discourage piecemeal development. Master planning of M-4 zoned property is required to avoid development in a manner which would prevent or preclude future development of	Alternative Route 4 (not applicable) Yes (Alternative Route 5)	**Alternative Route 4:** This alternative would not traverse land within the M-4 Zone. **Alternative Route 5:** This alternative would traverse approximately 2.58 miles of the M-4 Zone which requires compliance with this section of the city's zoning ordinance. However, as noted above in the consistency discussion for Section 22.05 of the city's Zoning Ordnance, the Energy Commission has pre-emptive authority for the licensing of

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	surrounding land in accordance with General Plan policies for Business Park development. Therefore, development in the M-4 zone shall be processed in accordance with a master plan, which may take one of the following forms: 2. A comprehensive Conditional Use Permit, pursuant to Chapter 2, Article 22.		thermal power plants 50 megawatts and larger and their associated linear facilities, such as high-voltage transmission lines that connect the power plant into the electric grid. Given this pre-emptive authority, the Energy Commission would be the "approval authority" for the siting of uses such as the proposed power plant and transmission line. As such, a CUP would not be applicable for the transmission line.
	CHAPTER 7 ARITCLE 71 PUBLIC FACILITIES (ZONE PF) Section 71.05 Uses Permitted Subject to Site Plan Review Approval The following uses are permitted in the PF zone subject to Site Plan Review approval… B. Public, quasi-public and institutional uses, including: 9. Public utilities, including administrative offices and facilities, excluding major communication facility.	Alternative Route 4 (not applicable) Yes with implementation of **LAND-2** (Alternative Route 5)	**Alternative Route 4:** This alternative would not traverse this designation. **Alternative Route 5:** This alternative would traverse approximately 0.05 mile of the PF Zone. Utility facilities are permitted uses within the PF zone; however, they are subject to the approval of a Site Plan Review. As such, staff recommends Condition of Certification **LAND-2**, which would ensure that the city's Site Plan Review is included in the siting of the transmission line. With implementation of **LAND-2**, the proposed project would be consistent with the requirements of this zone.
Los Angeles County - Antelope Valley Area Plan 1986	Chapter VI. Policy Maps A. The Land Use Policy Map a.) Residential – The following residential designations are shown on the Land Use Policy Map: (N-1) Non-Urban 1: to 0.5 dwelling units per acre. (N-2) Non-Urban 2: to 1.0 dwelling units per acre. b.) Non-residential Uses in Non-urban Areas Non-residential uses requiring, or appropriate for, remote locations may be allowed in Non-urban areas in keeping with the following general guidelines: Subject to compliance with the General Conditions for	Alternative Route 4 (not applicable) Yes (Alternative Route 5)	**Alternative Route 4:** This alternative would not traverse land within unincorporated Los Angeles County. **Alternative Route 5:** Utility installations are allowed in the N-1 and N-2 land use designations. In addition, as noted below, this alternative is consistent with Section D of Chapter VI. Therefore, this alternative is consistent with these designations.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	Development, (Section D of this Chapter) non-residential uses can include: (c) Public and semi-public uses typically located in non-urban environs, such as solid and liquid waste disposal sites, utility and communication installations, and schools and other public facilities necessary to serve Non-urban populations.		
	Chapter VI. Policy Maps A. The Land Use Policy Map h) Open Space – Open space areas are considered to be lands under public or private ownership that are essentially free of structures and roads, and are projected to be maintained in an open or natural state on a long-term basis. These areas are primarily managed for recreational purposes, the protection of natural resources, and/or for purposes of safeguarding public health and safety.	Alternative Route 4 (not applicable) No (Alternative Route 5)	**Alternative Route 4:** This alternative would not traverse land within unincorporated Los Angeles County. **Alternative Route 5:** The area surrounding Una Lake along Sierra Highway is designated as Open Space, which appears to be intended for land to be maintained in an open or natural state. Staff has attempted to contact the county of Los Angeles to obtain their input regarding their interpretation of the transmission line's consistency with this section of the Antelope Valley Areawide Plan. As of the writing of this analysis, staff has not obtained a response from the county regarding this issue. The transmission line corridor is proposed to be sited along the existing utility or road rights-of-way (i.e., Sierra Highway). Therefore, it is possible that the county would view the siting of a transmission line corridor to be a land use type similar to these other rights-of-way. However, without the county's input, staff cannot assume consistency with this LORS. Therefore, based on the written intent of the Open Space designation, staff assumes this alternative would not be consistent with this policy. Staff will make every attempt to contact the county and will update this consistency determination upon receipt of input from the county.
	Chapter VI. Policy Maps D. General Conditions for Development 3. Non-Residential Uses in Non-Urban Areas a) Location (1) The proposed use should be located and	Alternative Route 4 (not applicable) Yes (Alternative	**Alternative Route 4:** This alternative would not traverse land within unincorporated Los Angeles County. **Alternative Route 5:** As discussed in the impacts related to a physical disruption or division of an established community, this alternative would be parallel to existing, road rights-of-way or transmission line corridors, and therefore,

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	designed so as not to conflict with established community land use and circulation patterns. (3) The proposed use should be located and designed so as to provide an appropriate buffer between potentially disruptive, polluting or hazardous uses and other existing development.	Route 5)	would not conflict with established community land use patterns. In addition, the minimum right-of-way width required for a 230kV line is 60 feet. As stated in Section 2.1, this alternative would be constructed within a 60-foot right-of way, which would be an appropriate buffer between the transmission line and existing land uses. Therefore, this alternative would be consistent with the general conditions for development of a non-residential use in a non-urban area.
Los Angeles County Zoning Code, Title 22 Planning and Zoning	**Part 6 R-A RESIDENTIAL AGRICULTURAL ZONE** **22.20.440 Uses subject to permits.** Property in Zone R-A may be used for: A. The following uses, provided a conditional use permit has first been obtained as provided in Part 1 of Chapter 22.56, and while such permit is in full force and effect in conformity with the conditions of such permit for: — Electric distribution substations, including microwave facilities used in conjunction therewith.	Alternative Route 4 (not applicable) Yes (Alternative Route 5)	**Alternative Route 4:** This alternative would not traverse land within unincorporated Los Angeles County. **Alternative Route 5:** This alternative would traverse 0.38 mile of lands within the Residential Agricultural Zone (R-A). The provisions of the R-A zone allow for the development of electric substations and generating plants with issuance of a CUP by Los Angeles County, but do not specifically allow for siting of high voltage transmission lines. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code. According to the county's comments on the PSA, the county's Zoning Ordinance does not regulate such projects and does not require a CUP (LAC 2010a). Therefore, the proposed project would not be inconsistent with this zone.
	Part 2 A-1 LIGHT AGRICULTURAL ZONE **22.24.100 Uses subject to permits.** Property in Zone A-1 may be used for: A. The following uses, provided a conditional use permit has first been obtained as provided in Part 1 of Chapter 22.56, and while such permit is in full force and effect in conformity with the conditions of such permit for: — Electric distribution substations and electric transmission substations, including microwave facilities used in conjunction with either. **Part 3 A-2 HEAVY AGRICULTURAL ZONE**	Alternative Route 4 (not applicable) Yes (Alternative Route 5)	**Alternative Route 4:** This alternative would not traverse land within unincorporated Los Angeles County. **Alternative Route 5:** This alternative would traverse approximately 0.10 mile of land within the Light Agricultural Zone (A-1), and approximately 0.03 mile of land within the Heavy Agricultural Zone (A-2). The provisions of both the A-1 and A-2 zone designations allow for the development of electric substations and generating plants with issuance of a CUP by Los Angeles County, but do not specifically allow for siting of high voltage transmission lines. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code. According to the

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	22.24.150 Uses subject to permits. Property in Zone A-2 may be used for: A. The following uses, provided a conditional use permit has first been obtained as provided in Part 1 of Chapter 22.56, and while such permit is in full force and effect in conformity with the conditions of such permit for: -- Electric distribution substations, electric transmission substations and generating plants, including microwave facilities used in conjunction with any one thereof.		county's comments on the PSA, the county's Zoning Ordinance does not regulate such projects and does not require a CUP (LAC 2010a). Therefore, the proposed project would not be inconsistent with this zone.
	Part 2 M-1 LIGHT MANUFACTURING ZONE 22.32.040 Permitted uses. Premises in Zone M-1 may be used for: A. Any use listed as a permitted use in either Sections 22.24.070 (Zone A-1) or 22.28.230 (Zone C-M), subject to the limitations and conditions set forth therein.	Alternative Route 4 (not applicable) Yes (Alternative Route 5)	**Alternative Route 4:** This alternative would not traverse land within unincorporated Los Angeles County. **Alternative Route 5:** This alternative would traverse approximate 0.25 mile of lands within the Light Manufacturing Zone (M-1). Uses permitted within the M-1 zone are the same as those for the A-1 zone. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code. According to the county's comments on the PSA, the County's Zoning Ordinance does not regulate such projects and does not require a CUP (LAC 2010a). Therefore, the proposed project would not be inconsistent with this zone.
	22.44.126 Acton Community Standards District. A. Intent and Purpose. The Acton Community Standards District is established to protect and enhance the rural, equestrian and agricultural character of the community and its sensitive features including significant ecological areas, floodplains, hillsides, National Forest, archaeological resources, multipurpose trail system, and Western heritage architectural theme. The standards are intended to ensure reasonable access to public riding and hiking trails, and to minimize the need for installation of infrastructure such as sewers, streetlights, concrete sidewalks and concrete flood control systems that	Alternative Route 4 (not applicable) Yes (Alternative Route 5)	**Alternative Route 4:** This alternative would not traverse land within unincorporated Los Angeles County. **Alternative Route 5:** A portion of the southern end of this alternative would be located within the Acton Community Standards District (CSD). According to Los Angeles County's online GIS mapping, this portion of the line would traverse an area zoned for light agriculture (A-1) within the CSD. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code within the CSD. According to the county's comments on the PSA, the County's Zoning Ordinance does not regulate such projects and does not require a CUP (LAC 2010a). Therefore, this alternative would not be inconsistent with this

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	would alter the community's character, while providing for adequate drainage and other community safety features.		CSD.

Environmental Justice

Staff has reviewed **Socioeconomics Figure 2** that shows the environmental justice population is greater than fifty percent within a one-mile buffer of Alternative Routes 4 and 5. Based on the alternatives land use analysis, staff has identified LORS inconsistencies for the two transmission line alternatives. Some of the Overhead route's LORS Inconsistencies with land use and zoning standards set forth by local and federal agencies can be mitigated to less than significant levels with implementation of **LAND-2** and **LAND -4.** Alternative Route 4's LORS Inconsistencies with land use and zoning standards set forth by local and federal agencies can be mitigated to less than significant levels with implementation of **LAND-2**. However, Alternative Route 5 remains inconsistent with the following policies and zoning designation:

- the Public Facilities (PF) zone category within the city of Palmdale's Trade and Commerce Center Specific Plan, which explicitly prohibits utility facilities as a land use;
- Policies CD 1.9.1 through 1.9.4 and Policy CD 9.1.9 of the city of Palmdale's Community Design Element, which require utility facilities to be underground; and
- Los Angeles County's Antelope Valley Areawide General Plan, which requires land within the Open Space land use designations to be preserved in a natural and open state.

Staff has not identified any mitigation to reduce these LORS inconsistency impacts to less-than-significant levels. However, no environmental justice population along the Overhead transmission line alternative would be disproportionately burdened or impacted when compared to the non-minority population living within the same affected area, because of the multiple land use and zoning designations, and land use types traversed by the route.

Proposed Conditions of Certification

LAND-2 The project owner shall ensure that the proposed transmission line and natural gas pipeline will be constructed and operated in compliance with the city of Palmdale's Zoning Ordinance, Chapter 2, Article 21 (Site Plan Review). The project owner shall submit a Site Plan Review to the city of Palmdale in sufficient time for review and comment, and to the Compliance Project Manager (CPM) for review and approval prior to the start of transmission line construction. The Site Plan Review shall be in compliance with the review process set forth by Chapter 2, Article 21 (Site Plan Review) of the city's Zoning Ordinance in order to ensure that the physical plans for the project are compatible with neighboring developments, are appropriate for the site, and achieve the highest level of design that is feasible for the project.

Verification: At least 90 calendar days prior to the start of construction of the transmission line and natural gas pipeline, including any demolition, grading, trenching, or site remediation, the project owner shall submit the site plan to the city of Palmdale for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to the city of Palmdale.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any revisions to the site plan received from the city of Palmdale, along with any changes to the proposed site plan, to the CPM for review and approval.

LAND-4 The project owner shall ensure that the Alternative Route 5 will comply with the minimum design standards set forth by the U.S. Air Force (the poles would have to be restricted to a height of 94 feet above the runway surface elevation of 2543 LSL). The project owner shall submit the design plans to the U.S. Air Force in sufficient time for review and comment and to the Compliance Project Manager (CPM) for review and approval prior to the start of transmission line construction.

Verification: At least 30 days prior to the start of construction, the project owner shall submit written documentation to the CPM, including evidence of review by the U.S. Air Force that the transmission line route meets the requirements set forth by the land use regulations.

Comparison to Proposed Transmission Line Route

Alternative Route 4 - Partial Underground Transmission Line

Conversion of Farmland

Under the proposed project, the transmission line would traverse farmland, including Prime Farmland. Alternative Route 4 would not traverse Important Farmland or land within agricultural zoning designations.

Physical Disruption or Division of an Existing Community

As with the proposed project, the line would not conflict with existing land uses and would not result in the division or disruption of an established community. Therefore, under this threshold, impacts as a result of the proposed project and this alternative would be the same.

Conflict with Any Applicable Land Use Plan, Policy, or Regulation

Based on staff's review of the city of Palmdale and Los Angeles County's applicable LORS documents, with implementation of Conditions of Certification **LAND-2** and **LAND-3** the proposed PHPP would be consistent with all applicable LORS.

For consistency with applicable LORS documents, this alternative would require implementation of Condition of Certification **LAND-2**, which includes a Site Plan Review, as requested by the city (City of Palmdale 2010). In addition, several of the city of Palmdale land use and zoning designations traversed by the proposed transmission line routes indicate that utility developments require the issuance of a CUP by the "approval authority" (i.e., the city). However, the Energy Commission has pre-emptive authority for the licensing of thermal power plants 50 megawatts and larger and their associated linear facilities. Given this pre-emptive authority, the Energy Commission would be the "approval authority" for the siting of this transmission line. As such, a CUP would not be applicable for the transmission line; however, in the event that this alternative is chosen, the Energy Commission would need to make a recommendation

regarding the transmission line's compliance with the city's intended development pattern. Therefore, with implementation of the condition of certification, the proposed PHPP and this alternative would both be consistent with applicable LORS, and would be the same from a LORS consistency perspective.

Land Use Compatibility

For the proposed PHPP, staff found no significant impacts regarding land use compatibility; therefore the proposed transmission line would be compatible with nearby surrounding sensitive receptors. Similarly, this alternative would be compatible with existing land uses. Therefore, from a physical land use compatibility perspective, the proposed PHPP and this alternative would be the same.

Alternative Route 5 – Overhead Division Street Transmission Line

Conversion of Farmland

Under the proposed project, the transmission line would traverse farmland, including Prime Farmland and land within agricultural zoning designations, but would not result in a significant conversion of Farmland. Alternative Route 5 would not traverse Important Farmland or result in a significant impact to land within an agricultural zoning designation.

Physical Disruption or Division of an Existing Community

As with the proposed project, the line would not conflict with existing land uses and would not result in the division or disruption of an established community. Therefore, under this threshold, impacts as a result of the proposed project and this alternative would be the same.

Conflict with Any Applicable Land Use Plan, Policy, or Regulation

Based on staff's review of the city of Palmdale and Los Angeles County's applicable LORS documents, with implementation of Conditions of Certification **LAND-2** and **LAND-3** the proposed PHPP would be consistent with all applicable LORS.

Alternative Route 5 also requires Condition of Certification **LAND-2** which requires the applicant submit a site plan to the city for a Site Plan Review. In addition, this alternative would require **LAND-4** to ensure compliance with land use regulations set forth by the U.S. Air Force. Implementation of these conditions of certification would ensure compliance with most of the applicable land use and zoning requirements. However, this alternative would not comply with the city's Public Facilities designation within the Trade and Commerce Center Specific Plan, the city's Community Design Element which require utilities to be underground, and Open Space designation within the county's Antelope Valley Areawide General Plan. The inconsistencies with these LORS could not be mitigated by conditions of certification. In addition, several of the city of Palmdale land use and zoning designations traversed by the proposed transmission line routes indicate that utility developments require the issuance of a CUP by the "approval authority" (i.e., the city). However, the Energy Commission has pre-emptive authority for the licensing of thermal power plants 50 megawatts and larger and their associated

linear facilities. Given this pre-emptive authority, the Energy Commission would be the "approval authority" for the siting of this transmission line. As such, a CUP would not be applicable for the transmission line. However, in the event that this alternative is chosen, the Energy Commission would need to make a recommendation regarding the transmission line's compliance with the city's intended development pattern, and would also require the Energy Commission to consider the inconsistencies with the city's Community Design Element and PF zone, and the county's Open Space designation.

Land Use Compatibility

For the proposed transmission line, staff found no significant impacts regarding land use compatibility; therefore the proposed transmission line would be compatible with nearby surrounding sensitive receptors. This alternative transmission line would be inconsistent with several LORS. It would not traverse important farmland in contrast to the proposed transmission line. From a land use compatibility perspective, impacts as a result of Alternative Route 5 would be greater than the proposed project transmission line.

3.6 NOISE AND VIBRATION

Setting and Existing Conditions

Two electric transmission line routes have been proposed (as described in Section 2.0 above, **Alternative Transmission Line Routes** of this document) as shorter alternatives to the approximately 36-mile-long transmission line proposed in the AFC. Both alternatives would run through the eastern edge of the city of Palmdale, in Los Angeles County.

As described in the **Noise and Vibration** section of the FSA, ordinances set forth in the City of Palmdale Municipal Code would apply to the construction of transmission lines through the city.

Assessment of Impacts and Discussion of Mitigation

Alternative Route 4 and Alternative Route 5

Construction of linear facilities moves along rapidly, so no area is exposed to noise for more than a few days. Limiting noisy construction to daytime hours should provide adequate mitigation of impacts for either alternative transmission line route. Condition of Certification **NOISE-6**, proposed in the FSA, would restrict noisy construction, including construction of transmission lines, to the hours between 6:00 a.m. and 6:00 p.m., Mondays through Fridays.

Additionally, Conditions of Certification **NOISE-1** and **NOISE-2**, proposed in the FSA, would establish a notification process to make nearby residences aware of the start of construction of the project and its linear facilities, and would establish a noise complaint process that requires the applicant to resolve any problems caused by noise from the project and its linear facilities, in the event that actual construction noise should annoy nearby residents.

Construction equipment is typically equipped with noise reduction features (e.g., mufflers and engine shrouds). If noise complaints result in the need to further quiet

construction equipment and activities, several effective measures are available. These include, but are not limited to, installation of temporary sound walls or acoustic blankets around stationary noise sources to shield adjacent sensitive receptors, minimizing unnecessary construction vehicle idling time, replacing old mufflers and installing additional noise suppression measures. Selection of appropriate mitigation measures depends on the characteristics of the noise. These measures are typical industry-accepted measures and thus, staff does not typically propose specific mitigation measures for construction equipment. However, Condition of Certification **NOISE-2** requires resolution of the complaint to the satisfaction of the complainant.

In the **Socioeconomics** section of this Appendix, staff presents census information that shows that there are minority populations within a three-mile buffer of the project. Since staff has added conditions of certification that would reduce the risk associated with noise to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the alternative transmission lines on minority populations. Therefore, there are no environmental justice issues for Noise.

Comparison to Proposed Transmission Line Route

Regardless of which transmission line route is selected, whether Alternative Route 4, Alternative Route 5, or the applicant's proposed route, construction of the transmission lines for the project would be temporary and would be expected to result in an insignificant noise impact if constructed in accordance with the Conditions of Certification proposed in the FSA (**NOISE-1**, **NOISE-2**, and **NOISE-6**). Impacts of Alternative Route 4 and Alternative Route 5 are expected to be similar to those of the proposed route.

3.7 PUBLIC HEALTH

Setting and Existing Conditions

The project site is located in the city of Palmdale, California. Land in the vicinity of the proposed project is designated for Light Industry, Commercial, Office, and Business Park. There are several residential uses within a one-mile radius (COP 2008a, Section 5.10.2). Sensitive receptors and residences in the project vicinity (within a 3-mile radius) are listed in **Appendix G.7** and shown in **Figure 5.10-2** of the AFC. The nearest sensitive receptor to Alternative Route 4 is the Palmdale School District office on the west side of 10th south of Avenue P. The nearest sensitive receptor to Alternative Route 5 is the Palmdale Learning Center, approximately 250 feet from the route on Division Street.

Assessment of Impacts and Discussion of Mitigation

During the construction phase of the project, the only impacts to public health that could occur would be those associated with exposure to toxic substances in contaminated soil disturbed during transmission line construction and diesel exhaust from heavy equipment operation during the construction of the transmission line. Soil contamination encountered during construction of the overhead or underground transmission line is addressed in **Section 3.13 - Waste Management**.

Diesel emissions are generated from sources such as trucks, graders, cranes trenching equipment, directional boring equipment, and other vehicles necessary for construction purposes. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by the California Air Resources Board (ARB) as toxic air contaminants. Exposure to diesel exhaust may cause both short- and long-term adverse health effects. Short-term effects can include increased 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.

Any exposure due to emissions of these materials would be limited to an area very close to where the construction equipment was operating. Staff has conducted many air dispersion modeling studies of the dispersion of vehicular exhaust – and has reviewed countless more such studies – and has determined that the impacts to public health, if any, would be limited to an area very near the sources of emissions, measured in feet, not blocks. And because transmission line construction activities would be very transitory in nature and would not linger at one location for any significant length of time (hours, not days), exposure durations would also be very short. Furthermore, staff recommends the use of ultra-low sulfur diesel fuel and Tier 3 (or Tier 2 if Tier 3 not available) California Emission Standards for Off-Road Compression-Ignition Engines or the installation of an oxidation catalyst and soot filters on diesel construction equipment. 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 percent. Such filters will reduce diesel emissions during construction and reduce any potential for significant health impacts.

Emissions from maintenance vehicles during operation of the transmission line would be minimal and infrequent and thus not pose a significant impact to public health.

While magnetic field would be greater directly above the underground line, generally total EMF is less for underground lines and drops off more rapidly in comparison to overhead lines.

In the **Socioeconomics** section of this Appendix, staff presents census information that shows that there are minority populations within a three-mile buffer of the project. Since staff has added conditions of certification that would reduce the risk associated with public health to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the alternative transmission lines on minority populations. Therefore, there are no environmental justice issues for Public Health.

Alternative Route 4 – Partial Underground Transmission Line

The emissions from construction of an underground transmission line would present a less-than-significant risk to the off-site public. A shorter transmission line construction period would result in shorter public exposures to emissions along the route than with the proposed route simply as a function of time, and the risks from the construction of an underground route would be less than significant.

During operations, emissions from vehicles for maintenance and repair of underground transmission lines during operation of the transmission line would be minimal and much less frequent than for the overhead transmission lines and thus not pose a significant impact to public health.

Alternative Route 5 – Overhead Division Street Transmission Line

The emissions from construction of the overhead transmission alternative would present a less-than-significant risk to the off-site public. A shorter transmission line route would result in fewer emissions along the route simply as a function of time and distance, and the risks from any route would be less than significant.

During operations, emissions from vehicles for maintenance and repair of overhead transmission lines during operation of the transmission line would be minimal and infrequent and thus not pose a significant impact to public health.

Comparison to Proposed Transmission Line Route

As stated above, the construction of a 35.6 mile overhead 230 kV transmission line will result in proportional greater public exposure to toxic air contaminants from diesel construction equipment exhaust along the route. Since exposure is directly proportional to the length of the transmission line and the time it takes to complete construction, the applicant's proposed route would pose a greater risk of exposure to the public than the overhead or underground alternatives. However, staff believes that all risks to the public from toxic air contaminants during construction of all three routes would be less than significant and no additional Conditions of Certification other than those already proposed by staff are necessary. During operations, the need to maintain the overhead transmission lines would result in public exposure to additional, although infrequent, toxic air containments which would not occur if the underground option were chosen.

3.8 SOCIOECONOMICS

Setting and Existing Conditions

Alternative Route 4 (Partial Underground Route) and Alternative Route 5 (Overhead Route along Division Street) would be located within the vicinity of the PHPP, in the city of Palmdale, California**.** The setting and existing conditions for the two alternative transmission line routes would be the same as that analyzed in the Socioeconomic Resources section of the FSA.

Laws, Ordinances, Regulations and Standards

The socioeconomic laws, ordinances, regulations, and standards (LORS) discussed in the Socioeconomic Resources FSA, **SOCIOECONOMICS Table 1** would also be

applicable to the Alternative Routes 4 and 5. Please refer to **SOCIOECONOMICS Table 1** of the FSA for a list of applicable Socioeconomic LORS.

Minority Populations/ Below-Poverty-Level Populations

Staff's demographic screening is designed to determine the existence of a minority or below-poverty-level population or both within an approximate one-mile area (three-mile buffer on each side). Please refer to the FSA for additional information regarding minority populations and below-poverty-populations.

For Alternative Routes 4 and 5, the minority population within the approximate six-mile radius of the proposed site is 25,315 persons or about 65.53 percent of the total population (see **Socioeconomics Figure 2**). Several technical areas evaluated in this Appendix have considered environmental justice in the environmental impact analysis.

Staff also identified the below-poverty-level population based on Year 2000 U.S. Census block group data within an approximate s one-mile radius of Alternative Routes 4 and 5. The below-poverty-level population within an approximate sone-mile radius of Alternative Routes 4 and 5 is approximately 4.27 percent.

Assessment of Impacts and Discussion of Mitigation

The socioeconomic resource areas evaluated by staff for Alternative Route 4 and Alternative Route 5 include population growth, housing supply, displacement of existing housing and people, and physical impacts to government facilities (emergency medical services, law enforcement, education, recreation facilities) and are based on Appendix G of the CEQA Guidelines. These are the same areas of potential impact staff analyzed for the PHPP and associated transmission line.

Alternative Route 4 - Partial Underground Transmission Line and Alternative Route 5 - Overhead Division Street Transmission Line

Using the same setting and conditions and analyzing the same areas of potential impact, staff concluded that the much larger PHPP construction and operation workforce would have no significant adverse socioeconomic impacts in the project area and region. Therefore, staff concludes the same for the Alternative Routes 4 and 5.

Proposed Conditions of Certification

Staff concludes that there would be no significant adverse socioeconomic impacts resulting from the construction of Alternative Routes 4 and 5. Therefore, no conditions of certification are proposed.

Comparison to Proposed Transmission Line Route

The proposed transmission line route discussed in the FSA would consist of a 35.6-mile transmission line. Alternative Route 4 and Alternative Route 5 would consist of a 12.8 mile and 14-mile transmission line, respectively. Because the alternative transmission line routes would be shorter than the proposed PHPP transmission line route, it is reasonable to state that the construction time would be shorter (see **Alternatives Appendix A Table 4**). Employment and income from construction of the two alternative lines would be less than the 35.6-mile transmission line; however, Alternative Route 4

and Alternative Route 5 would have some economic benefits to the project area and region.

Similar to the proposed PHPP, Alternative Routes 4 and 5 would not cause significant direct or cumulative adverse socioeconomic impacts to housing, schools, emergency services, law enforcement, and parks. In addition, similar to the proposed PHPP, the two alternative routes would not induce substantial growth or concentration of population, induce substantial increases in demand for housing or public services, or displace a large number of people.

3.9 SOIL AND WATER RESOURCES

Setting and Existing Conditions

Two alternative transmission line routes have been identified. Alternate Route 4, a partial underground route, would follow Sierra Highway south for about a mile and then jog over to 10th Street until East Avenue S. From this point the route would jog back over to Sierra Highway to the Angeles Forest Highway and on to SCE's Vincent substation. Alternative Route 4 would be installed underground to the junction of East Avenue S and Sierra Highway, where overhead construction would take the line up to the substation. Alternative Route 5, an overhead route, would follow a similar corridor as Route 4, but would be an entirely overhead line. Route 5 would follow Division Street south to East Avenue R, where it would jog over to Sierra Highway and follow the same route as Route 4 to the substation. The routes would be 12.8 and 14 miles in length, respectively.

The proposed alternative routes would cross numerous ephemeral streams and the California Aqueduct and Palmdale Ditch (Waters of the U.S.). Potential construction related impacts of Alternative Route 4 would involve trenching, horizontal or directional drilling, installation of conductor in the trenches/boreholes and piping, installation of new transmission poles, and pulling conductor from pole to pole. Construction of Route 5 would be logistically less complicated, requiring the installation of new poles only and the pulling of conductor between poles.

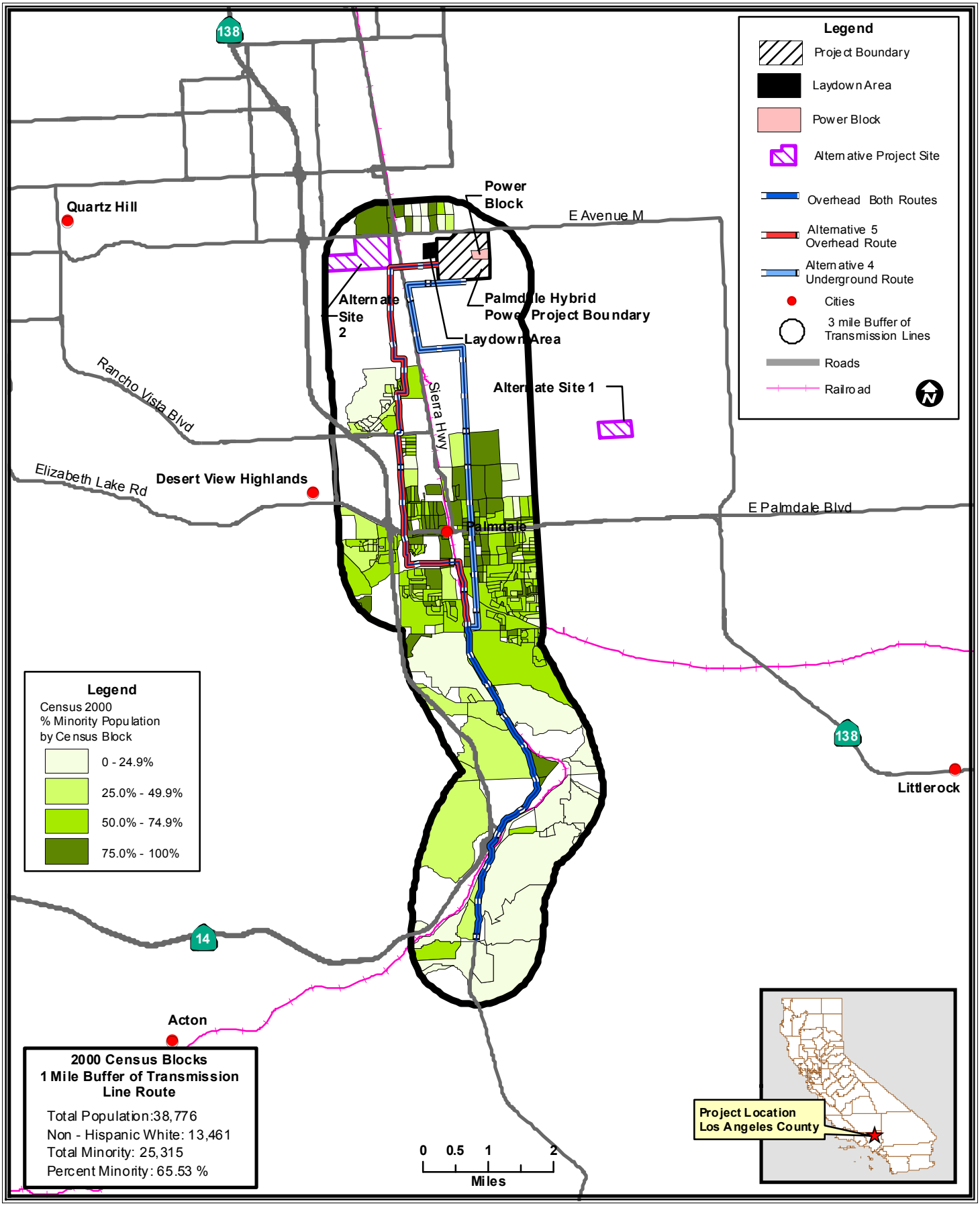
Assessment of Impacts and Discussion of Mitigation

Alternative Route 4 and Alternative Route 5

Both Route 4 and Route 5 would require the installation of new conductor poles and conductors. Construction of the new poles would require an area of approximately 50 by 50 feet to be cleared of vegetation. Each pole footprint would be approximately two square feet. Soil and vegetation would also be disturbed by pulling and tensioning the conductors. Tensioning areas of approximately 150 by 500 feet and pull areas of approximately 150 by 300 feet would be required. In addition, temporary conductor snub/transfer areas of approximately 150 by 200 feet would be required to sag conductor wires to the correct tension.

SOCIOECONOMICS - FIGURE 2

Palmdale Hybrid Power Project - Census 2000 Minority Population by Census Block - 1 Mile Buffer of Transmission Lines



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission Statewide Power Plant Maps 2010 - Census 2000 PL 94-171 Data - Matrix PL2

In addition to overhead lines, Alternative Route 4 would require conductor installed underground.

Underground entrance and exit points would require a 40 foot wide construction footprint. Trenches would be approximately 15-inches wide and 36- inches deep, with excavated soil stockpiled and later used as backfill once the conductor is installed. Pre-formed concrete splice vaults would be installed at approximately 1,600-foot intervals (approximately 23 in total). These vaults would be used for pulling conductor and housing conductor splices. Each vault would require an excavation of 26 by 12 feet wide by 10 feet deep. Approximately 115 cubic yards of soil would be excavated for each vault, some of which would be used as backfill and compaction material. Excavation and pulling areas would require an area of approximately 100 by 100 feet. In addition, Route 4 railroad crossings along Sierra Highway adjacent to Plant 42 would need horizontal or directional drilling. Drill entrance and exit points would need to be excavated, each requiring an area of approximately 75 by 75 feet to be cleared of vegetation.

Construction could involve the preparation of roads for construction vehicles and equipment. Preparation of these roads would require clearing of vegetation, blade-grading to remove potholes, ruts, and other surface irregularities, and recompaction to provide a smooth and dense surface. These roads would be graded to a width of approximately 14 feet with 2 foot shoulders on each side.

All construction activity would require water for dust suppression, soil compaction, drinking and sanitation. Portable sanitation facilities would also be required. The source of water during construction has not been identified. Portable sanitation facilities would have to be serviced regularly, with sanitation waste disposed of at a local treatment facility. Excavated soil would either be reused or disposed of at an appropriately licensed waste facility. Construction waste generated would be disposed of at an appropriately licensed waste facility.

Construction of either route would disturb stabilizing vegetation and would cross several soil types with differing susceptibility to wind and water erosion and compaction. Disturbed soil is more susceptible to erosion and compacted soil can accelerate storm water runoff and erosion. Vehicles and equipment crossing the ephemeral streams would disturb and compact the soil and potentially cause the loss of stabilizing vegetation. The California Aqueduct and Palmdale Ditch would be spanned by the conductor and therefore not affected. Existing and new poles installed in ephemeral streams and the river channel would be subject to channel scour during storm events.

In the **Socioeconomics** section of this Appendix, staff presents census information that shows that there are minority populations within a 1-mile buffer of the project. Since staff has added conditions of certification that would reduce the risk associated with soil and water to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the alternative transmission lines on minority populations. Therefore, there are no environmental justice issues for Soil and Water.

Impact Minimization Measures

The **Soil and Water** FSA section discusses erosion mitigation measures that are designed to avoid and reduce the amount of soil loss due to wind and water erosion. These mitigation measures include implementation of a construction Storm Water Pollution Prevention Plan (SWPPP). The Clean Water Act (CWA) (33 U.S.C. Section 1251 *et seq*.) regulates discharges through the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). In California, the NPDES program is administered by the State Water Resources Control Board. Pursuant to NPDES permit requirements, the project owner would be required to prepare and adhere to a SWPPP to minimize construction erosion. The SWPPP would include temporary and permanent Best Management Practices (BMPs) for the protection of water quality and soil resources; demonstrate no increase in offsite flooding potential; and identify all monitoring and maintenance activities. The applicant should complete all engineering plans, reports, and documents necessary for the lead agency to conduct a review of the project and provide a written evaluation as to whether the proposed grading, drainage improvements, and flood management activities comply with all requirements of the construction SWPPP. Examples of BMPs that should be included in the SWPPP are:

- Use of existing poles for conductor installation to reduce the amount of soil and vegetation that could be disturbed and compacted.
- Use of trenches already proposed for other PHPP related utilities to reduce the amount of soil and vegetation that could be disturbed and compacted.
- Use of temporary and long-term erosion control measures to minimize soil loss and maintain water quality until long-term soil stabilization has been established. The following erosion control measures should be used as necessary: silt fences, sediment basins, sediment traps, check dams, fiber rolls, gravel bag berms, sandbag barriers, straw bale barriers, storm drain inlet protection, street sweeping and vacuuming, wind erosion control, soil binders and weighting agents, stabilized construction entrance/exit, stabilized construction roadway, and entrance/outlet tire wash.
- Use of measures to insure that contaminants are not discharged from the construction site.
- Restoration of all areas disturbed by construction activity, except access roads, to preconstruction conditions. Restoration may include grading and restoring original land contours to facilitate natural re-vegetation, proper drainage, and erosion prevention, and reseeding where appropriate. In addition, all construction materials and debris should be removed and recycled or properly disposed in accordance with all applicable laws.
- A final inspection to ensure that all BMPs have been implemented successfully.

Areas that are temporarily disturbed should implement mitigation measures similar to the following:

- Soils and vegetation disturbed and removed should be limited to the minimum area necessary for access and construction.
- Vehicles should be inspected daily for fluid leaks before leaving the staging area.

- Spill controls and cleanup plans and procedures should be developed. Spill-control and cleanup materials should be kept onsite at all times during construction. Workers should be trained in their use.

The following suggested or similar mitigation measures should be implemented for earth disturbing activities associated with work on conductor pole footings:

- Removed topsoil should be segregated and stockpiled for reuse if practicable.
- All activity should be minimized during winter and other wet periods to avoid accelerating erosion and increasing compaction of the soil.
- All soil excavated for structure foundations should be backfilled and tamped around the foundations, and used to provide positive drainage around the structure foundations.
- Use of ground-disturbing mechanical equipment to remove vegetation should be avoided on slopes over 30 percent or on highly erosive soils, unless it can be demonstrated that erosion of the disturbed slopes would not accelerate.

The following mitigation measures should be implemented during construction activities in and around any water bodies or ephemeral washes:

- Discharge of material, such as displaced soils and vegetation debris, within waters of the United States may be subject to U.S. Army Corps of Engineers regulations under the CWA.
- Wetland delineation surveys should be conducted before each phase of project construction to identify jurisdictional wetlands and Waters of the U.S.
- Mitigation for the permanent loss of jurisdictional wetlands or Water of the U.S. should be provided per agreement with the US Army Corps of Engineers.
- Access ways should be located to avoid wetlands or, if necessary, crossed at the least sensitive feasible point.
- If wet areas cannot be avoided, a wide-track or balloon tire vehicle or timber mats should be used.
- Grading should be minimized as much as possible. When required, grading should be conducted away from watercourses/washes to reduce the potential for material to enter the watercourse.
- Excavated material or other construction materials should not be stockpiled or deposited near or in stream banks or other watercourse perimeters.
- Sediment control devices, such as placement of native rock, should be used at all dry wash crossings, as appropriate.
- All fill or rip-rap placed within a stream or river channel should be limited to the minimum area required for access or protection of existing facilities.

Comparison to Proposed Transmission Line Route

Alternative Route 4 - Partial Underground Transmission Line

Alternative Route 4 (alternative 12.8-mile partial underground route) would be about 63 percent shorter than the proposed route (35.6 miles); however, this route may result in more ground disturbance due to the amount of trenching that would be required to install the conductor underground and numerous underground vaults that would have to be excavated and installed. The vaults alone would require the excavation of an estimated 71,760 cubic feet (2,645 cubic yards) of soil. Soil generated during the excavation would have to be stockpiled or contained in soil bins either adjacent to the vaults or at a construction staging area.

Alternative Route 5 – Overhead Division Street Transmission Line

Alternative Route 5 (14 miles) would also be shorter than the proposed route and would result in less ground disturbance. Less soil would have to be excavated for conductor pole foundations and there would be less ground disturbance during pole installation, conductor pulling, and conductor tensioning activity due to the shorter route.

It is expected that construction of the transmission line would be done in compliance with all LORS. The California Aqueduct and Palmdale Ditch would be spanned and therefore not impacted. A wetland delineation should be conducted for other potential jurisdictional waters along the selected route with appropriate mitigation measures implemented. Additionally, BMPs similar to those discussed above would need to be implemented and a construction SWPPP/BMPs developed to avoid and reduce environmental impacts to soil and water resources to levels that are less than significant. Staff believes that soil and water impacts during construction of all three proposed routes would be less than significant and no additional Conditions of Certification other than those already proposed by staff are necessary. However, Alternative Route 5 would require less ground disturbance than Alternative Route 4 and no horizontal or direction drilling.

3.10 TRAFFIC AND TRANSPORTATION

SETTING AND EXISTING CONDITIONS

The electricity output of PHPP is proposed to be delivered to the Vincent substation located on the west side of the Antelope Valley Freeway (Highway 14) approximately 10.5 miles south of the project site, south of the Palmdale City limits. The two 230 kilovolt (kV) alternative transmission alignments proposed to serve the PHPP originate on the west side and the south side of the project site, respectively (see **Alternatives Appendix A Figure 2**).

Alternative Route 4 (underground-overhead) and Alternative Route 5 (single-pole overhead) would generally parallel the north/south alignments of either Division Street or Sierra Highway/10th Street E. According to the city of Palmdale Circulation Plan, Division Street is identified as a major arterial (north/south) serving primarily local Palmdale traffic. Sierra Highway is also designated a major arterial that passes through Palmdale and Lancaster, as well as points north and south of both cities. It should be

noted that Sierra Highway is designated as a regional arterial north of Rancho Vista Blvd.

The installation of the proposed transmission line alternatives involves crossing two (2) types of transit infrastructure, surface at-grade roadways and heavy rail lines. The proposed transmission line would also cross approximately 400-feet of Una Lake on the west side of the Sierra Highway. Una Lake is a relatively small pond east of Lake Palmdale, physically separated by Sierra Highway. The Palmdale Corridor (interstate connector) is proposed along E. Avenue P, however the precise location and design of this corridor is currently undecided; therefore, provisions for interfacing the corridor with the transmission lines will be analyzed and mitigated, if necessary, in a future analysis. Each of the proposed alternatives is discussed in turn below, as well as potential impacts and mitigation measures.

Laws, Ordinances, Regulations, and Standards (LORS)

The LORS applicable to both Alternative Routes 4 and 5 are the same as the LORS used for the Traffic and Transportation analysis conducted for the PHPP (see **Table1** in the **TRAFFIC AND TRANSPORTATION** section of the FSA). Compliance with LORS for both alternatives is the same as the analysis for the applicant's proposed transmission line. Both alternatives routes would require determinations of "no hazard" from the FAA for several transmission line poles. Staff does not foresee any impediments to obtaining these determinations and, with implementation of Trans-2 requiring the determinations prior to start of construction, staff believes that both alternative routes would comply with LORS. Please refer to the **TRAFFIC AND TRANSPORTATION** section of the PHPP FSA for a detailed discussion of LORS compliance.

Alternative Route 4 – Partial Underground Transmission Line

The total length of Alternative Route 4 is approximately 12.8 miles which is shorter and more direct than Alternative Route 5. From the PHPP site to E. Avenue S, the transmission line would be underground. The transmission line would exit on the south side of the PHPP site at the current location of 10th Street E and cross over Avenue M-12 to the south side. The line would proceed west along E. Avenue M approximately 0.75 mile to Sierra Highway. The transmission line parallels Sierra Highway south for approximately 1.75 mile to Lockheed Way. At Lockheed Way, the line would turn east for approximately 0.5 mile until reaching 10th Street E., following the natural gas pipeline. The line again picks up 10th Street E and turns south for 3.5 mile until reaching E. Avenue S.

After crossing E. Avenue S, the unified transmission line would continue south along the east side of Sierra Highway for approximately 3.6 miles until Sierra Highway comes to a T intersection with the Pearblossom Hwy. The transmission line route would cross the intersection and proceed southwest on the east side of Sierra Highway for approximately 1.15 miles to the intersection of Sierra Highway and Antelope Valley Freeway (Highway 14). The transmission line would then diverge from Sierra Highway and proceed overland for approximately 0.80 mile to intersect with the applicant's proposed transmission line route, crossing the railroad right-of way and East Carson

Mesa Road. Both routes would continue to follow the applicant's proposed route into the Vincent Substation.

The installation of Alternative Route 4 would follow typical undergrounding procedures. Construction generally occurs much closer to the ground and proceeds sequentially down the line. The open trenching method in conjunction with boring for conduit placement would most likely be used to cross all roads (and rail) between the PHPP site and E. Avenue S. A smaller amount of hardware is necessary for undergrounding, so smaller staging and set-up areas would be required for Alternative Route 4. Any temporary road closures would be conducted in the same fashion as for Alternative Route 5.

Route Crossings

Regional Arterial

An arterial roadway is typically designed to carry high volumes of traffic from one place to another, providing access to collectors, while intersecting local streets as well as major traffic corridors. A regional arterial is an even larger, more intensive-use roadway than an arterial. In many cases, destinations such as shopping centers, eateries, and other gathering places are located along arterials. In addition to the above, regional arterials provide a through connection to other locales including other cities or population centers, typically accessing freeways. Alternative Route 4 proposes to cross one regional arterial, E. Avenue M.

Major Arterial

An arterial roadway is typically designed to carry high levels of traffic from one place to another, providing access to collectors, while intersecting local streets as well as major traffic corridors. In many cases, destinations such as shopping centers, eateries, and other gathering places are located along arterials. Alternative Route 4 proposes to cross the following major arterials.

- W. Avenue N
- E. Avenue P
- E. Avenue Q
- E. Palmdale Blvd./SR-138
- E. Avenue R
- E Avenue S

Secondary Arterial

A secondary arterial roadway is typically designed to deliver traffic from lower volume local streets to higher volume major arterials. They can also provide access directly to collectors, and may serve destination uses such as local mixed-use shopping, and neighborhood eateries. Alternative Route 4 proposes to cross one secondary arterial, 10th Street E.

Local Roadways

Local roads typically carry low traffic volumes at the neighborhood level and provide a link to collectors, which eventually provide access to arterials and thoroughfares. This alternative proposes to cross the following local roadways.

- Lockheed Way
- Kelly's Way
- Blackbird Lane
- E. Avenue P-4
- E. Avenue P-8
- E. Avenue P-5
- E. Avenue Q-3
- E. Avenue Q-5

Private Roadways/Driveways

Private roads and driveways are developed for a variety of purposes, most often for providing access from a public road to a private house or property. Typically, a minimum roadway width of 20-feet is required. Approximately six (6) private driveways are proposed to be crossed by Alternative Route 4 between the PHPP and the Vincent substation.

Railroads

Union Pacific Railroad (UPRR) operates a mainline that extends northerly from Los Angeles to Mojave through Santa Clarita and the Antelope Valley and serves automobile distribution centers, imported consumer goods, food and food products, and chemicals and manufactured goods. The UPRR mainline is located along Sierra Highway 1/4 mile to the west of the subject site. Alternative Route 4 (as does the applicant's proposed natural gas line) would cross the mainline twice as it proceeds through the city, paralleling the line in alternating fashion on the west and east sides.

Alternative Route 5 - Overhead Division Street Transmission Line

The overall length of Alternative Route 5 is approximately 14 miles. The transmission line exits on the west side of the PHPP and proceeds westerly 50-feet north of and parallel to a private road 0.26 mile north of Avenue M-12. The line extends 0.80 mile to the west crossing over Sierra Highway until ultimately reaching the west side of Division Street.

The line would travel approximately 1.35 miles south, running parallel to Division Street, crossing W. Avenue N. At this point, the transmission line would cross over Division Street, and come back to the east about 0.10 miles. It should be noted that long stretches of Division Street are unimproved particularly north of W. Avenue P. The line would then continue south behind a residential subdivision, crossing over Avenue O, running parallel to Maravilla Drive/La Cola Drive, before coming back to Division Street.

Now located on the east side of Division Street, the transmission line would travel another one-half mile, stopping short of W. Avenue P. After crossing back over to the

west side of Division Street, the line would proceed across W. Avenue P then travel south paralleling Division Street for almost 2.0 miles; approximately 0.20 miles short of E. Avenue R, the line would cross back over to the east side and then cover the final distance. From the northeast corner of Division Street and E. Avenue R, the line would extend approximately three-quarters of a mile, paralleling E. Avenue R until reaching the Sierra Highway. The line continues down Sierra Highway to E. Avenue S where is unified with Alternative Route 4. The line would proceed southward as a single overhead transmission route, following the same path identified for Alternative Route 4, above.

For Alternative Route 5, typical procedures for overhead construction would be followed. Depending on the size of the street to be crossed, a crew of between 4 and 6 workers is required. Two heavy-duty two axle work trucks, one auger truck, one large spool truck, and one large crane are necessary to carry out the process of erecting the single-pole structures, and pulling wires across roadways, rail lines, or water bodies. Moving sequentially down the line, crews would auger the necessary holes and set the poles on their bases using concrete and steel attachment hardware. If temporary road closures are necessary, they would typically be closed one lane or one direction at a time, depending on the size of the road. Once the poles have been erected, lines would be pulled from one side to the other, followed by the conductors and insulators. Depending on individual circumstances, a net may be strung across the road as an additional safety measure.

Route Crossings

In the generally accepted streets hierarchy, freeways are carrying the largest, highest volume roads; local streets or lanes are the smallest, and carry the lowest traffic volumes, other street types fall somewhere in between the two extremes.

Regional Arterial

The description of regional arterials is the same as under Alternative Route 4. Alternative Route 5 proposes to cross one regional arterial, Palmdale Blvd/SR-138.

Major Arterial

The description of major arterials is the same as under Alternative Route 4. Alternative Route 5 proposes to cross the following major arterials.

- Sierra Highway (five crossings)
- Rancho Vista Blvd.
- Avenue Q
- E. Avenue R
- E. Avenue S
- Division Street (four crossings)
- W. Avenue N.
- Technology Rd.

Local Roadways

The description of local roadways is the same as under Alternative Route 4. Alternative Route 5 proposes to cross the following local roadways.

- 5th Street E
- 6th Street E
- E. Barrel Springs Road
- Carson Mesa Road

Private Roadways/Driveways

The description of private roadways is the same as under Alternative Route 4. Approximately six (6) private driveways are proposed to be crossed by Alternative 5 between the PHPP and the Vincent substation.

Railroads

The description of railroads is the same as under Alternative Route 4. The proposed transmission line would cross the mainline four (4) times as it proceeds through the city, paralleling the line in alternating fashion on the west and east sides.

Assessment of Impacts and Discussion of Mitigation[7]

Method and threshold for determining significance

Significance criteria are based on California Environmental Quality Act (CEQA) Guidelines, the CEQA Environmental Checklist and on performance standards and thresholds established by interested agencies. Thresholds used for analyzing the proposed project's impacts are the same as those used in analyzing the PHPP's impacts. Issues considered for impacts of significance, under CEQA, include the following:

- Cause an increase in traffic that would be substantial in relation to the existing traffic load and capacity of the street system (i.e., would result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections or roadway segments.
- Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways.
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment, oversized vehicles).
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.
- Result in inadequate parking capacity.

[7] Note for Traffic and Transportation, the discussion of Alternative Route 5 appears before the discussion of Alternative Route 4

- Result in inadequate emergency access.
- Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts bicycle racks).

Direct/Indirect Impacts and Mitigation

Alternative Route 5 - Overhead Division Street Transmission Line

Construction Impacts

Alternative Route 5 could generate construction related impacts, primarily on service levels due to lane closures or rerouted traffic. More intensive use streets, according to the streets hierarchy, would have greater potential for a ripple of effects on traffic. However, any significant effects the project may have related to traffic will be temporary. A project's potential impact on the local transportation system is assessed based on the potential degradation of Levels of Service (LOS) at intersections and roadway segments (see PHPP FSA Tables 2 through 5). Transmission line construction activities do not have the potential to impact traffic any more than PHPP construction activities.

A majority of the project's construction workforce (for both alternatives) is expected to come from the local labor market but the workforce may also originate from other population centers like the Los Angeles basin and San Fernando Valley. As noted in the **Traffic and Transportation** section of the FSA, staff supports a more recent traffic analysis (Fehr & Peers 2010) which suggests that Avenue M would be the primary route for construction traffic, fed by SR-138 and SR-14 from the south, and SR-58 from the north and west. The PHPP AFC, Section 5.13.3.2 states that construction of the PHPP is anticipated to occur over 27 months; construction of both transmission line alternatives would be expected to correspond with this time frame.

Construction activities relative to Alternative Route 5 include transporting the single-pole structures and rolls of high tension wire to designated locations for placement, grubbing and excavating the pole bases, maneuvering cranes and stationing workmen to erect the poles and string the wire, as well as finishing work done from a cherry picker. All of these activities, whether executed in private ROW or in the public ROW would involve potential impacts to transportation infrastructure, and the possibility for temporary road closures and/or detours. Transporting oversize equipment over surface roads also creates the potential for impacts on traffic flow and capacity. Where necessary, construction vehicles will operate in areas that may necessitate temporarily redirecting traffic. The AFC indicates that only stub roads would be constructed to access any transmission line constructed in unimproved ROW, minimizing the need for future interruptions of traffic.

Operational Impacts

Staff finds that ongoing operations (active or hot in-service transmission line) associated with Alternative Route 5, subsequent to installation, would have a less than significant impact on study area roadways, roadway safety, or intersection LOS. Occasional planned maintenance and repair activities would be expected to occur, but such activities would occur infrequently and would be completed in a rapid fashion to return the line to active service.

Transportation System Impacts

Will the proposed project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment, oversized vehicles)?

Alternative Route 5 would align with Division Street primarily on the west side, with a portion of the segment located on the east side of the street. A minimum setback will be maintained to minimize potential interference with the streets. In the segments where transmission lines parallel roadways, there will be no point at which the two linear features meet or cross; therefore, there will be no physical impact(s) to the transportation system due to any type of design or other system element. Where the transmission line crosses roadways (see Figure 1), the high tension wires will be located a minimum of 30-feet above the finished grade of the road surface; strictly limiting any incompatibilities that may occur.

Hazards associated with road closures and vehicle safety will be mitigated through the implementation of Condition of Certification **TRANS-1 of the TRAFFIC AND TRANSPORTATION** section of the **FSA**, which requires the preparation of a construction traffic control plan that would include the use of flagging, flag men, signage and maintaining open trenches in a covered, secured condition during inactive periods; therefore, Alternative Route 5 will not substantially increase hazards due to a design feature or incompatible use.. . Implementation of Condition of Certification **TRANS-4** in the **TRAFFIC AND TRANSPORTATION** section of the FSA will also ensure that any damage to roadways resulting from project design or construction is restored to pre-project conditions.

Will the proposed project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

According to the letter received from the Department of the Air Force, dated May 21, 2010, the Air Force has determined that the placement of power poles in military airspace has the potential to adversely impact air traffic from the U.S. Air Force Plant 42, due to the proximity to runway 07-25. To address this concern, the poles along Division Street would be restricted to a maximum height of 94-feet above the runway at critical locations (likely poles north of Avenue O). Any structure, including power poles, within navigable air space would also require a determination of “no hazard” by the FAA. Implementation of Condition of Certification **TRANS-2** in the **TRAFFIC AND TRANSPORTATION** section and **LAND- 4** in the **LAND USE** section of the FSA, requiring adherence to a development/site plan review prior to construction approval, would reduce the potential impact to less than significant.

Will the proposed project result in inadequate parking capacity?

There would be an incidental need for additional off-street parking associated with Alternative Route 5. Construction vehicles will use temporary easements, yet-to-be developed access/maintenance roads, with the possibility of some on-street parking (subject to closures/detours) during construction. Implementation of Condition of Certification **TRANS-1** found in the **TRAFFIC AND TRANSPORTATION** section of the

FSA ensures compliance with local regulations, including local Zoning regulations; therefore, construction of the Alternative Route 5 will have a less than significant impact on parking capacity or the need for additional parking.

Impacts to Traffic Congestion

Will the proposed project cause an increase in traffic that would be substantial in relation to the existing traffic load and capacity of the street system (i.e., would result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections or roadway segments)?

Impacts to traffic congestion from the construction of Alternative Route 5 would be temporary. There may be some temporary displacement of traffic if short term road closures are necessary, and a corresponding increase in the traffic load from rerouted traffic, in relation to existing trips and capacity. However, staff is proposing Condition of Certification **TRANS-1** in the **TRAFFIC AND TRANSPORTATION** section of the FSA, which would reduce potential impacts on the existing traffic load and capacity of the street system to less than significant.

Will the proposed project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

The City of Palmdale General Plan Circulation Element indicates that the minimum acceptable Level of Service (LOS) during peak hour traffic is LOS D. As stated above, construction traffic and rerouted traffic resulting from implementation of Alternative Route 5 has the potential to cause the LOS to fall below level D. However, with the implementation of **TRANS-1** of the **TRAFFIC AND TRANSPORTATION** section of the FSA, potential impacts would be mitigated to less than significant levels; therefore, the project would not exceed either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways.

Will the proposed project result in inadequate emergency access?

The provision of emergency access will be unaffected by the construction/installation of transmission line infrastructure associated with Alternative Route 5. Implementation of short term traffic diversions and their potential effect on emergency response will be detailed in the construction traffic control and safety plan (**TRANS-1**). Therefore, the proposed project will not result in inadequate emergency access.

Will the proposed project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

Consistent with the Traffic and Transportation section of the FSA prepared for the PHPP, Alternative Route 5 is consistent with plans and policies for alternative transportation. No pedestrian facilities or mass transit facilities, either existing or planned, would be disturbed, interrupted, or displaced, other than the possibility for short term detours. For safety reasons, construction perimeters will be actively

enforced, delays to bus service would be negligible; therefore, the proposed project will not conflict with policies, plans, or programs supporting alternative transportation.

Alternative Route 4 - Partial Underground Transmission Line

Construction Impacts

Similar to Alternative 5, Alternative Route 4 could generate construction related impacts, primarily on service levels due to lane closures or rerouted traffic. Any significant effects the project may have related to traffic will be temporary and short-term, regardless of whether open trenching or the boring method is determined to be most effective.

Construction activities relative to Alternative Route 4 include transporting the rolls of conduit and high tension wire for undergrounding, trenching and/or directional drilling maneuvering equipment, and stationing and coordinating workmen to route the line beneath all roadways and rail lines. All of these activities, whether executed in private ROW or in the public ROW would involve potential impacts to transportation infrastructure, and the possibility for temporary road closures and/or detours. Where necessary, construction vehicles will operate in areas that may necessitate temporarily redirecting traffic. The AFC indicates that only stub roads would be constructed to access any transmission line constructed in unimproved ROW, minimizing the need for future interruptions of traffic.

Operational Impacts

Staff finds that ongoing operations associated with Alternative Route 4 within the underground segments north of E. Avenue S would be unnoticeable. Subsequent to installation, they would have a less than significant impact on study area roadways, roadway safety, intersection LOS, or on any other transportation related systems. Consequently, no operations-related mitigation measures are required related to the underground portion. Operational impacts associated with the above-ground section of Alternative Route 4 are the same as those described for Alternative Route 5.

Transportation System Impacts

Will the proposed project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment, oversized vehicles)?

Alternative Route 4 would align with Sierra Highway north of Lockheed Way, and with 10th Street E south of Lockheed. Potential impacts to the transportation system associated with undergrounding activities would be mitigated by implementing Condition of Certification **TRANS-1** of the **TRAFFIC AND TRANSPORTATION** section of the FSA. In the segments south of E. Avenue S where the overhead transmission line parallels roadways, the impacts and mitigations are the same as described for Alternative 5 above; therefore, there will be no physical impact(s) to the transportation system, due to any type of design or other system element.

Will the proposed project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

From the PHPP site to E. Avenue S, transmission infrastructure would be located underground. Facilities are proposed to be buried to avoid potential conflicts with aircraft air space. South of E. Avenue S, the placement of power poles and high voltage lines will be the same as for Alternative Route 5. Therefore, installation of Alternative Route 4 will not result in changes to air traffic patterns, including increased traffic levels or other changes that will result in substantial safety risks. Any structure, including power poles, within navigable air space would also require a determination of "no hazard" by the FAA; Condition of Certification Trans-2 requires these determinations prior to start of construction and, with implementation of this condition, potential impacts would be reduced to less than significant.

Will the proposed project result in inadequate parking capacity?

Less than significant with mitigation; please see the analysis for Alternative Route 5.

Impacts to Traffic Congestion

Will the proposed project cause an increase in traffic that would be substantial in relation to the existing traffic load and capacity of the street system (i.e., would result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections or roadway segments)?

Similar to Alternative Route 5, impacts to traffic congestion from the undergrounding of transmission lines would be temporary in nature. The severity of impacts would depend on the construction technique used; however, regardless of whether the open trenching method or boring is used to cross roadways, traffic disruptions will remain temporary and short-term. Similar to Alternative Route 5, implementation of **TRANS-1** of the **TRAFFIC AND TRANSPORTATION** section of the FSA would reduce the impacts on traffic congestion to less than significant.

Will the proposed project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

Less than significant with mitigation; please see the analysis for Alternative Route 5.

Will the proposed project result in inadequate emergency access?

Less than significant with mitigation; please see the analysis for Alternative Route 5.

Will the proposed project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

Less than significant with mitigation; please see the analysis for Alternative Route 5.

Proposed Conditions of Certification

This section references conditions of certifications contained in the **LAND USE** and **TRAFFIC AND TRANSPORTATION** sections of the PHPP FSA.

Comparison of Transmission Line Alternatives

Staff has made its determinations based on analyses cited in this section and testimony contained in the **LAND USE** and **TRAFFIC AND TRANSPORTATION** sections of the PHPP FSA, as well as consideration of the proposed use in relation to the affected traffic and transportation infrastructure located within the city of Palmdale and on the outskirts of the city, and applicable LORS.

The implementation of Alternative Route 5 would have a greater potential for requiring road closures because of the higher number of overhead transmission line crossings at public roadways (18 at-grade crossings) versus approximately six (6) at-grade overhead crossings with implementation of Alternative Route 4. Furthermore, eight (8) of the crossings for Alternative Route 5 are major arterials. South of E. Avenue S, the number and type of crossings are identical for both alternatives. The Proposed Route requires approximately 20 at-grade crossings.

Traffic counts are higher for Alternative Route 5 given the greater presence of commercial and residential uses along Division Street. Large segments of the Proposed Route are within existing roadway ROW, and other large segments cross open terrain. Along the first stretch of the Proposed Route, within the existing ROW of Avenue M (with no crossings), the potential impacts to traffic are low. East of 30th St., traffic counts drop significantly.

As per the Air Force, both Alternative Route 5 and the Proposed Route require power poles to be restricted in height at critical locations with respect to airspace. Poles for Alternative Route 5 (along Division Street) would be restricted to 94-feet above the runway surface, while poles along Avenue M and/or Avenue L would be limited to 120-feet tall. Due to the greater height restrictions, more poles would be required along Division Street to maintain minimum transmission line clearance. Finally, the Alternative Route 5 poles are located one-mile west of the end of runway 07-25, while the Proposed Route's poles would be located approximately 0.9-mile north of the side of runway 07-25.

Potential adverse impacts to levels of traffic congestion and to the overall roadway transportation system resulting from implementation of either of the alternatives would be adequately mitigated through implementation of avoidance and/or minimization techniques contained in Conditions of Certification **LAND-4, TRANS-1, TRANS-4**.

3.11 TRANSMISSION LINE SAFETY AND NUISANCE

Setting and Existing Conditions

Two alternative transmission line routes (Alternative Route 4 and Alternative Route 5) have been proposed by the Energy Commission staff in place of the circuitous 35.6-mile route proposed in the AFC for PHPP's 230 kV line. Each alternative is identified in Section 2.0, Alternative Transmission Line Routes of this document regarding the traversed area and underground or above-ground placement of the related line. As noted in staff's Transmission Line Nuisance and Safety FSA analysis, the proposed route was selected by the applicant to bypass specific area aviation-related facilities and businesses. Staff's proposed alternatives are intended for a more direct electrical

connection to the SCE Vincent Substation, thereby reducing the area of the potential field and nonfield transmission line impacts described in staff's FSA section.

As more fully described in Section 2.0, the total length of Alternative Route 4 would be 12.8 miles. The first segment of Alternative Route 4 would be located underground for a total of 6.75 miles and would follow the same route proposed by the applicant for its underground gas and water lines for PHPP. The second segment of Route 4 would be constructed as an overhead line for 6.05 miles.

Alternative Route 5 would essentially follow a similar corridor as Route 4 (although to the west of Route 4), but would be an entirely overhead line. Alternative Route 5 would exit the PHPP site to the west, and follow Division Street south to East Avenue R, from where it would cross over to Sierra Highway and follow the same route as Route 4 to the Vincent Substation. The route would be 14.0 miles in length.

As discussed in Section 2.0, staff's proposed alternatives would traverse residential, industrial and mixed-use areas while located within their respective rights-of-way whose dimensions would be established according to design and operational guidelines for lines in the proposed voltage class. Design, routing, and operation according to approved utility guidelines would constitute compliance with present CPUC requirements for safety and field management as noted in staff's FSA. The LORS in Table 1 of that analysis are intended to maintain the main field and nonfield impacts within levels the CPUC considers appropriate in light of present knowledge on health, safety, and nuisance effects.

Assessment of Impacts and Discussion of Mitigation

Alternative Route 4 and Alternative Route 5

In staff's FSA section, the field and nonfield impacts of most concern for the applicant's proposal were identified as relating to the physical presence of the line around area airports and the interactive effects of the generated electric and magnetic fields. As with the applicant's proposed route, both Route 4 and Route 5 would require installation of new conductor poles and support structures within the identified rights-of-way. Route 4 would require conductor undergrounding for specified segments together with overhead placement as more fully discussed in Section 2. 0. The overhead segments would be constructed according to the LORS identified in staff's FSA section for the applicant's proposal while the underground section would be constructed and operated according to the requirements of CPUC's GO-128 dealing with underground lines.

Electric fields are unable to penetrate the soil and other materials meaning that the electric field impacts in staff's final analysis would not be encountered in the area around the underground segments. Since magnetic fields can penetrate most materials, the line's magnetic fields would be encountered in all the areas around the route. It is exposure to this magnetic field component that has been of specific health concern in recent years. The potential magnitude of any related health risks is discussed in staff's preliminary assessment as likely small. Since line conductors are placed closer together underground than when located overhead, the enhanced cancellation effects of magnetic fields from the individual conductors would result in magnetic fields of comparatively lower strengths than with their overhead counterparts. Furthermore, such

underground line-generated fields diminish more rapidly from the line than with the overhead counterpart. Because the underground line is located closer to the individual at ground level than the overhead line, exposure to the individual directly above the line would be greater. Since the fields from the underground line diminish more rapidly with distance, the total area of potential impacts would be less than with the overhead counterpart.

Given the uncertainty about the most biologically significant pattern of exposure to line and other magnetic fields, as noted in staff's FSA, the health significance of such exposure differences remains uncertain, meaning that there presently is no reliable way to establish any significant differences between the biological effects of fields from overhead lines and those from underground lines. The CPUC considered this uncertainty in establishing the GO-128 requirements for underground lines as well as the LORS for overhead lines.

In the **Socioeconomics** section of this Appendix, staff presents census information that shows that there are minority populations within a three-mile buffer of the project. Since staff has added conditions of certification that would reduce the risk associated with transmission line safety and nuisance to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the alternative transmission lines on minority populations. Therefore, there are no environmental justice issues for Transmission Line Safety and Nuisance.

Comparison to Proposed Transmission Line Route

As discussed in staff's FSA, reducing the line impacts of concern for the proposed 230 kV and similar lines would be assured through compliance with the LORS identified for overhead lines in staff's final assessment. The five recommended conditions of certification are intended to ensure such compliance and would therefore apply to the applicant's proposal, Alternative Route 5, and the overhead portion of Alternative Route 4. G0-128 would apply to the underground section of Alternative Route 4 identifying GO-128 as the only added requirements related to staff's own proposals.

The only change in compliance requirements for the applicant's proposal (as specified in staff's FSA) would be the addition of GO-128 requirements to TLSN-1 to reflect the need for specific focus on the underground segment. The related modification to this condition of certification is as shown below.

Proposed Conditions of Certification

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-128, GO-131-D, Title 8, and Group 2. High Voltage Electrical Safety Orders, sections 2700 through 2974 of the California Code of Regulations, and Southern California Edison's EMF reduction guidelines.

3.12 VISUAL RESOURCES

Setting and Existing Conditions

The PHPP site is just south of East Avenue M about 0.5 miles east of the intersection with Sierra Highway in the city of Palmdale and adjacent to the northern boundary of USAF Plant 42 (Plant 42). The area is a desert landscape with several military industrial facilities. There are existing telephone and transmission distribution lines and poles running along the north side of East Avenue M.

Laws, Ordinances, Regulations, and Standards (LORS)

Both transmission line options would come under the jurisdiction of the LORS identified in the Visual Resources section of the Final Staff Assessment (FSA). No additional LORS are applicable.

Alternative Route 4 - Partial Underground Transmission Line

Alternative Route 4 would consist of 6.75 miles of underground transmission line that would parallel East Avenue to the west from the PHPP to the intersection with Sierra Highway. The line would proceed south on either the east or west side of Sierra Highway. It would transition to an overhead line at East Avenue S and would continue south until crossing over the intersection of Sierra Highway and Pearblossom Highway and would proceed southeast to the Vincent Substation. The above ground portion of the transmission line route would be about six miles.

Alternative Route 5 - Overhead Division Street Transmission Line

Alternative Route 5 would be 14 miles long and would exit the PHPP site and proceed west along East Avenue until reaching Division Street and then would turn left and proceed five miles south to East Avenue R. It would turn east along the north side of East Avenue R until reaching Sierra Highway. The line would proceed south along the east and west side of Sierra Highway in a similar route to Alternative Route 4 until reaching the Vincent Substation.

Assessment of Impacts and Discussion of Mitigation

Method and Thresholds for Determining Significance

To determine whether there is a potentially significant visual resources impact generated by a project, staff reviews the project using the 2010 CEQA Guidelines Appendix G Environmental Checklist pertaining to “Aesthetics.” The checklist questions are as follows:

A. Would the project have a substantial adverse effect on a scenic vista?

B. Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

C. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

D. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Staff evaluates the existing visible physical environmental setting from a fixed vantage point (called a “Key Observation Point” [KOP]), and the visual change introduced by the proposed project to the view from that KOP. Staff has selected one KOP for each transmission alternative.

Alternative Route 4 - Partial Underground Transmission Line

KOP 1 – Looking South on Sierra Highway just south of the intersection with East Avenue S- Existing Conditions

KOP 1 (VISUAL RESOURCES Figure 1A) was chosen to represent views by travelers driving south on Sierra Highway, approximately 5.5 miles southwest of the PHPP.

Visual Sensitivity

The major elements in this view are Sierra Highway in the center of the view, flat desert land, telephone poles and lines in the foreground, Sierra Highway desert foothills in the midground, and San Gabriel Mountains and sky are in the background. The KOP 1 viewshed does not include a scenic resource or vista, and this section of Sierra Highway is not a state or local scenic highway. The visual quality of the KOP viewshed is considered to be moderate due to the combination of natural and industrial features. The estimated level of viewer concern towards preserving the existing KOP 1 viewshed is considered to be moderate. Given the wide-open viewshed, the natural and industrial features in this view are highly visible.

The estimated number of motorists (6,600 average annual daily traffic [COP 2010]) using Sierra Highway is considered to be moderately high. Staff visited the project site and estimated the duration of view for motorists and cyclists traveling north or south in the KOP 1 viewshed to an exposure of the project site is on the order of 5 to 10 seconds, which is considered to be low. Overall, view exposure for motorists from this KOP is considered moderately high. The overall visual sensitivity for a motorist would be considered moderate from the KOP location. This assessment is the result of moderate visual quality, moderate viewer concern, and moderately high overall viewer exposure.

Visual Change

The KOP 1 simulation (**Figure 1B**) displays one difference between the existing photo and the simulation; the new transmission line and towers that would be above ground for the remainder of this alternative route. The new transmission lines would be located adjacent to existing transmission lines in the left fore and mid-ground view and would be consistent with the current lines and forms of the existing towers and lines, though they would be larger and the contrast would be moderate. The new structures would be co-dominant with existing features in this viewshed. The simulation shows the proposed steel poles would be a non-reflective grayish color and would have a minor color contrast with the sky compared to the existing dark brown wooden poles. The degree of view disruption or blockage introduced by the new transmission lines and poles is

moderately low. The applicant has noted that the color and non-reflected surface of the transmission line structures would reduce their visual contrast with the background view (CPO 2008a, pg. 5.15-13).

The overall visual change to the view from KOP 1 would be moderate due to the moderate contrast, codominance, and low blockage. Given the moderate visual sensitivity of the viewer and the moderate degree of visual change, the project's impact would be less than significant with mitigation such as painting and texturing/finishing (see staff's proposed Condition of Certification **VIS-2** from the FSA). This would reduce the likelihood that the transmission towers and lines would be a source of glare that could adversely affect daytime views from KOP-1.

Alternative Route 5 - Overhead Division Street Transmission Line

KOP 2 – Looking North Up Division Street, North of East Avenue R

KOP 2 (**VISUAL RESOURCES Figure 2A**) was chosen to represent views by motorists accessing the residential area on the right side of the photograph. Another set of viewers would be the occupants of the residences on the right side of **Figure 2A**.

Visual Sensitivity

The major elements in this view are Division Street in the center of the view, flat desert land, residences, telephone poles and lines in the foreground, Division Street, flat desert land, residences, and telephone poles and lines in the midground, and San Gabriel Mountains and sky are in the background. The KOP 2 viewshed does not include a scenic resource or vista, and this section of Division Street is not a state or local scenic highway. The visual quality of the KOP viewshed is considered to be moderate due to the combination of natural and residential features. The estimated level of viewer concern for motorists towards preserving the existing KOP 2 viewshed is considered to be moderate as viewers driving along Division Street expect a visual setting of a mix of utility lines and light poles. Given the wide-open viewshed, the natural and residential features in this view are highly visible.

The estimated number of motorists (4,100 average annual daily traffic [COP 2010]) using Division Street is considered to be moderate. Staff visited the project site and estimated the duration of view for motorists and cyclists traveling north or south in the KOP 1 viewshed to an exposure of the transmission line is on the order of 5 to 10 seconds, which is considered to be low (brief period of time). Overall, view exposure for motorists from this KOP is considered moderately high. The overall visual sensitivity for a motorist would be considered moderate from the KOP location. This assessment is the result of moderate visual quality, moderate viewer concern, and moderately high overall viewer exposure.

Another set of viewers would be the occupants of the residences on the right side of **Figure 2A**. Based on a site visit to Division Street, staff believes there are dozens of residences that face the street and occupants currently have a view of telephone and light poles, trees and shrubs, flat desert landscape in the foreground, SR-14 in the midground, and San Gabriel Mountains and sky in the background. The residential viewshed does not include a scenic resource or vista, and this section of Division Street,

as noted earlier, is not a state or local scenic highway. The visual quality is moderate to moderately high given the predominately natural features of the viewshed. The number of residences (21-50) is moderate but the duration of view is considered to be high (an extended view) because residents experience this view every day. Overall, view exposure for residents in this location is considered moderately high. The overall visual sensitivity for a resident would be considered moderately high from this location. This assessment is the result of moderate to moderately high visual quality, moderately high viewer concern, and moderately high overall viewer exposure.

Visual Change

The KOP 2 simulation (**Figure 2B**) displays one difference between the existing photo and the simulation; the new transmission line and towers. The new transmission lines would be located on the opposite side of Division Street than the existing transmission poles, lines and light poles in the left fore-ground, mid-ground, and background view. The new transmission structures would be consistent with the current lines and forms of the existing towers and lines, though they would be larger and more noticeable since they would be located on flat desert land. The new structures would be co-dominant with existing features in this viewshed. The simulation shows the proposed steel poles would be a non-reflective grayish color and would have a moderate color contrast with the sky compared to the existing dark brown wooden poles. The degree of view disruption or blockage introduced by the new transmission lines and poles is moderately low. The applicant has noted that the color and non-reflected surface of the transmission line structures would reduce their visual contrast with the background view (CPO 2008a, pg. 5.15-13).

The overall visual change to the view from KOP 2 for motorists would be moderate due to the moderate contrast, codominance, and low blockage. Given the moderate visual sensitivity of the viewer and the moderate degree of visual change, the project's impact would be less than significant with mitigation such as painting and texturing/finishing (see staff's proposed Condition of Certification **VIS-2**). This would reduce the likelihood that the transmission towers and lines would be a source of glare and would not adversely affect daytime views from KOP-1.

For residential viewers at this location, the new transmission towers and lines would be located across Division Street in the foreground. The new transmission structures would be consistent with the current lines and forms of the existing towers and lines, though they would be larger and more noticeable since they would be located on flat desert land and would have a moderate to moderately high contrast with the background hills and sky. The new structures would be co-dominant with existing features in this viewshed. The simulation shows the proposed steel poles would be a non-reflective grayish color and would have a moderate color contrast with the sky compared to the existing dark brown wooden poles. The degree of view disruption or blockage introduced by the new transmission lines and poles is moderate. The applicant has noted that the color and non-reflected surface of the transmission line structures would reduce their visual contrast with the background view (CPO 2008a, pg. 5.15-13).

The overall visual change to the view from KOP 2 for residents would be moderate due to the moderate to moderately high contrast, codominance, and moderate blockage.

Given the moderately high visual sensitivity of the viewer and the moderate to moderately degree of visual change, the transmission towers and lines visual impact would be significant even after mitigation such as painting and texturing/finishing However, staff's proposed Condition of Certification **VIS-2** from the FSA would reduce the likelihood that the transmission towers and lines would be a source of glare that could adversely affect daytime views from this residential area.

Comparison to Proposed Transmission Line Route

The applicant's proposed 35.6 mile transmission line route is divided into two (2) segments and ends approximately 11 miles south of the plant site at SCE's Vincent Substation in an unincorporated portion of Los Angeles County. Transmission pole heights will range from 100 to 135 feet (Ibid, pg. 2-33). Segment 1 consists of approximately 24 miles of a new 230 kV transmission line and poles that would go north, east, and south of the project and would be constructed within new and existing designated right-of-way. The line would connect with SCE's Pearblossom Substation. Segment 2 is a system reliability upgrade that would extend west from the Pearblossom Substation to Vincent Substation, a distance of approximately 12 miles. Segment 2 lies entirely within the county of Los Angeles jurisdiction. Property along this segment is largely undeveloped and is bisected by Pearblossom Highway. In general, there are relatively few residences along the applicant's proposed transmission line route.

The applicant's proposed transmission line would be seen by motorists using East Avenue M, 30th Street, East Avenue L, 100th Street and other rural roads. East Avenue M is the only street along the route that has significant (high) traffic volumes (13,832 average daily traffic), and there no traffic counts available for 100th Street and other rural roads (COP 2010). The transmission line would cross Pearblossom Highway which the city of Palmdale has designated as a scenic highway. However, the crossing would occur in an existing transmission corridor with several towers and lines that are visible to motorists using this section of Pearblossom Highway. With staff's proposed mitigation, the visual impacts of the applicant's proposed transmission line would be less than significant.

Alternative Route 4 - Partial Underground Transmission Line

As noted earlier, Alternative Route 4 involves 6.75 miles of underground transmission line and about six miles above ground transmission line. The construction of the underground portion of the line would take place in existing rights-of-way and would be visible to motorists using East Avenue M and Sierra Highway. Average daily traffic counts for East Avenue M from 10th Street to Sierra Highway are 32,407. Daily traffic counts for Sierra Highway range from 34,401 about 0.5 miles north of East Avenue P to 6,619 about 0.5 miles south of East Avenue S. Construction materials, equipment, trucks, and vehicles would be visible from nearby areas along this route, but only for a short duration. Because of the constant movement of crews from one section of the underground line to another, the viewer exposure, and viewer sensitivity is low. Staff concludes that because the visual changes associated with the construction period of the underground transmission lines would be minor and temporary, impacts would be less than significant. Once the line is underground, there would be no visual impacts.

During the construction and installation of the overhead transmission line and associated structures, construction materials, equipment, trucks, and vehicles will be visible from motorists on Sierra Highway south of East Avenue S, but only for a short duration. From the use of drilling augers for the transmission poles, setting the poles and pouring of concrete, and stringing of the transmission conductor, the anticipated timeframe at each juncture is approximately one week. Because of the constant movement of crews from one pole to another, the viewer exposure, and viewer sensitivity is low. Construction impacts would be minor and temporary. With mitigation, staff believes that visual impacts for motorists from constructing and operating the aboveground portion of Alternative Route 4 would be less than significant.

Construction of the above ground segment of the transmission would also be visible to occupants of a few residences scattered along Sierra Highway prior to the intersection with Pearblossom. In addition, there is a cluster of about a dozen residences about a mile south of East Avenue S that would have a good view of the transmission line construction and operation. This location was not selected to be a KOP but staff does have a Google Character photo of this area but not a simulation of a new aboveground transmission line.

Visual Sensitivity

Visual Resources Figure 3 is a Google character Photo staff used to show what the viewshed is like from the middle of Sierra Highway in front of the cluster of residences identified above. It should be noted that the residents view would be further back (30-50 feet) or east of the photo where the houses are actually located. The major elements in this view are Sierra Highway running through the bottom of the view and telephone pole and lines in the foreground, flat desert landscape in the midground, and desert hills and sky in the background. This viewshed does not include a scenic resource or vista, and this section of Sierra Highway is not a state or local scenic highway. The visual quality of the viewshed is considered to be moderate due to the combination of natural and residential features. The estimated level of viewer concern for residents towards preserving the existing viewshed is considered to be moderately high. Given the wide-open viewshed, the natural and residential features in this view are highly visible.

The number of residences (12) is low to moderate but the duration of view is considered to be high (an extended view) because residents experience this view every day. Overall, view exposure for residents in this location is considered moderately high. The overall visual sensitivity for a resident would be considered moderately high from this location. This assessment is the result of moderate to moderately high visual quality, moderately high viewer concern, and moderately high overall viewer exposure.

Visual Change

Staff believes the view of the existing poles and lines combined with new transmission line from this cluster of residences would be similar to the simulation for KOP 2 in **Visual Resources Figure 2B**. The new transmission lines would be located on the same side of Sierra Highway (west) as the existing transmission poles, lines in the center of the foreground view. The new transmission structures would be consistent with the current lines and forms of the existing towers and lines, though they would be

larger and more noticeable. It is possible that only one or two towers would be visible in this view looking west though residents would see other towers when they are outside and looking north or south, or when arriving and departing from this residential area. The new structures would be co-dominant with existing features in this viewshed. The **Figure 2B** simulation shows the proposed steel poles would be a non-reflective grayish color and would have a moderate color contrast with the sky compared to the existing dark brown wooden poles. The degree of view disruption or blockage introduced by the new transmission lines and poles is moderate. The applicant has noted that the color and non-reflected surface of the transmission line structures would reduce their visual contrast with the background view (CPO 2008a, pg. 5.15-13).

The overall visual change to the view from the cluster of residents would be moderate due to the moderate contrast, codominance, and moderate blockage. Given the moderately high visual sensitivity of the viewer and the moderate visual change, the transmission towers and lines visual impact would be less than significant with mitigation such as painting and texturing/finishing. In addition, staff's proposed Condition of Certification **VIS-2** from the FSA would reduce the likelihood that the transmission towers and lines would be a source of glare and would not adversely affect daytime views from this residential area.

Staff concludes that with staff's proposed mitigation, visual impacts for the construction and operation of Alternative Route 4 would be less than significant and would be similar to the applicant's proposed transmission line route.

Alternative Route 5 - Overhead Division Street Transmission Line

As noted earlier, aboveground Alternative Route 5 would be 14 miles and would parallel East Avenue M, Division Street, and Sierra Highway. Construction would take place in existing in an existing ROW. Materials and equipment would be visible to motorists and residents as construction crews moved from pole. These and related impacts noted in the discussion about the above ground portion of Alternative Route 4 would apply to this alternative. Staff has identified a significant visual impact for residences on Division Street north of East Avenue R that persists even after mitigation. Impacts on motorists and a cluster of residences of Sierra Highway south of East Avenue would be similar to the impacts identified in the discussion about the aboveground section of Alternative Route 4. In comparison with the applicant's proposed transmission line route, Alternative Route 5 would have a significant visual impact.

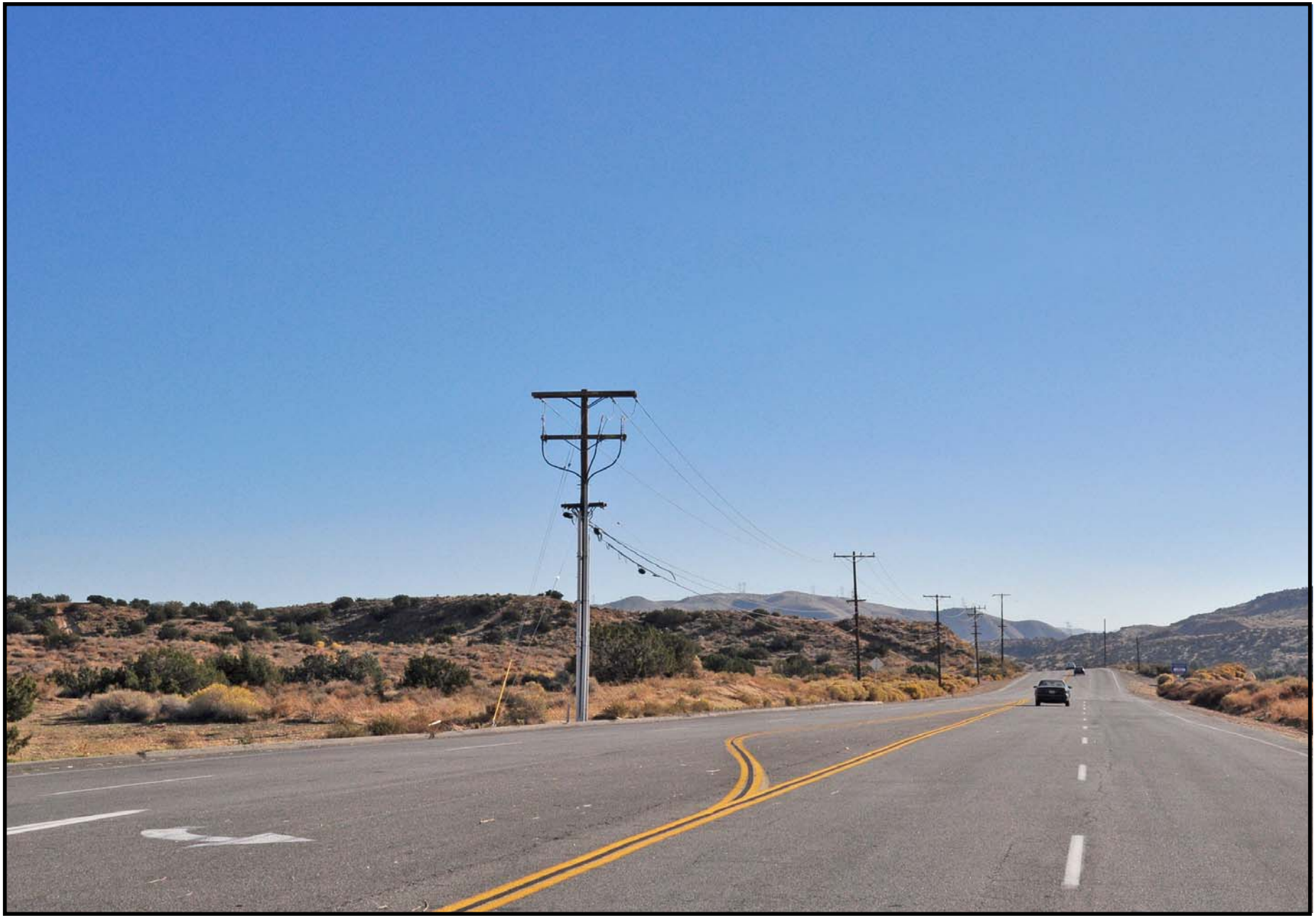
In the **Socioeconomics** section of this Appendix, staff presents census information that shows that there are minority populations within a three-mile buffer of the project. Given that significant visual impacts occur along a section of Alternative Route 5, staff concludes that there will be a significant impact from construction or operation of this alternative transmission line on minority populations.

Proposed Conditions of Certification

Staff has proposed Condition of Certification **VIS-2** in the FSA which requires submittal of a surface treatment plan for the power plant structures and electric transmission line poles. **VIS-2** would apply to the aboveground portion of either alternative transmission line route. In addition, Condition of Certification **VIS 2** which would require the project

VISUAL RESOURCES - ALTERNATIVE 4 - FIGURE 1A

Palmdale Hybrid Power Project - Alternative Tranmsission Line Analysis - Looking South on Sierra Highway, Just South of East Avenue S - Existing View



VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Photo by Energy Commission Staff, Dec. 2010

VISUAL RESOURCES - ALTERNATIVE 4 - FIGURE 1B

Palmdale Hybrid Power Project - Alternative Tranmsission Line Analysis - Looking South on Sierra Highway, Just South of East Avenue S - Simulated Condition

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Simulation by Energy Commission Staff, Dec. 2010

VISUAL RESOURCES - ALTERNATIVE 5 - FIGURE 2A

Palmdale Hybrid Power Project - Alternative Tranmsission Line Analysis - Looking North Up Division Street, North of East Avenue R - Existing View

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Photo by Energy Commission Staff, Dec. 2010

VISUAL RESOURCES - ALTERNATIVE 5- FIGURE 2B

Palmdale Hybrid Power Project - Alternative Tranmsission Line Analysis - Looking North Up Division Street, North of East Avenue R - Simulated Condition

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Simulation by Energy Commission Staff, Dec. 2010

VISUAL RESOURCES - FIGURE 3

Palmdale Hybrid Power Project - Alternative Tranmsission Line Analysis - Google Photo Taken From Sierra Highway Centerline In Front of Residential Area

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Adapted by Energy Commission Staff 12/16/10

3.13 WASTE MANAGEMENT

Setting and Existing Conditions

Both Alternative Route 4 and Alternative Route 5 could generate non-hazardous and hazardous wastes. In addition, tower footings for overhead lines and the trench excavation for the underground line would require soil and vegetation removal. Waste streams generally include solid waste, including excavated soil that could not be backfilled, vegetation and sanitation waste. All waste streams are regulated and discharges or disposal of any waste material either requires specific permitting, or disposal at a permitted facility based on the type of waste. Both solid and liquid waste streams can be either hazardous or non hazardous, depending on the constituents in the waste stream and the characteristics (e.g., ignitability, reactivity, toxicity, and corrosivity) of the waste. The status of the waste stream determines both the storage options for the material, and the disposal method for the material.

As identified in Table 5.16-4 of the PHPP AFC (COP 2008a), there are ten Class III waste disposal facilities in Los Angeles County that could potentially take non-hazardous waste generated by the project. The combined remaining capacity for the Class III landfill facilities is approximately 118.8 million cubic yards. The two Class I disposal facilities that could accept hazardous waste are the Clean Harbors Buttonwillow Landfill in Kern County and the Chemical Waste Management Kettleman Hills Landfill in Kings County.

The 6.75 mile-underground portion of the Alternative Route 4 would follow the route for proposed natural gas supply pipeline – for which the applicant completed a Phase I ESA in February 2009 (AECOM 2009i) — until it reaches E. Ave S. No recognized environmental conditions (RECs), historical RECs or de minimis conditions were identified in relation to the pipeline alignment. For the remaining overhead portion along Sierra Highway and the Angeles Forest Highway, the route is the same as the Alternative Route 5.

Alternative Route 5 would generally cross disturbed but undeveloped parcels, and would be adjacent to residential and industrial areas. It mostly follows public roadways – including Division Street, E. Ave. R., and Sierra Highway – to reach Vincent Substation. A Phase I ESA has not been performed for this route.

Assessment of Impacts and Discussion of Mitigation

Alternative Route 4 and Alternative Route 5

There is the potential for hazardous materials, in the form of contaminated soil, along the routes for the Alternative Route 4 and Alternative Route 5. These routes mostly follow existing public streets and highways, where there is a reduced likelihood for significant contamination. Also, the applicant has already completed a Phase I ESA has for the underground portion of the Alternative Route 4. For those portions of the selected overhead transmission route that have not been previously surveyed, **WASTE-1** (as detailed in the Waste Management section of the FSA) would require a Phase I ESA at locations where excavation or significant ground disturbance would

occur. If contamination is identified that could potentially affect the health and safety of workers or the public during transmission line construction, **WASTE-1** would also require a subsequent Phase II ESA, Health Risk Assessment, and Remedial Action Plan. .

Installation of tower foundations for Alternative Route 5 and the overhead portion of Alternative Route 4 would result in some soil and vegetation removal. The foundations in the last 1.8 miles of the route would require more grading than those in the flatter desert portion. The applicant has indicated that the total area of disturbance at each location for all above ground transmission line installation activities would average 200 feet by 200 feet but did not provide data on amount of soil that would be excavated (COP 2008a). The underground portion of the Alternative Route 4 would require soil removal for a 6.75-mile trench approximately seven to ten feet wide and six feet deep. Approximately 500,000 cubic feet of soil would be excavated. Some soil could be backfilled, but the remainder would require disposal in Class III landfill (or Class I if contaminated). There may also be concrete and asphalt waste from underground vault construction. However, with 118.8 million cubic yards remaining capacity in Los Angeles County, either alternative transmission route would have a less than significant impact on landfill capacity.

Construction of both Alternative Route 4 and Alternative Route 5 would result in the generation of hazardous and non-hazardous wastes. Hazardous materials could include small amounts of fuels, lubricants, and cleaning solvents. **WASTE MANAGEMENT-3** through **-10** and **-13** would ensure proper handling, notification, use and disposal in accordance with applicable regulations.

In the **Socioeconomics** section of this Appendix, staff presents census information that shows that there are minority populations within a three-mile buffer of the project. Since staff has added conditions of certification that would reduce the risk associated with hazardous waste to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the alternative transmission lines on minority populations. Therefore, there are no environmental justice issues for Waste Management.

Comparison to Proposed Transmission Line Route

Alternative Route 4

The 12.8-mile Alternative Route 4 would be shorter than the proposed route, and a Phase I ESA has already been conducted for the underground segment. However, a greater quantity of soil could require disposal due to the 500,000 cubic feet removed for underground trenching and vaults. Overall waste management impacts would be similar to that of the proposed route.

Alternative Route 5

This alternative route (14 miles) would be about 60 percent shorter than the proposed route (35.6 miles), for a corresponding reduction in waste. There would be less soil removal for tower foundations, and less construction waste. As with the proposed route, a Phase I ESA would be required for the length of the alternative route.

Although the proposed transmission line route would not have significant waste management impacts, the Alternative Route 5 would have an overall reduction in waste generation.

3.14 WORKER SAFETY

Setting and Existing Conditions

Worker safety and fire protection are regulated through federal, state, and local LORS. Workers installing both overhead and underground transmission lines both operate equipment and handle hazardous materials daily, and could face hazards resulting in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or minimize their risk through special training, protective equipment, and procedural controls. The construction and operation of either an overhead or underground transmission line would require the project owner to implement and maintain adequate worker safety and health measures to comply with applicable safety LORS including those of CalOSHA and Federal OSHA; protect against fire; and provide adequate emergency response procedures for worker injury, worker rescue, hazardous materials spills, and fires.

Fire and all emergency response services to the transmission line would be under the jurisdiction of the Los Angeles County Fire Department (LACFD). Station #129, located at 42110 6th Street in Lancaster plus an additional ten fire stations located within the City of Palmdale would all be available to respond to any event along the transmission line route. All LACFD personnel are trained at minimum to Emergency Medical Technician Level 1 (EMT-1) and as first responders for hazardous materials incidents. The Hazmat unit at Station #129 is capable of responding to any type of hazardous materials spill (LACFD 2008).

Assessment of Impacts and Discussion of Mitigation

During the construction phase of the project, the need for emergency response would most likely be limited to worker rescue from a transmission line pole or utility trench, Emergency Medical Services (EMS) due to injury, and rarely due to a hazardous materials spill. Staff has determined that fires during construction of transmission lines are a very rare occurrence. Other impacts to workers that must be addressed include exposure to extreme heat during construction activities and to Coccidioidomycosis or "Valley Fever" (VF) caused by inhaling the spores of the fungus Coccidioides immitis, which are released from the soil during soil disturbance (e.g., during construction activities). Because the fungus is usually found 4 to 12 inches below the surface of the soil, the undergrounding alternative would pose no greater or lesser risk to workers than the overhead option.

In the **Socioeconomics** section of this Appendix, staff presents census information that shows that there are minority populations within a three-mile buffer of the project. Since staff has added conditions of certification that would reduce the risk associated with worker safety to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the alternative transmission lines on minority populations. Therefore, there are no environmental justice issues for Worker Safety.

Alternative Route 4 - Partial Underground Transmission Line

The placement of transmission lines underground requires specific engineering construction measures to ensure the safe and reliable operation of the line and thus the construction of an underground transmission line could result in the need for occasional responses of unknown frequency from the LACFD for emergency services. The chances for needing emergency response would be proportional to the number of workers involved and the time it takes to complete the transmission line. The impacts to the LACFD would not be significant.

Although an underground transmission line route would result in a higher chance of excavation cave-ins and need for rescue along the route simply as a function of time and distance, the risks to workers from excavation and trenching can be mitigated by staff's proposed Conditions of Certification. Also, the risk from falls from transmission line towers would be non-existence. Staff thus believes that the risks to workers from undergrounding the transmission line would be less than significant.

During operations, a minimal need will exist for emergency response for maintenance and repair of underground transmission lines. Since vaults and entry ways to subsurface areas will be constructed, confined space precautions would be of the utmost importance.

Alternative Route 5 - Overhead Division Street Transmission Line

The construction of overhead transmission lines could result in the need for occasional and unknown responses from the LACFD for emergency serves and the chances for emergency response would be proportional to the number of workers involved and the length of the transmission line. The impacts to the LACFD would not be significant.

Although a shorter transmission line route would result in a smaller chance of spills and leaks of hazardous materials along the route simply as a function of time and distance, the risks to workers from any route would be less than significant.

During operations, a minimal need will exist for emergency response for maintenance and repair of overhead transmission lines.

Comparison to Proposed Transmission Line Route

As stated above, the construction of a 35.6 mile 230 kV overhead transmission line will result in proportional greater chance that emergency response would be needed along the route. Since the chance of an accident or fire or hazardous materials spill is directly proportional to the length of the transmission line and the time it takes to complete construction, the applicant's proposed route would pose a greater chance that emergency response would be needed than the overhead or underground alternatives. However, staff believes that all risks during construction of all three proposed routes would be less than significant and no additional Conditions of Certification other than those already proposed by staff are necessary.

Staff concludes that the existing proposed Conditions of Certification, including those requiring protective measures for heat stress and Valley Fever, would be adequate to address any additional impacts of overhead transmission line and underground transmission line construction and maintenance and therefore no new Conditions are recommended.

3.15 FACILTY DESIGN

Setting and Existing Conditions

Two electric transmission line routes have been proposed (as described in Section 2.0 above, **Alternative Transmission Line Routes** of this document) as shorter alternatives to the approximately 36-mile-long transmission line proposed in the AFC. Both alternatives would run through the eastern edge of the city of Palmdale, in Los Angeles County.

Assessment of Impacts and Discussion of Mitigation

There will be no impacts to facility design from either use of Alternative Route 4 or use of Alternative Route 5. Mitigation measures related to all transmission facilities (lines, switchyards, switching stations, and substations) are addressed by the conditions of certification in the **Transmission System Engineering** section of this document.

Comparison to Proposed Transmission Line Route

No comparison is warranted because transmission line routes do not impact facility design.

3.16 GEOLOGY AND PALEONTOLOGY

Setting and Existing Conditions

The project would require a new 230 kV transmission line connecting the proposed PHPP site and the Vincent 500/230 kV Substation south of the proposed site (AECOM2009aa). The proposed route and two alternative routes are shown on attached **Geology and Paleontology Figure 1.**

The proposed PHPP site and both alternative transmission line alignments are located near the western boundary of the Mojave Desert geomorphic province where it terminates against the San Andreas fault. Mountain ranges within this 25,000-square-mile province are primarily Paleozoic and Mesozoic-age igneous and metamorphic basement rocks, and valley fill is Quaternary-age alluvium. The western edge of the Antelope Valley is sharply delineated by the northwest-southeast trending San Andreas fault system, beyond which rise mountains of the Transverse Ranges geomorphic province including the San Gabriel Range and Sierra Pelona. The San Gabriel Range is composed largely of Mesozoic to Precambrian granitic rocks, and Sierra Pelona is composed of the Pelona schist, a pre-Cretaceous metamorphic unit. Foothills on both sides of the fault include areas of Oligocene, Miocene, Pliocene, and Pleistocene non-marine sediments. All of the transmission line alignments under consideration begin with the Mojave Desert geomorphic province, cross the San Andreas fault zone, and

terminate in the Sierra Pelona Mountains (Transverse Range geomorphic province) at the existing Vincent Substation.

The Mojave segment of the San Andreas fault zone is classified by the California Division of Mines and Geology (CDMG 2003) as a Type A fault, or a fault with displacement of greater than 5 mm/year. The San Andreas fault system is a major transform fault along the Pacific plate/North American Plate boundary and has multiple traces in a broad zone approximately 1 to 2 miles wide, at southern ends of the transmission line alternatives. A wide variety of studies on the Mojave segment indicate average fault slip rates in Holocene time of between ¼ and 1-½ inches per year (7 and 38 mm per year, Bryant and Lundberg 2002). Earthquakes resulting in surface faulting are estimated to have occurred in the range of every 125 to 150 years over the last 1500 years. Assuming that the maximum slip rate occurs during an earthquake at the estimated 150-year return period, right-lateral slip in the range of 19 feet (5.7 m) is likely to develop on the San Andreas or parallel faults during a major earthquake on the Mojave segment. The Cemetery fault zone, a short parallel splay of the San Andreas fault system, lies just north of the main rift zone with its western terminus at or near 10th Street East.

Laws, Ordinances, Regulations, and Standards (LORS)

Laws, ordinances, regulations, and standards (LORS), pertaining to transmission lines, were addressed in the **Geology and Paleontology** section of the FSA. The discussion presented therein remains appropriate for the Alternative Route 4 and Alternative Route 5.

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 alternate transmission lines and create life/safety concerns. The second is the potential impacts the alternative transmission lines could have on existing geologic, mineralogic, and paleontologic resources in the area.

Methods and Thresholds for Determining Significance

Staff's independent research included the review of available geologic maps, reports, and related data of the PHPP plant site. Geological information was available from the California Geological Survey (CGS), CDMG, the United States Geological Survey (USGS), and other government organizations. Since 2002, the CDMG has been known as the CGS. Geologic hazards include faulting and seismicity, liquefaction, hydrocompaction, subsidence, expansive soils, landslides, and others as may be dictated by site-specific conditions. The city of Palmdale has specific requirements with regard to addressing geologic hazards for utilities.

With regard to protecting resources from impacts by the project, 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 paleontological resource or site, or a unique geological 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.

Staff has reviewed geologic and mineral resource maps for the surrounding area, as well as site-specific information provided by the applicant, to determine if geologic and mineralogic resources exist in the area. Staff reviewed existing paleontologic information and requested records searches from the San Diego Natural History Museum and the Natural History Museum of Los Angeles for the surrounding area. The University of California (at Berkeley) Museum of Paleontology's website, which gives generalized information for locality records of their collection, was reviewed as well (University of California, Museum of Paleontology [UCMP] 2010). Site-specific information generated by the applicant for the PHPP was also reviewed (SWCA 2008). 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, and proposed as part of the projects approval.

In the **Socioeconomics** section of this Appendix, staff presents census information that shows that there are minority populations within a three-mile buffer of the project. Since staff has added conditions of certification that would reduce the risk associated with geologic hazards to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the alternative transmission lines on minority populations. Therefore, there are no environmental justice issues for Geology and Paleontology.

Geological Hazards: Alternative Route 4 and Alternative Route 5

The two alternative transmission line alignments, Alternative Route 4 and Alternative Route 5, are parallel, never more than about one mile apart, and share a common overhead alignment south of East Avenue S and across the San Andreas fault zone. As a consequence, the following discussion of geologic hazards applies to both alternative alignments.

Some potential for liquefaction, fault rupture, and landslides has been identified along both alternative alignments, as well as along the proposed transmission line. These potential hazards can be effectively mitigated through facility design by incorporating recommendations contained in a project-specific geotechnical report. As required in Condition of Certification **GEO-1**, the preliminary geotechnical report for the site should be updated as a project-specific geotechnical report. The requirements of the proposed **Facility Design** Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section of the FSA should also aid in mitigating these impacts to a less than significant level. Detailed assessment of geologic hazards along project linear facilities is required in Conditions of Certification **GEO-2** through **GEO-5**.

Faulting and Seismicity

The transmission line alternatives both cross the San Andreas fault zone south of East Avenue S (CDMG 1974; CDMG 1979). There are no California State regulations or

national standards that prohibit utilities, including transmission lines, from crossing faults (Robert Anderson Personal Communication 2010). The City of Palmdale General Plan requires restricting location of utility lines, whether above or below ground, within an appropriate distance from active fault traces, as determined by geotechnical investigation and approved by the City (Policy S1.1.7). Additional geologic investigation of potential fault rupture hazards crossing the Cemetery fault zone is proposed (proposed Condition of Certification **GEO-2A**). The Cemetery fault appears to terminate before Alternative Route 5 but may intersect the southern end of the underground transmission line segment proposed for Alternative Route 4. While there are no state regulations or national guidelines that recommend that underground transmission lines be set back from active faults, prudent engineering would be to avoid underground fault crossings where practical.

South of East Avenue S, Alternative Route 4 is above ground so both Alternative Route 4 and Alternative Route 5 cross the fault zone overhead and follow the same alignment to the Vincent Substation. Since the electrical facility may be a critical facility for post-earthquake recovery, the transmission line towers should not be sited directly on the active fault traces (Condition of Certification **GEO-3**). Provided that towers are not damaged, typical slack in transmission lines may be enough to accommodate the likely maximum 20± feet of fault offset during a major earthquake on the Mojave segment of the San Andreas fault crossed by the alternative transmission routes. It may be preferable to cross the fault zone at a steep, rather than flat angle to reduce line tension from horizontal fault displacement.

Based on the geotechnical investigation of the PHPP site, the site soil class is assumed to be seismic Class D along both Alternative Route 4 and Alternative Route 5. Seismic Class D is the default condition used when detailed subsurface information is not available (CBC 2007). The design-level geotechnical investigation (**GEO-3**) may identify Class C or Class B seismic conditions across the fault in the Sierra Pelona Mountains.

Liquefaction

Liquefaction is a condition where in a cohesionless soil may lose shear strength because of sudden increase in pore water pressure caused by an earthquake. The seismic hazards zones map for the Palmdale Quadrangle where the alternative transmission lines are located indicates these lines cross areas "*…where historic occurrence of liquefaction or local geological, geotechnical, and ground water conditions indicate a potential for permanent ground displacement such that mitigation as defined in Public Resources Code Section 2693(c) would be required*" (CDMG 1999). The potential liquefaction zone is a broad area, primarily south of the San Andreas fault, but also a narrow band along the Alternative Route 4/Alternative Route 5 alignment as it heads southeast to California State Highway 14. No geotechnical investigation has been performed for the transmission line alternative in this area. Some areas of liquefaction potential may be eliminated by showing that local ground water is deeper than the typical 40-foot-maximum depth of liquefiable materials; other liquefaction hazards may potentially be avoided by spanning select areas with the transmission towers. Some areas may require detailed investigation, or may require actual mitigation. Studies (Conditions of Certification **GEO-4**) need to be completed to assess what mitigation might be necessary.

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, such as a nearby steep hillside or deeply eroded stream bank, but can also occur on gentle slopes. 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. Lateral spread potential and its impact on the two alternative transmission alignments needs to be determined with the liquefaction assessment (**GEO-4**).

Hydrocompaction

Hydrocompaction (also commonly known as hydrocollapse) 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. Shallow foundations built on these types of compressible materials can settle excessively, particularly when landscaping irrigation or concentrated infiltration dissolves the weak cementation that is preventing the immediate collapse of the soil structure. Deeper foundations, such as used for transmission towers, are much less susceptible to hydrocompaction. Any necessary mitigation measures for the effects of hydrocompaction soils should be addressed as required in the project-specific geotechnical report, per CBC (2007) requirements and proposed Condition of Certification **GEO-1** and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**.

Dynamic Compaction

Dynamic compaction can occur when relatively unconsolidated granular soils 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. Deeper foundations, such as used for transmission towers, are much less susceptible to dynamic compaction. The possible occurrence of dynamic compaction should be addressed in the final project geotechnical report, per Condition of Certification **GEO-4**. Given the seismic history of the area, it seems likely that any potential dynamic compaction has already occurred.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist at a moisture content below their plastic limit. The addition of moisture from irrigation, precipitation, capillary tension, water line breaks, etc. causes the clay soils to absorb water molecules into their structure, which in turn causes an increase in the overall volume of the soil. Expansive soils will not have a significant impact on transmission towers since they are not sensitive to minor shrink-swell movement in the upper few feet of the soils profile.

Landslides

Transmission tower sites must be investigated to assure they are not located in a potential landslide area (Conditions of Certification **GEO-5**).

Flooding

The Federal Emergency Management Agency (FEMA) has identified both the Alternative Route 4 and Alternative Route 5 alignments as lying in Unshaded Zone X, which are “areas determined to be outside the 0.2 percent annual chance flood plain” (FEMA 2008). Lake Palmdale, a dammed reservoir along the San Andreas fault, is located along the west side of the common Alternative Route 4 and Alternative Route 5 alignment, directly south of the San Andreas fault zone. If the dam were to fail, as the result of major fault movement, some transmission towers might see flood water. Because of their embedment depth, electric transmission line linears are not considered significantly susceptible to flooding. The project civil engineer can provide erosion protection from catastrophic floodings, if appropriate.

Geologic, Mineralogic, and Paleontologic Resources: Alternative Route 4 and Alternative Route 5

The two alternative transmission line routes (Alternative Route 4 and Alternative Route 5) are parallel, only one mile apart or less, and share a common alignment south of East Avenue S. The following discussion applies equally to both alternative routes.

Energy Commission staff has reviewed applicable geologic maps and reports for this area (CDC 1992; CDC 2001; CDMG 1969; CDMG 1990; CDMG 1994; CDMG 1998; CDMG 1999; Dibblee, 2008). Numerous historic sand and gravel production pits are present along the length of the Little Rock Wash. However, no viable geologic or mineralogic resources are known to exist along Alternatives Routes 4 and 5. Historically, minor quantities of gold copper, and other minerals were obtained from the Transverse Ranges to the west (CDMG 1998).

Energy Commission staff has reviewed the Paleontological Resources assessment in Section 5.9 and Paleontological Records Search and Literature Review (Confidential) in Appendix J of the AFC (SWCA 2008). Staff has also reviewed the paleontological literature and records searches conducted by the Natural History Museum of Los Angeles County (NHMLC) (McCleod 2010) as well as the online records database maintained by the UCMP (2010). The SWCA Environmental Consultants (SWCA) survey identified a single, previously undocumented vertebrate fossil locality just north of the Vincent Substation. The SWCA report (SWCA 2008) makes appropriate recommendations for their collection and preservation. The proposed route, as well as Alternative Route 4 and Alternate Route 5, appear to avoid this specific location. No other fossil collection localities have been documented within the project boundaries or along the proposed alignments or alternative transmission line.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received comments regarding geologic hazards and transmission lines from Los Angeles, California Department of Public Works, in a letter dated January 15, 2009. Those comments were addressed in the FSA and remain appropriate for Alternative Routes 4 and 5, as well. Proposed Condition of Certification **GEO-2** has been modified slightly to address the underground segment of Alternative Route 4. That modification is included herein as proposed Condition of Certification **GEO-2A**.

Proposed Conditions of Certification

The Conditions of Certification proposed in the FSA (**GEO-1** through **GEO-5**; **PAL-1** through **PAL-7)** are appropriate for Alternative Route 4 and Alternative Route 5, as well as the proposed alignment. Proposed Condition of Certification **GEO-2** has been modified below (**GEO-2A**) to include the underground segment of Alternative Route 4.

GEO-2A Additional fault investigation shall be performed for the southern end of the natural gas pipeline and transmission line Alternative Route 4 (if selected), in conjunction with city of Palmdale review and comment, in accordance with city of Palmdale General Plan S1.1.7, which requires that utility locations be limited in areas with exposure to faulting, and based on the City of Palmdale General Plan faulting hazards map (Figure LU-4). If the natural gas pipeline or underground transmission line cross the San Andreas fault or any of its splays (Cemetery fault), or if it would be in danger of rupture from intense ground shaking, design shall include appropriate safety features. This shall include a mechanism, such as automatic pressure-sensitive shut-off valves, to cut gas supply in event of pipe rupture.

Verification: A fault investigation report for the southern end of the proposed natural gas line and transmission line Alternative Route 4 (if selected) shall be submitted to the CPM at least 60 days prior to start of trenching. Recommendations for further mitigation, beyond automatic shut-off valves, shall be included, as appropriate.

Comparison to Proposed Transmission Line Route

The proposed and alternative transmission alignments (Alternative Route 4 and Alternative Route 5) have a number of factors in common, with respect to geologic hazards, geologic resources, and paleontologic resources:

- All three routes would use similar transmission tower configurations. Typically, this would be a steel pole embedded in a bored excavation 8 to 20 feet below ground surface. Angle points and end structures (transition to and from underground) would require larger, drilled shaft foundations or guy wires anchored by buried plates, helical screw anchors, or rock bolts.
- All three routes cross the Mojave segment of the San Andreas fault zone.
- All of the alignments include zones with potential for liquefaction and lateral spreading.
- None of the routes affect existing or potential areas of mineral or aggregate extraction.
- All of the routes begin and remain in sediments with potentially increasing paleontologic sensitivity with depth of ground penetration until after crossing the San Andreas fault.
- South of the San Andreas fault, all three routes enter the Sierra Pelona Mountains where paleontologically-sensitive units of older alluvium and sedimentary rock are (rarely) exposed at the ground surface.

Alternative Route 4 - Partial Underground Transmission Line

Alternative Route 4 is 12.8 miles long, 22.8 miles shorter than the currently proposed alignment. The overhead segment of Alternative Route 4 extends south from East Avenue S only 6.05 miles to the Vincent Substation. Proportionately, then Alternative Route 4 should only have about 17 percent of the drilled transmission tower foundations necessary for the proposed route. While a properly monitored excavation can be a plus for paleontology, tower foundation borings, are typically a salvage operation since any fossils present are damaged and out of context. Fortunately, fossils are rare and sporadic, even in most highly-sensitive geologic units. Therefore, the chance of encountering fossils in small-diameter borings advanced every few hundred to 1,000 feet is very low. An alignment that reduces the required number of tower foundations further reduces the chance of encountering paleontologic resources.

The remainder of Alternative Route 4, from the PHPP site to East Avenue S (6.75 miles), would be underground conduit laid in a continuous trench. This trench should be in the range of 6 feet deep and 7 to 10 feet wide, depending on the stability of the soils and trench walls. In general, trenching provides the opportunity for a net gain to the science of paleontology. With proper monitoring (per proposed Condition of Certifications **PAL-1** through **PAL-7**), fossils that would not otherwise have been discovered can be collected, preserved, and studied. For Alternative Route 4, however, the upper few feet and possibly even the entire depth of the trench may be in younger alluvial deposits with low paleontological sensitivity.

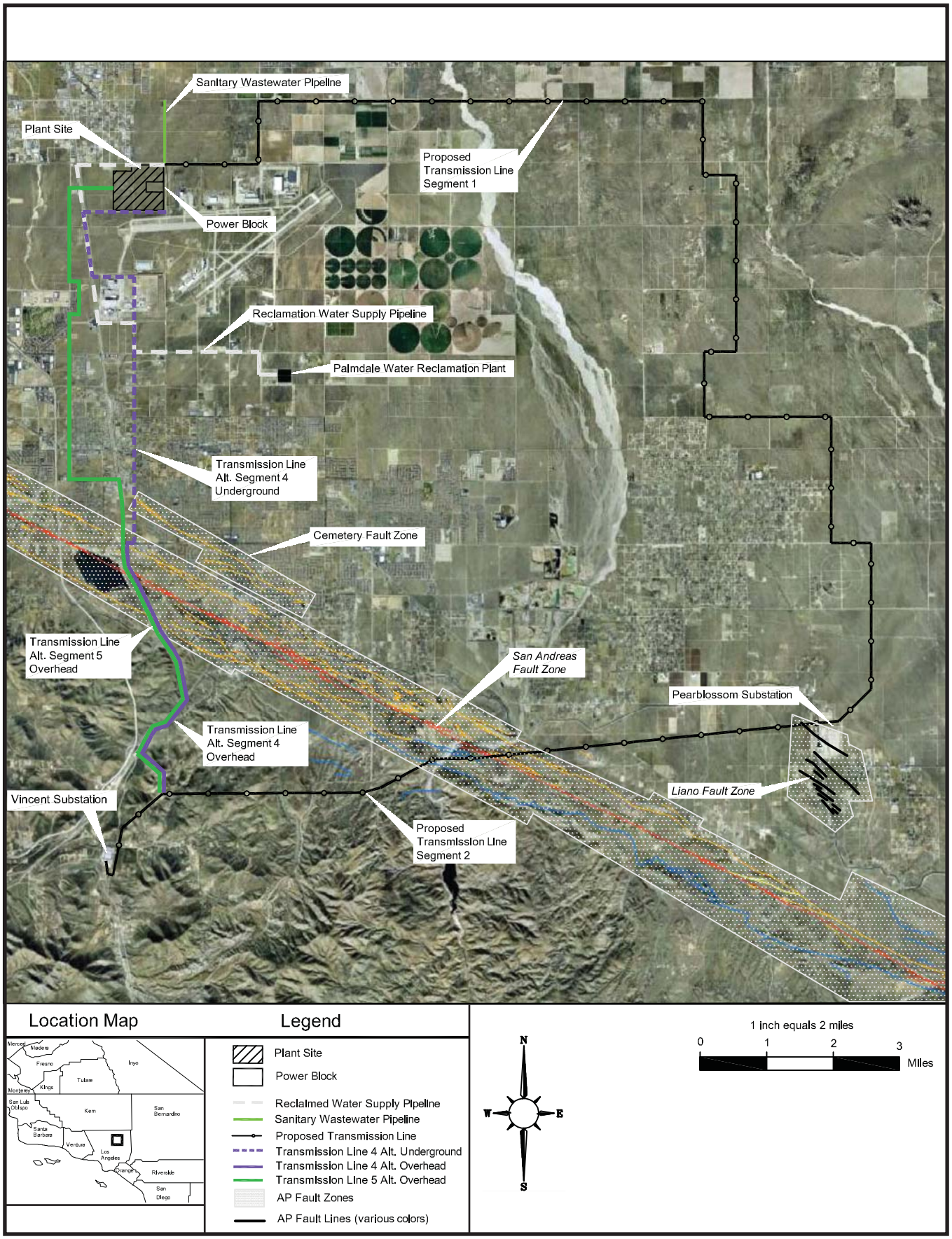
It is likely that horizontal borings would be used where the underground conduit crosses major roads or railroad tracks. In this case, the borings would be similar to vertical borings for tower foundations in that any fossils encountered would be damaged, and out of context. Horizontal borings, however, require an excavated pit on each side of the road. The pit excavations could be monitored for stratigraphy to determine if paleontologically-sensitive geologic units are even present. Often the roadways are either in fill and/or overlie material that has been severely disturbed by utility trenching. The depth necessary to advance a horizontal boring beneath existing utilities may be barely below the disturbed zone and still in younger, low sensitivity alluvium.

Alternative Route 5 - Overhead Division Street Transmission Line

Alternative Route 5 is entirely overhead, as is the proposed transmission line route. The geology/paleontology advantage of Alternative Route 5 is that it is only 14 miles in length, 21.6 miles shorter than the alignment currently proposed. A shorter alignment will require fewer deep tower foundations, access roads, and general ground disturbance. An alignment that reduces the required number of tower foundations further reduces the chance of encountering paleontologic resources.

ALTERNATIVES - APPENDEX A GEOPALEO FIGURE 1

Palmdale Hybrid Power Project - Alquist-Priolo Fault zone in the Vicinity of the Proposed Project Site and Linears



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Figure 5.2-1

3.17 POWER PLANT EFFICIENCY

Setting and Existing Conditions

Two electric transmission line routes have been proposed (as described in Section 2.0 above, **Alternative Transmission Line Routes**) as shorter alternatives to the approximately 36-mile-long transmission line proposed in the AFC. Both alternatives would run through the eastern edge of the city of Palmdale, in Los Angeles County.

Assessment of Impacts and Discussion of Mitigation

There will be no impacts to power plant efficiency.

Comparison to Proposed Transmission Line Route

No comparison is warranted because transmission line routes do not impact power plant efficiency.

3.18 POWER PLANT RELIABILITY

Setting and Existing Conditions

Two electric transmission line routes have been proposed (as described in Section 2.0 above, **Alternative Transmission Line Routes**) as shorter alternatives to the approximately 36-mile-long transmission line proposed in the AFC. Both alternatives would run through the eastern edge of the city of Palmdale, in Los Angeles County.

Assessment of Impacts and Discussion of Mitigation

There will be no impacts to power plant reliability.

Comparison to Proposed Transmission Line Route

No comparison is warranted because transmission line routes do not impact power plant reliability.

3.19 TRANSMISSION SYSTEM ENGINEERING

Setting and Existing Conditions

Applicant's Proposed Overhead 230 kV Transmission Line

The proposed PHPP 570 MW project would be located on East Avenue M just outside northwest corner of the military airport in the city of Palmdale, California. The PHPP switchyard would be interconnected to the existing SCE 500/230 kV Vincent substation which would require expansion and upgrading. The Vincent substation is located at a distance of about 12 miles directly south from the project site. The applicant's proposed 230 kV overhead Generator (Gen) Tie line would be about 35.6-miles long and would be built with bundled 1590 kcmil steel-reinforced aluminum conductors (ACSR) on 100-135 foot high single steel tubular poles with average 750 foot span length in two segments as below.

Segment 1

From the PHPP switchyard, the proposed 23.7-mile long Gen Tie line would run east along East Ave M, then proceed north and east along City roads and existing SCE ROW. In certain portions of the route, SCE 66 kV and underbuild lower voltage distribution lines exist. The line would then proceed south through city of Palmdale, private and Los Angeles County lands to north of the California Department of Water Resources (DWR) Pearblossom Pumping Station. The line is proposed to be built as a single circuit line on single steel tubular poles with provision for double circuits.

Segment 2

The remaining 11.9-mile segment of the proposed 230 kV Gen Tie line would proceed from north of the Pearblossom Pumping Station and run southwest to the Vincent Substation through the existing/extended SCE ROWs. In addition to the proposed 230 kV Gen Tie line, approximately 11.9 miles of the existing SCE Pearblossom Pumping Station-Vincent 230 kV line would be reconductored and relocated from the existing H-frame wooden poles to the Gen Tie line steel tubular poles. As a result, Segment 2 (consisting of the PHPP 230 kV Gen Tie line and the reconductored Vincent–Pearblossom Pumping Station 230 kV line) would be built as a 230 kV double circuit line on the same steel tubular pole structures.

Before connecting to the Vincent Substation, the 230 kV double circuit line would need to cross under two SCE and three LADWP 500 kV lattice tower lines (COP2008a Section 2.1, Section 2.5, Figure 2-10, Figure 2-10B, AECOM2009 TSE, Figure 2).

SCE has proposed to conduct a post-certification ROW study to determine the feasibility of replacing or relocating the existing Pearblossom Pumping Station-Vincent 230 kV line, the possible use of the SCE ROW or its extension and possible impacts on the LADWP & SCE 500 kV lines and CDWR Pumping station facilities. SCE did not incorporate the applicant's proposed Gen Tie line in the latest Facility study.

Alternative Route 4 – Partial Underground Transmission Line

Alternative Route 4 (Partial Underground Transmission Line) 230 kV transmission line route is described and depicted in Section 2.1 above. The PHPP 230 kV switchyard would be interconnected to the Vincent Substation by the proposed Alternative Route 4 230 kV Gen Tie line which would be comprised of a partial 6.75-mile long underground cable line that transitions to a 6.05-mile long overhead line. The underground cable line from the PHPP switchyard would run along Ave M 12, Sierra Highway, Lockheed Way, 10th Street East and East Avenue South and would transition to overhead line at the crossing of East Ave South and Sierra Highway. The cable line would encounter at least two railroad crossings and possibly a third, should the route cross to the west side of Sierra Highway. The overhead portion of the line would go primarily along Sierra Highway and after crossing the Pearblossom Highway would proceed southeast up to the intersection with Highway14 and then diverge overland to meet the applicant's proposed route to the Vincent substation. The overhead line would encounter two railroad crossings and cross under two LADWP and two SCE 500 kV lattice tower lines.

In order to carry 570 MW generation output from the PHPP, the underground cable line portion could be built as a single circuit line with 2000/2500 millimeter square Cross-

Linked Polyethylene (XLPE) 230 kV copper cable along with communication and grounding cables within PVC conduits encased in concrete. The cable line would require about a 20-30 foot ROW. The trench would be about 3 feet wide and 6 feet high. The cable line PVC conduits would be laid 3 feet (minimum) to 6 feet below the surface. A minimum cable depth of 40 inches is required under the railroad tracks. A typical Duct Bank Underground Cable Line construction is shown in **TSE - FIGURE 1.**

The 230 kV overhead line portion (the same as Alternative 5 overhead line) would be built by using, at a minimum, bundled 954 kcmil ACSR conductors on 75-foot to 90-foot high steel tubular poles in general. Where the line would cross under 500 kV lines, 70-foot high steel single tubular poles or preferably H-frame 70-foot high double steel poles with shorter spans could be used to avert any interference with the 500 kV lines. The overhead line would require a minimum 50-foot wide ROW and must maintain a minimum of 30 feet of ground clearance, a minimum of 34 feet of clearance above railroad tracks and a minimum of 8 feet of clearance from any 500 kV line or other supply conductors.

Alternative Route 5 – Overhead Division Street Transmission Line

The Alternative Route 5 is described and depicted in Section 2.2 of the Alternatives Appendix A. The PHPP 230 kV switchyard would be interconnected to the Vincent Substation by the proposed Alternative 5 overhead 230 kV Gen Tie line, approximately 14 miles long. The overhead line from the PHPP switchyard would run west along East Avenue M and then subsequently turn south on Division Street, turn east on East Avenue R and turn south on Sierra Highway. The overhead line then would go primarily along Sierra Highway and after crossing the Pearblossom Highway would proceed southeast to the intersection with Highway14 and then diverge overland southwest along the applicant's proposed route to the Vincent substation. The overhead line may cross over SCE 66 kV distribution lines to avoid underbuilding the low voltage lines on Division Street. The overhead line would encounter two railroad crossings and would cross under two existing LADWP lines and two existing SCE 500 kV lattice tower lines.

In order to carry 570 MW generation output from the PHPP, Alternative Route 5 could built by using conductors rated as low as bundled 954 kcmil ACSR. Near the airport and also for crossings under 500 kV lines, 70-foot high steel single tubular poles or preferably H-frame 70-foot high double steel poles with shorter spans to avert any interference with the nearby local military airport and the 500 kV lines could be used. The overhead line would require a minimum 60-foot wide ROW and must maintain a minimum 30 feet ground clearance, a minimum 34 feet clearance above railroad tracks and a minimum 8 feet clearance from any 500 kV line or other supply conductors.

Assessment of Impacts and Discussion of Mitigation

Alternative Route 4 and Alternative Route 5

During construction, applicable construction standards, safety and reliability Laws, Ordinances, Regulations and Standards (LORS) must be met. The underground transmission line would be built by following the Rules for Construction of Underground Electric Supply and Communication Systems of the CPUC General Order No. 128 (G.O. 128). The overhead transmission line construction would follow the CPUC G.O. 95

Rules. In addition, construction must meet Title 8 CCR construction Safety Code, SCE construction standards (if applicable) and National Electric Safety Code. Additionally, to maintain system reliability, the California ISO and LADWP (in case LADWP 500 kV line(s) is involved) must be advised by the applicant's authorized contractor (such as SCE or any other) per the California ISO and LADWP scheduling protocols of scheduled circuit outages prior to occurrence[8]. Such outages are scheduled about 30 days prior to occurrence and are verified prior to actual outage. In the event system reliability requires restoring such circuits, a "no work" order is given and where practicable, circuits are restored.

To mitigate potential safety and reliability impacts, the applicable LORS and California ISO/LADWP scheduling protocols would be used and the applicant's authorized contractor would assure conformance with the above safety and reliability requirements in coordination with the California ISO/LADWP.

There would no additional downstream impacts on the SCE system for interconnecting the PHPP with the Vincent substation through any of these Gen Tie lines compared to proposed transmission line and hence no additional mitigation would be required. The PHPP being a new efficient plant would meet increasing local load and SCE system demand in a cost-effective way.

Comparison to Proposed Transmission Lines

The applicant's proposed route is approximately two and a half times longer than staff's proposed Alternative routes: 35.6 miles 230 kV transmission line vs.12.8 miles or 14 miles for Alternative Route 4 and Alternative Route 5, respectively. All routes, including the applicant's proposed route, would require a ROW study.

For the applicant's proposed route, the existing Vincent-Pearblossom Pumping station 230 kV radial line is the only transmission line serving the CDWR pumping station. During construction it would be necessary to de-energize the line and there would be power interruption for unspecified time that would affect the operation of the Pumping station. Construction could be delayed. Necessary permits and coordination with CDWR would be required for any power interruption. If Alternative Routes 4 and 5 are co-located with the Vincent-Pearblossom line, it would be only for approximately one mile and impacts to the CDWR pumping station would be less.

Near the airport and for the crossings under 500 kV lines, the overhead lines for all routes (applicant's proposed route, Alternative Route 4 and Alternative Route 5) would be built on shorter spans to avert any interference or issue with the nearby local military airport and 500 kV lines.

[8] For the applicant's proposed Gen Tie line, coordination with CDWR for power interruption would also be necessary.

[Placeholder for TSE - FIGURE 1
Palmdale Hybrid Power Project - Typical Duct Bank Construction Underground Cable Transmission Line]

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ATTACHMENT 1

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December 13, 2010

Re: Conduct a feasibility review of the alternative transmission line routes between the Palmdale Hybrid Power Plant and Vincent Substation shown in Alternatives Appendix A – Figure 2.

This letter report presents the results of ZECO's feasibility review of the alternative transmission line routes 4 and 5 between the Palmdale Hybrid Power Plant and Vincent Substation shown in attached Alternatives Appendix A – Figure 2 of the Final Staff Assessment (FSA) authorized by Aspen Environmental Group in Task 9 of Work Authorization 1920.033 (Alternatives Assessment of the Palmdale Hybrid Power Project), CEC Contract No. 700-08-001, dated 11-15-10.

Approach

The project approach consisted of first collecting and reviewing appropriate materials supplied by Aspen. In particular, appropriate sections in the Palmdale Hybrid Power Project Application for Certification, the associated Preliminary Staff Assessment, and PHPP Alternatives Appendix A were reviewed to familiarize myself with the alternative transmission routes and appropriate transmission characteristics. A street map of the Palmdale area was obtained, and Google Earth was used to familiarize myself with the area between PHPP and Vincent Substation.

I then made a trip to Palmdale on November 30 and December 1 to visually inspect the two alternative transmission routes 4 and 5. On November 30 I met Felicia Miller and Christopher Meyer in Palmdale, obtained maps of the routes from them, and drove the two routes with them to gain an initial impression of the route locations and potential issues. On December 1 I went back and inspected the two routes in more detail.

Results of Visual Inspection of Alternative Routes 4 and 5

The two alternative line routes 4 and 5 for the single circuit 230 kV transmission line from PHPP to Vincent Substation considered in this report are described in detail in Sections 2.1 and 2.2 respectively in the FSA Alternatives Appendix A (Draft 12/7/10), and the two routes are shown in Figure 2. This feasibility review will consider the two routes in the following three line segments:

1. The underground segment of Route 4 from the Palmdale Hybrid Power Plant (PHPP) to the intersection of East Avenue S and the Sierra Highway.
2. The overhead segment of Route 5 from the PHPP to the intersection of East Avenue S and the Sierra Highway.
3. The overhead segment for both Routes 4 and 5 from the intersection of East Avenue S and the Sierra Highway to Vincent Substation.

Underground Segment of Route 4 - PHPP to Intersection of E Ave S and Sierra Highway

I visually inspected the northern portion of this underground segment proceeding west from PHPP to Sierra Highway, then southeasterly along Sierra Highway to Lockheed Way south of the Lockheed facility, then east to 10th Street East. It looked like there was plenty of room east of the railroad tracks on the east side of Sierra Highway to route the underground 230 kV transmission line, as well as the underground gas line and water line being built to serve the PHPP. It looked like this might be the simplest way to route these underground lines without having to cross under the railroad tracks twice and build under the Sierra Highway. Note I observed that there is an underground fiber optic communication line located on the east side of the railroad tracks. This and any other existing underground utilities along the route may have to be relocated as necessary to accommodate the new underground lines.

I visually inspected southern portion of this underground segment from Lockheed Way proceeding south along 10th Street East to East Avenue S, and then proceeding one block west on East Avenue S to Sierra Highway. I saw signs for underground gas distribution facilities, manhole covers, and fire hydrants along the street right-of-way. The electric power lines and communication lines were strung overhead, with some underground dips, which appear to run under the street to serve customers across the street from the overhead distribution facilities. There also should be underground sewer facilities buried in the street to serve the residential and commercial customers. These kinds of underground utilities are normally present and are expected to be relocated as necessary when laying out a 230 kV underground transmission line. The overhead electric and communication utilities are not expected to have to be relocated. The street right-of-way appears to be 60' or more along this portion of the route, and should be wide enough to accommodate the new underground 230 kV transmission line plus the new underground gas line and water line.

During the visual inspection I observed that there is a school facility along 10th Street East. According to the attached California Department of Education (CDE) Power Line Setback Exemption Guidance, dated March 2006, without an approved CDE exemption request, an underground 230 kV transmission line easement should be located at least 37.5' from the useable portion of the school site. With the street right-of-way 60' or more, the 230 kV underground transmission line probably can be located on the opposite side of the street and meet the current CDE electromagnetic field policy guidelines without an exemption request.

In summary, I did not find any "showstoppers" for this underground segment of Route 4, and in my opinion this route segment is feasible.

Overhead Segment of Route 5 - PHPP to Intersection of E Ave S and Sierra Highway

Section 2.5.1 of the applicant AFC shows that the applicant intends to use a vertical conductor configuration on single tubular poles, with pole heights ranging from 100' to 135', and with an average span length of about 750' for the overhead 230 kV transmission line. Section 2.2 of FSA Alternatives Appendix A states that the applicant indicated in DR 124 that the minimum right-of-way requirement for the proposed 230 kV line configuration is 60'. These data will be used in evaluating the observations made during the visual inspection of the overhead segments of Routes 4 and 5.

I visually inspected the northern portion of this overhead segment proceeding west from PHPP across Sierra Highway to Division Street, then proceeding south along Division Street to the point of intersection (PI) where the line turns east to jog around the subdivision just north of Avenue O. This section of the proposed overhead 230 kV line is located in or near the military airport airspace. Section 2.2 of Alternatives Appendix A states that the overhead pole heights approximately 4900' from the end of the runway are restricted to 94' above the elevation of the

runway surface elevation of 2543'. A quick check with Google Earth indicated that the ground elevation along Division Street directly off the end of the runway is about 20 -25' higher than elevation at the end of the runway. So the 230 kV pole heights will be restricted to about 74' or less. This pole height restriction appears too low for the proposed applicant vertical line configuration with pole heights of 100' or more. Thus, for this section of line the 230 kV line should use a horizontal configuration with span lengths limited such that none of the structure heights exceed the 94' elevation above the runway restriction. This can easily be accomplished using tubular pole H-Frame structures for this section of the 230 kV line. At the PI north of Avenue O where the line turns east, the line can roll into a vertical configuration, and proceed from there using the applicant's proposed vertical 230 kV line configuration.

I visually inspected the southern portion of this overhead segment from the PI north of Avenue O where the transmission line jogs around the subdivision, then proceeds south to East Avenue R, then proceeds east on East Avenue R to Sierra Highway, then proceeds south along Sierra Highway to East Avenue S, the southern end of the segment. There are several significant issues that were identified during the visual inspection of this portion of the overhead segment as discussed below.

First, while proceeding south on Division Street from the subdivision, the line route must cross from the east side of the road to the west side of the road north of Rancho Vista Blvd. to avoid an overhead 66kV subtransmission line with a 12 kV underbuild and go over another 66 kV subtransmission line proceeding east to west on Rancho Vista Blvd. The line also has to also go over another 66 kV subtransmission line proceeding east to west at Avenue Q. This looks doable.

Second, while proceeding south at Palmdale Avenue, the line route passes close to an auto service gas station on the north side of Palmdale Avenue and a Taco Bell on the south side of Palmdale Avenue. With the 230 kV line conductors hanging over the street in the vertical configuration, the poles must be set to maintain adequate clearance to buildings – probably at least 30' based on the 60' right of way requirement. I think the line can squeeze through without having to take either of these buildings. However, if either or both of the buildings must be taken, in my opinion it is not a "showstopper" for Route 5.

Third, there is a school complex on the west side of the street north of East Avenue Q. According to the attached California Department of Education (CDE) Power Line Setback Exemption Guidance, dated March 2006, without an approved CDE exemption request, an overhead 230 kV transmission line easement should be located at least 150' from the useable portion of the school site. Therefore the line must cross over from the west side of the street to the east side of the street at an appropriate distance north of the school grounds. When crossing the street, the 230 kV line must proceed over an existing 66 kV subtransmission line located on the east side of the street to a point in the vacant lot on the east side of the street where the 230 kV line easement is at least 150' from the school. Then proceed south, paralleling the existing 66 kV subtransmission line to the north side of East Avenue R, and turn east.

Fourth, while proceeding east on the north side of East Avenue Q there are two buildings that appear too close to the line and probably will have to be taken. Even with the 230 kV line conductors hanging over the street, there doesn't appear to be adequate clearance to the buildings to set the poles near the street. One building is at the corner of 6th East and the other is at the PI where the line route turns south at Sierra Highway. However if the two buildings must be taken, in my opinion it is not a "showstopper" for Route 5.

Fifth, while proceeding south on Sierra Highway, the line route passes close to some storage buildings. With the 230 kV line conductors hanging over the street in a vertical configuration, it appears that the poles can be set to maintain adequate 30' clearance to the buildings.

In summary, in my opinion this overhead Route 5 segment is feasible. The 230 kV line can be routed through Palmdale while meeting the military air restrictions, and will not require burying any existing 66 kV subtransmission lines. Unfortunately, two buildings appear to need to be taken.

Overhead Segment of Routes 4 and 5 - Intersection of E Ave S and Sierra Hwy to Vincent Sub

I visually inspected this overhead segment of both Routes 4 and 5, proceeding southerly along Sierra Highway from East Avenue S to Angeles Forest Highway, along Angeles Forest Highway, then proceeding southeasterly overland a short distance to intersect the existing Pearblossom – Vincent 230 kV line, and then proceed jointly into the Vincent Substation. There are several significant issues that were identified during the visual inspection of this portion of the overhead segment as discussed below.

First, no overhead 66 kV subtransmission lines were observed along this proposed line segment route. Some existing 12 kV distribution lines and communication cables are expected to be buried to accommodate the 230 kV transmission line along some sections of this route segment. 12 kV distribution and communication facilities are commonly buried today at a reasonable cost, and I believe CA has a policy to encourage undergrounding these facilities. In my opinion burying 12 kV distribution facilities and communication facilities as necessary is not a "showstopper" for Routes 4 and 5.

Second, I observed that south of the water treatment plant where the overhead 230 kV line is located on the east side of Sierra Highway there are one or more businesses which appear to include a salvage yard with salvage materials and other items located close to the proposed 230 kV route. It looks like there are items and possibly buildings possibly within the route segment ROW. As described before, the 230 kV line conductors should face the highway, and poles must be set to maintain adequate clearance to buildings. This looks like a tight squeeze. Some of the salvage materials may need to be relocated and possibly one or more of these buildings may have to be taken. An alternative which avoids this is to have the 230 kV line cross to the west side of Sierra Highway south of the water treatment plant and proceed southerly across the intersection of Pearblossom Highway. This alternative would require burying the existing overhead 12 kV distribution and communication facilities on the west side of Sierra Highway south of the Water Treatment Plant. In my opinion relocating some of the salvage materials, taking one or more of these existing buildings or crossing to the west side of the Sierra Highway and burying the existing distribution and communication facilities are not "showstoppers" for Routes 4 or 5.

Third, at the PI where the 230 kV line route leaves Angeles Forest Highway and goes overland to intersect the existing Pearblossom – Vincent 230 kV line, it is recommended that the line roll into a horizontal configuration to more easily go under the two 500 kV lines.

Fourth, after the PHPP – Vincent 230 kV line route intersects the existing Pearblossom – Vincent 230 kV line, it is expected that the two 230 kV lines would be rebuilt for about 1 mile to the Vincent Substation using the double circuit towers proposed by the applicant in Segment 2 of their proposed route.

In summary, I did not find any "showstoppers" for this overhead segment of Routes 4 and 5, and in my opinion this route segment is feasible.

Alternative Route 4 and 5 Finding

In my opinion both alternative Routes 4 and 5 are feasible alternatives to the applicant's proposed transmission line route.

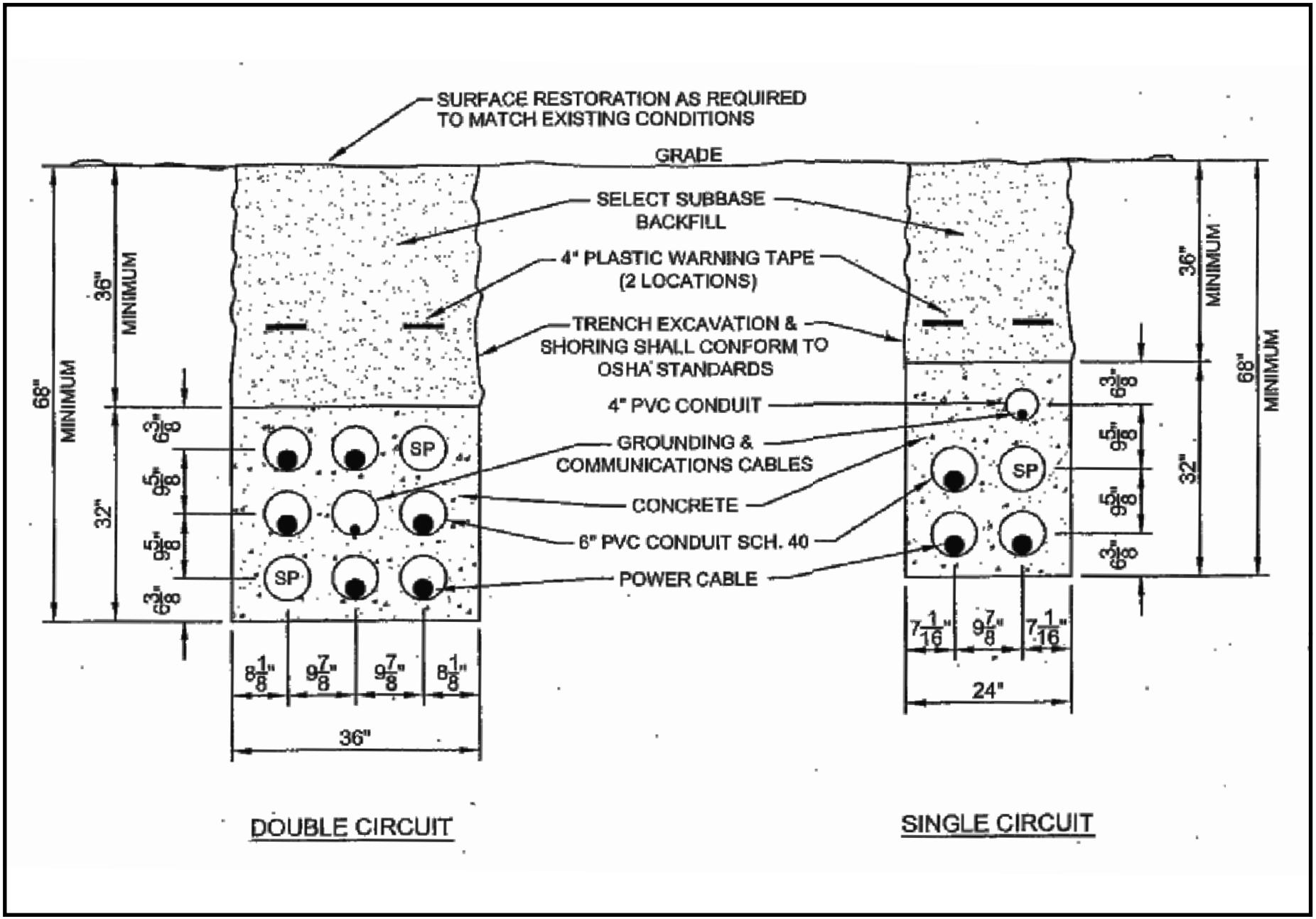
Sincerely,

Henry W. Zaininger

President

PROJECT DESCRIPTION - FIGURE 1

Palmdale Hybrid Power Project - Typical Duct Bank Construction Underground Cable Transmission Line



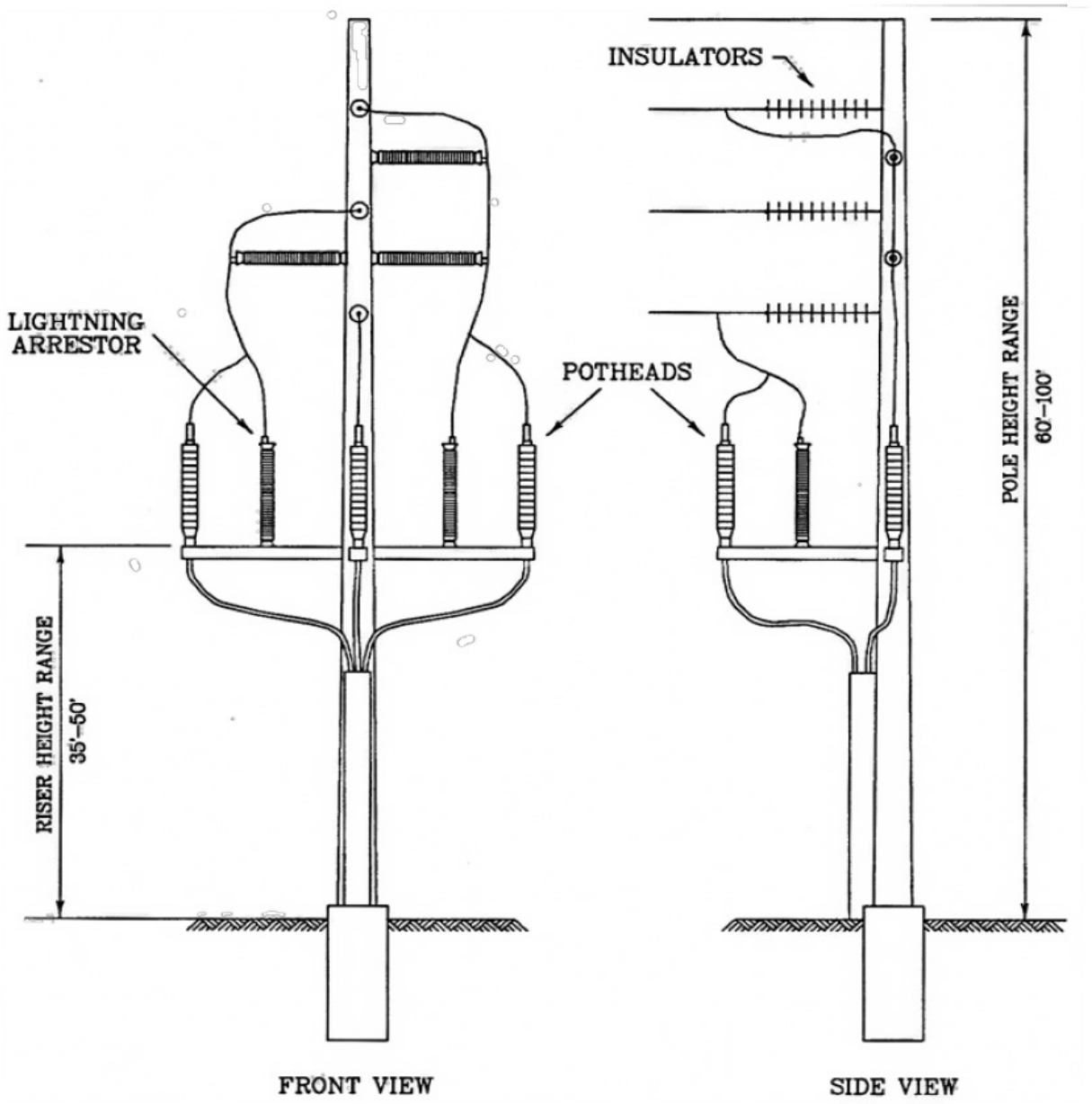
TRANSMISSION SYSTEM ENGINEERING

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: C.C.I., Fig 1

ALTERNATIVES APPENDIX A - FIGURE 1

Diagram of a Typical Transmission Riser Structure - Palmdale Hybrid Power Plant

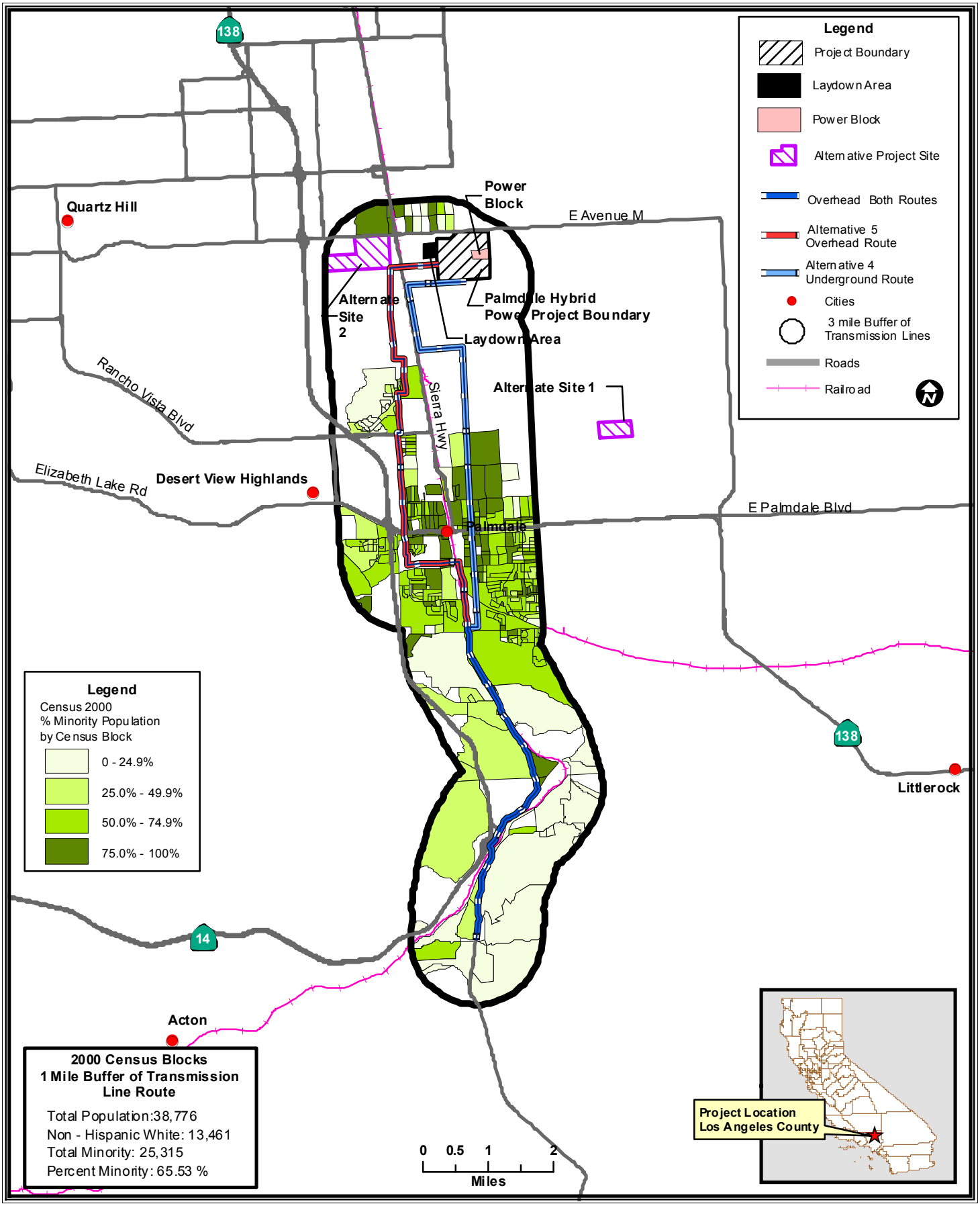


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission

SOCIOECONOMICS - FIGURE 2

Palmdale Hybrid Power Project - Census 2000 Minority Population by Census Block - 1 Mile Buffer of Transmission Lines



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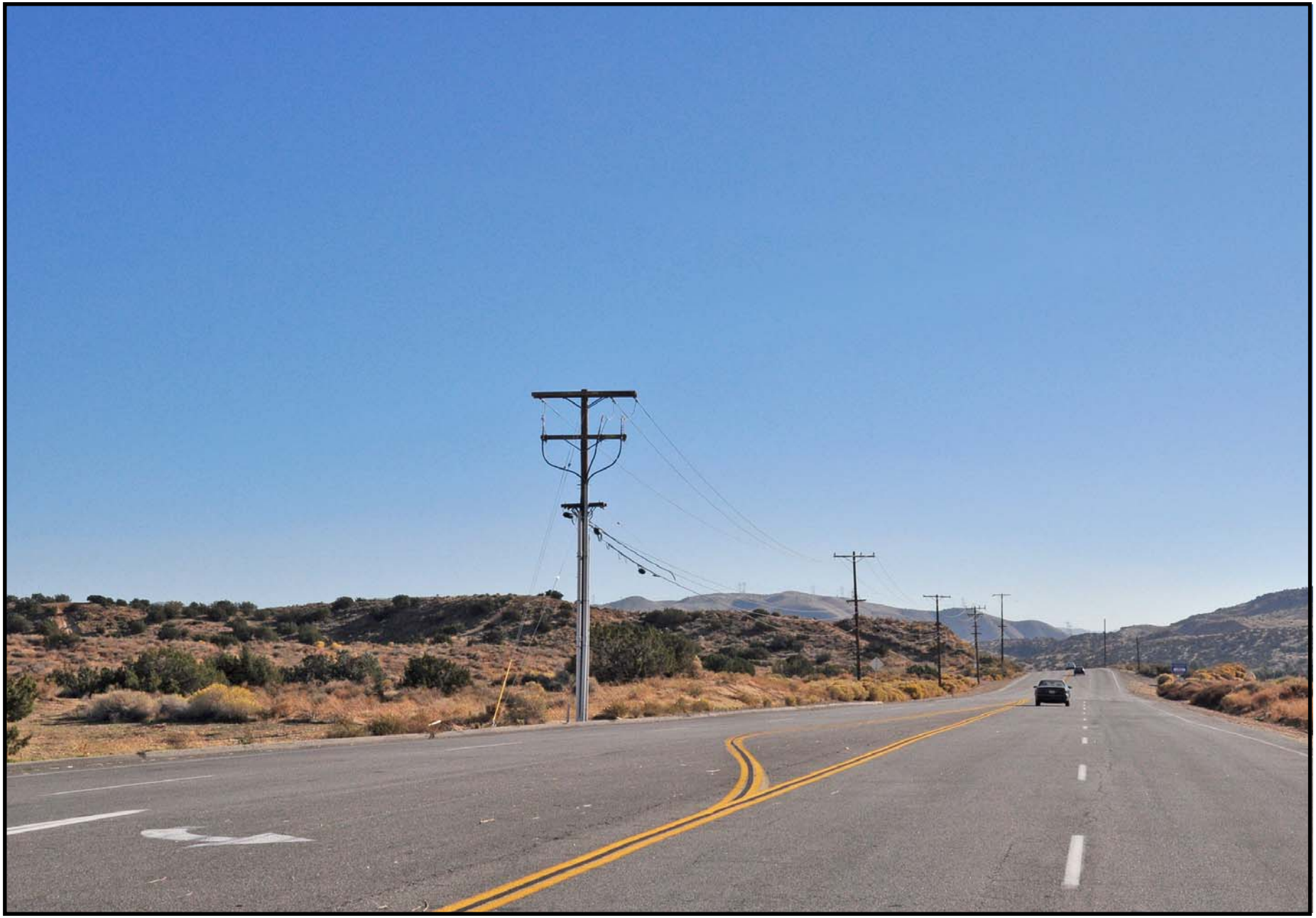
SOURCE: California Energy Commission Statewide Power Plant Maps 2010 - Census 2000 PL 94-171 Data - Matrix PL2

VISUAL RESOURCES - ALTERNATIVE 4 - FIGURE 1A

Palmdale Hybrid Power Project - Alternative Tranmsission Line Analysis - Looking South on Sierra Highway, Just South of East Avenue S - Existing View



VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Photo by Energy Commission Staff, Dec. 2010

VISUAL RESOURCES - ALTERNATIVE 4 - FIGURE 1B

Palmdale Hybrid Power Project - Alternative Tranmsission Line Analysis - Looking South on Sierra Highway, Just South of East Avenue S - Simulated Condition

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Simulation by Energy Commission Staff, Dec. 2010

VISUAL RESOURCES - ALTERNATIVE 5 - FIGURE 2A

Palmdale Hybrid Power Project - Alternative Tranmsission Line Analysis - Looking North Up Division Street, North of East Avenue R - Existing View

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Photo by Energy Commission Staff, Dec. 2010

VISUAL RESOURCES - ALTERNATIVE 5- FIGURE 2B

Palmdale Hybrid Power Project - Alternative Tranmsission Line Analysis - Looking North Up Division Street, North of East Avenue R - Simulated Condition

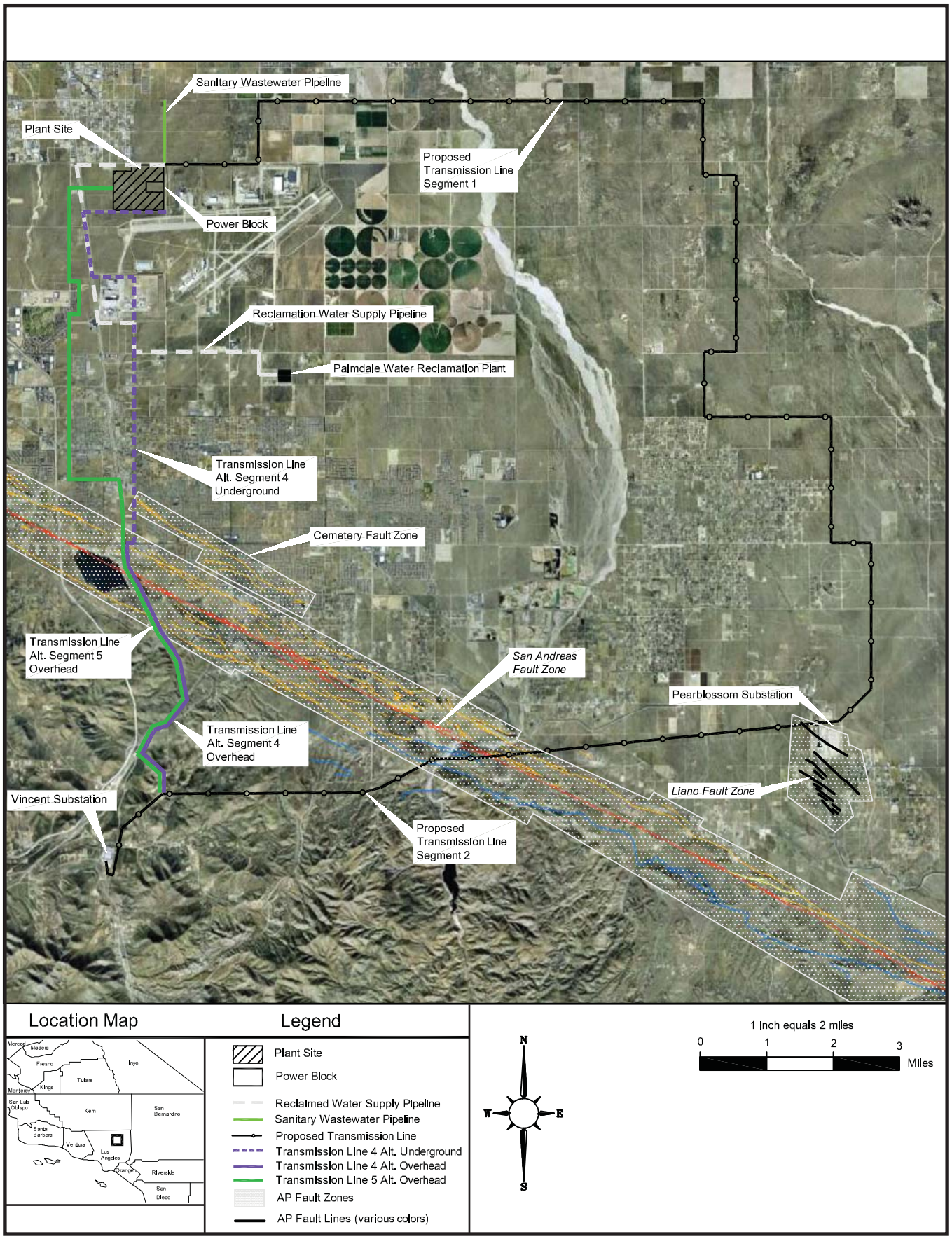
VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Simulation by Energy Commission Staff, Dec. 2010

ALTERNATIVES - APPENDEX A GEOPALEO FIGURE 1

Palmdale Hybrid Power Project - Alquist-Priolo Fault zone in the Vicinity of the Proposed Project Site and Linears

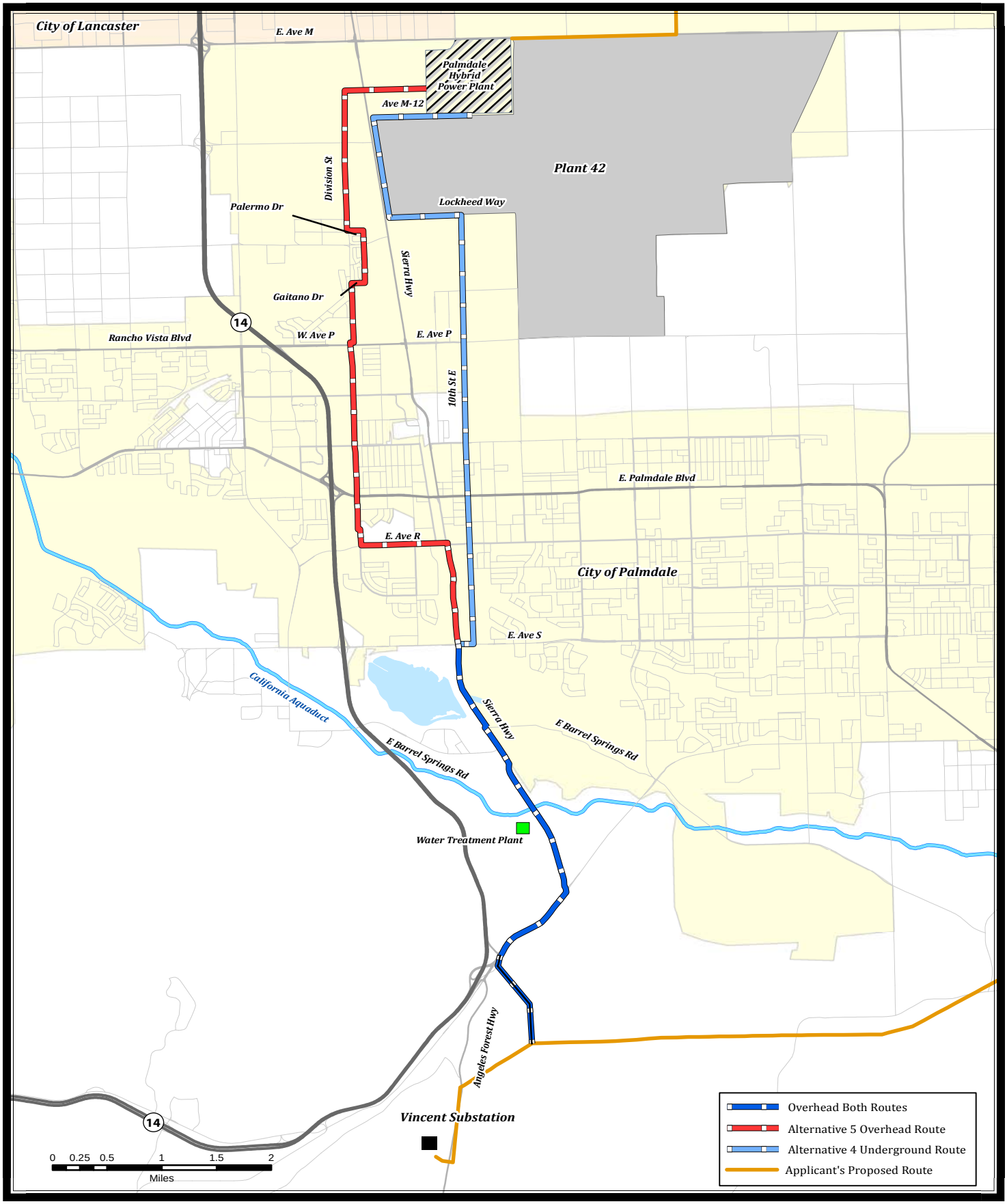


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Figure 5.2-1

ALTERNATIVES APPENDIX A - FIGURE 2

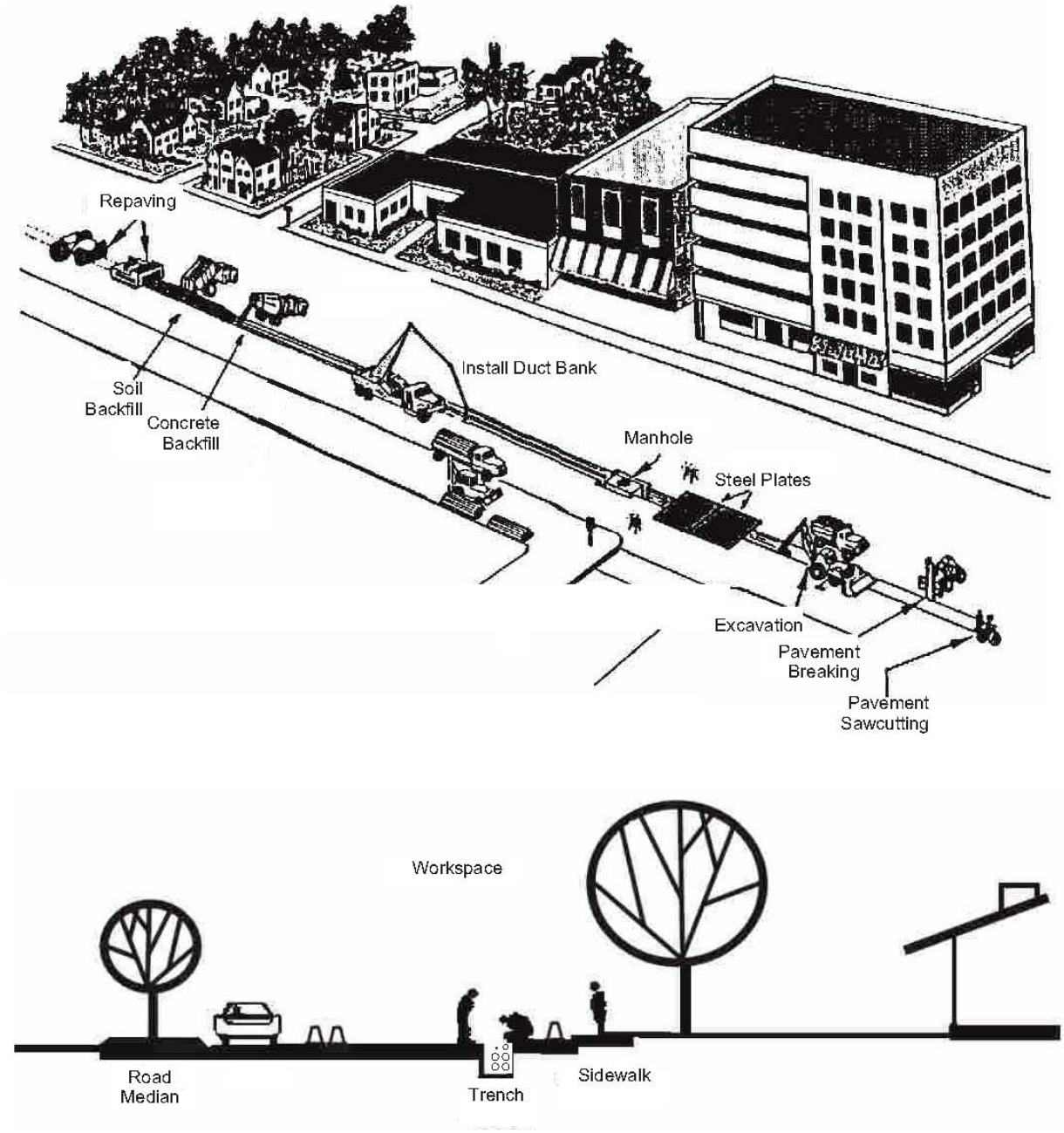
Proposed Transmission Line Route - Palmdale Hybrid Power Plant



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission

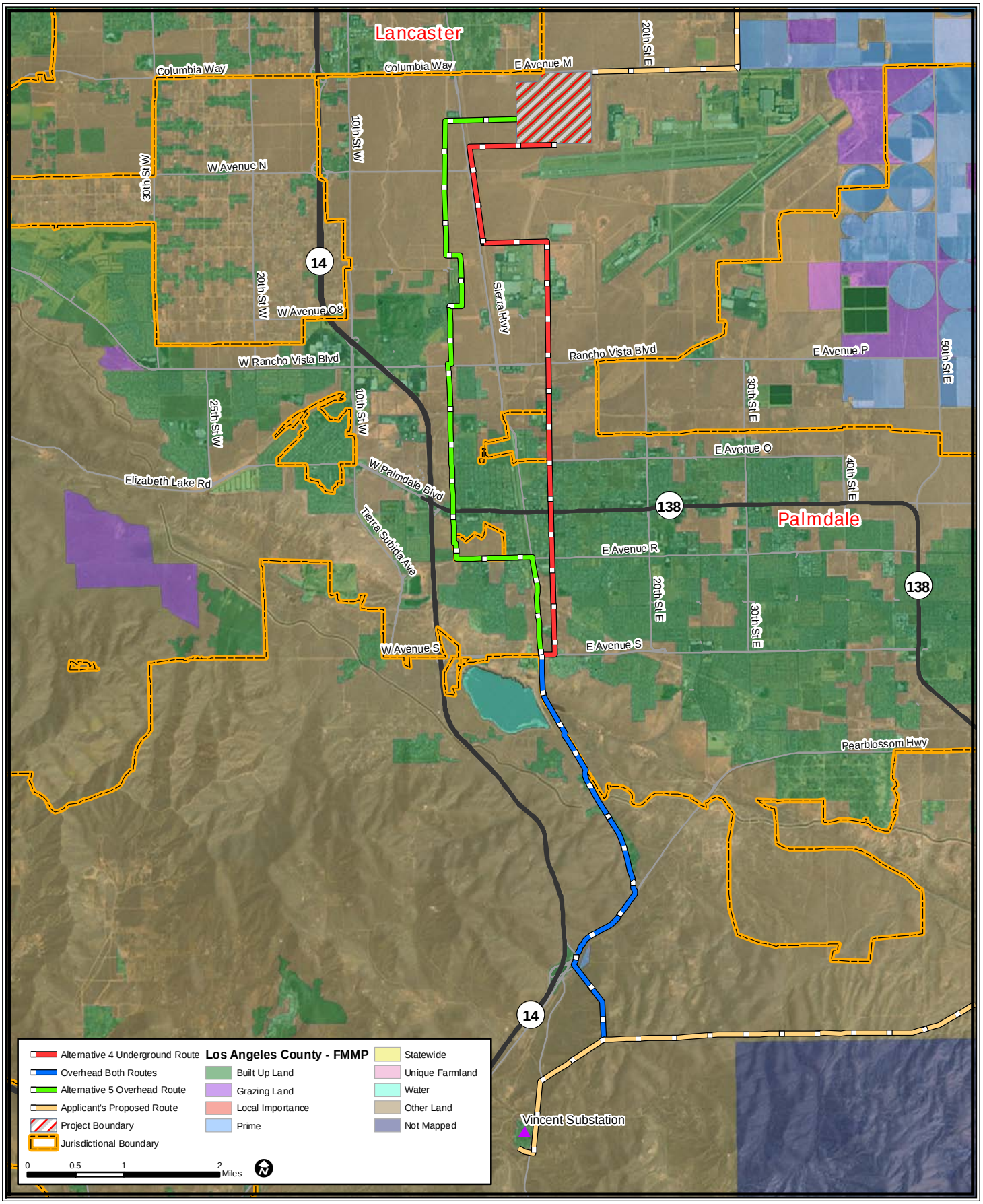
ALTERNATIVES APPENDIX A - FIGURE 3
Typical Construction of an Underground Line - Palmdale Hybrid Power Plant



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: California Energy Commission

ALTERNATIVES - FIGURE 3.5-1

Farmland Mapping and Monitoring Program (FMMP) - Transmission Alternatives

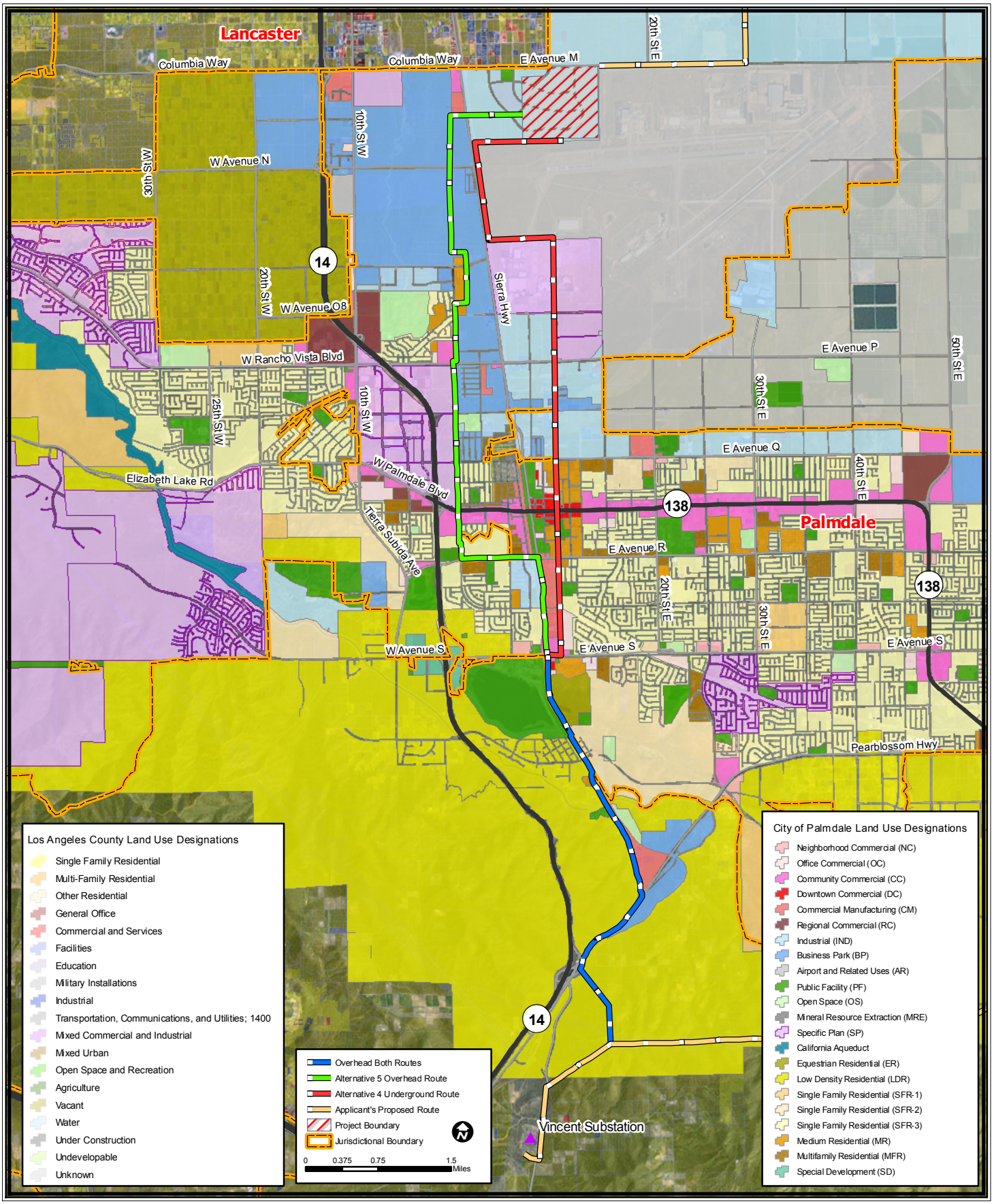


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission, CA Department of Conservation

ALTERNATIVES - FIGURE 3.5-2

General Plan Land Use Designations - Transmission Alternatives

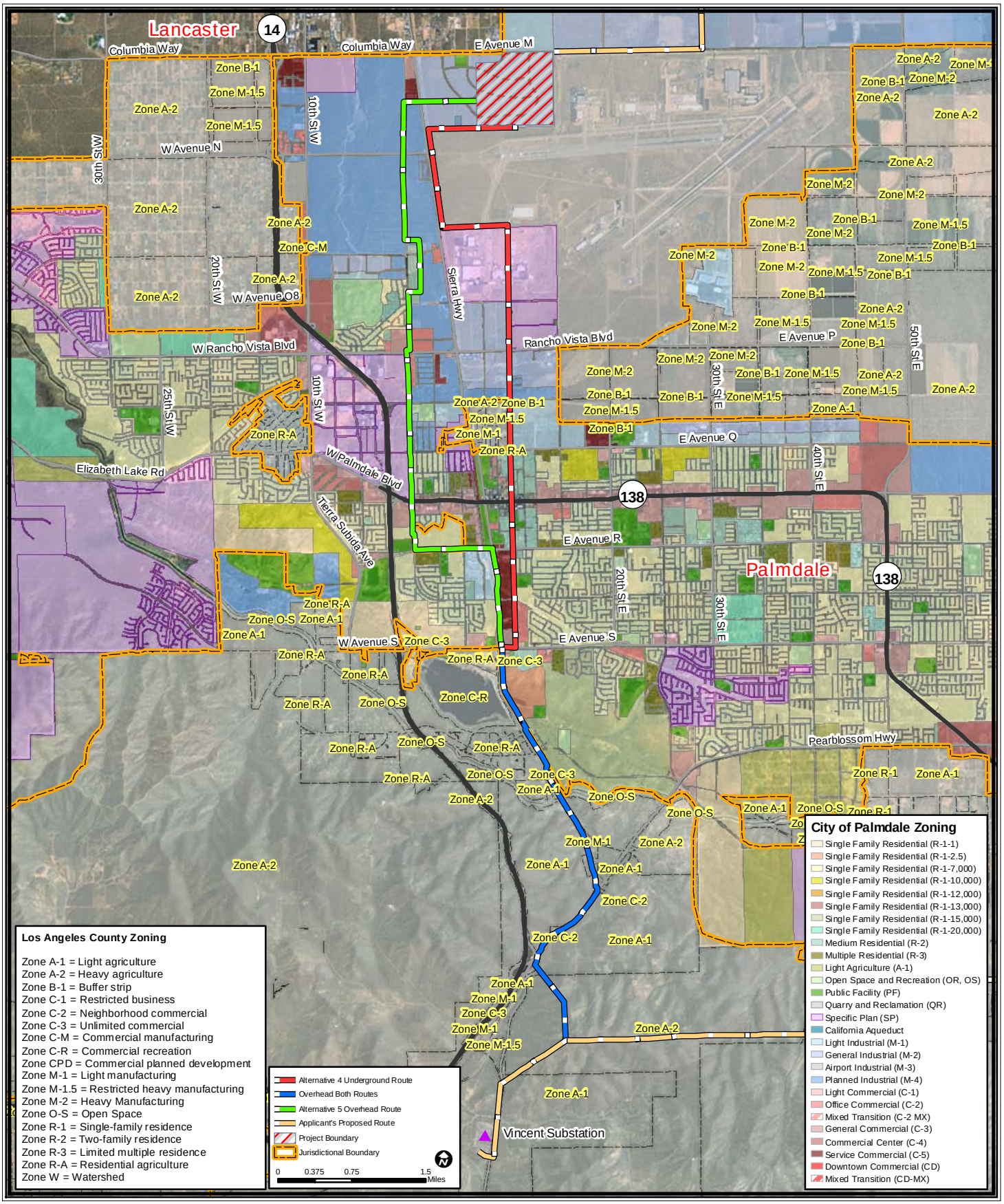


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission, LA County, City of Palmdale

ALTERNATIVES - FIGURE 3.5-3

Zoning Designations - Transmission Alternatives



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission, LA County, City of Palmdale

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Chris Davis

INTRODUCTION

The project's General Compliance Conditions of Certification, including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of elements that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions of certification;
- establish requirements for facility closure plans; and
- specify conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure below a level of significance. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

DEFINITIONS

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

PRE-CONSTRUCTION SITE MOBILIZATION

Site mobilization is limited preconstruction activities at the site to allow for the installation of fencing, construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated

with the above mentioned pre-construction activities is considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and light vehicles is allowable during site mobilization.

CONSTRUCTION

Onsite work to install permanent equipment or structures for any facility.

Ground Disturbance

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

Grading, Boring, and Trenching

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

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

1. the installation of environmental monitoring equipment;
2. a soil or geological investigation;
3. a topographical survey;
4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and
5. any work to provide access to the site for any of the purposes specified in “Construction” 1, 2, 3, or 4 above.

START OF COMMERCIAL OPERATION

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

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The Compliance Project Manager (CPM) shall oversee the compliance monitoring and is responsible for:

1. Ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision;

2. Resolving complaints;

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

4. Documenting and tracking compliance filings; and

5. Ensuring that compliance files are maintained and accessible.

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

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management. All submittals must include searchable electronic versions (pdf or word 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. The purpose of these meetings is to assemble both the Energy Commission's and project owner's technical staff to review the status of all pre-construction or pre-operation requirements, contained in the Energy Commission's conditions of certification. This is to confirm that all applicable conditions of certification have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

ENERGY COMMISSION RECORD

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

- All documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;
- All monthly and annual compliance reports filed by the project owner;
- All complaints of noncompliance filed with the Energy Commission; and
- All petitions for project or condition of certification changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

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

COMPLIANCE CONDITIONS OF CERTIFICATION

Unrestricted Access (COMPLIANCE-1)

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

Compliance Record (COMPLIANCE-2)

The project owner shall maintain project files on-site or at an alternative site approved by the CPM for the life of the project, unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all “as-built” drawings, documents submitted as verification for conditions, and other project-related documents.

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

Compliance Verification Submittals (COMPLIANCE-3)

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

Verification of compliance with the conditions of certification can be accomplished by the following:

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

2. Appropriate letters from delegate agencies verifying compliance;

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

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

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

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

Chris Davis, Compliance Project Manager
(08-AFC-9C)
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

Those submittals shall be accompanied by a searchable electronic copy, on a CD or by e-mail, as agreed upon by the CPM.

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

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

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner's first compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be submitted in the same format as the compliance matrix described below.

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

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

If the project owner anticipates commencing project construction as soon as the project is certified, it may be necessary for the project owner to file compliance submittals prior to project certification. Compliance submittals should be completed in advance where the necessary lead time for a required compliance event extends beyond the date anticipated for start of construction. The project owner must understand that the submittal of compliance documents prior to project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change, based upon the Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the Energy Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an

accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

Compliance Matrix (COMPLIANCE-5)

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all conditions of certification in a spreadsheet format. The compliance matrix must identify:

1. The technical area;
2. The condition number;
3. A brief description of the verification action or submittal required by the condition;
4. The date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. The expected or actual submittal date;
6. The date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable; and
7. The compliance status of each condition, e.g., “not started,” “in progress” or “completed” (include the date).
8. If the condition was amended, the date of the amendment.

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

Monthly Compliance Report (COMPLIANCE-6)

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

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

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

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

3. An initial, and thereafter updated, compliance matrix showing the status of all conditions of certification;

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

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

6. A cumulative listing of any approved changes to conditions of certification;

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

8. A projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;

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

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

All sections, exhibits, or addendums shall be separated by tabbed dividers or as acceptable by the CPM.

Annual Compliance Report (COMPLIANCE-7)

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

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

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

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

4. A cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;

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

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

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

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

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

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

Confidential Information (COMPLIANCE-8)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Executive Director with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

Annual Energy Facility Compliance Fee (COMPLIANCE-9)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner is required to pay an annual compliance fee, which is adjusted annually. Current compliance fee information is available on the Energy Commission's website http://www.energy.ca.gov/siting/filing_fees.html. You may also contact the CPM for the current fee information. The initial payment is due on the date the Energy Commission

adopts the final decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

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

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

Any changes to the telephone number shall be submitted immediately to the CPM, who will update the web page.

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

FACILITY CLOSURE

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

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

CLOSURE DEFINITIONS

Planned Closure

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

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

Unplanned Permanent Closure

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

COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

Planned Closure (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM) prior to commencement of closure activities. The 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 the desires of local officials or interested parties are inconsistent with the plan, the CPM will 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-12)

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

The project owner shall submit an on-site contingency plan for 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, shall 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 shall 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-13)

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify 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-14)

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. **It is the responsibility of the project owner to contact the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769.** Implementation of a project modification without first securing Energy Commission, or Energy Commission staff approval, may result in enforcement action that could result in civil penalties in accordance with section 25534 of the Public Resources Code.

A petition is required for **amendments** and for **staff approved project modifications** as specified below. Both shall be filed as a "Petition to Amend." Staff will determine if the change is significant or insignificant. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the CPM, who will file it with the Energy Commission's Dockets Unit in accordance with Title 20, California Code of Regulations, section 1209.

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

Amendment

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

Change of Ownership

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769 (b). This process requires public notice and approval by the full Commission. The petition shall be in the form of a legal brief and fulfill the

requirements of Section 1769(b). Upon request, the CPM will provide you with a sample petition to use as a template.

Staff Approved Project Modification

Modifications that do not result in deletions or changes to conditions of certification, that are compliant with laws, ordinances, regulations and standards and will not have significant environmental impacts may be authorized by the CPM as a staff approved project modification pursuant to section 1769(a) (2). This process usually requires minimal time to complete, and it requires a 14-day public review of the Notice of Petition to Amend that includes staff's intention to approve the proposed project modification unless substantive objections are filed. These requests must also be submitted in the form of a "petition to amend" as described above.

Verification Change

A verification may be modified by the CPM without requesting an amendment to the decision if the change does not conflict with the conditions of certification and provides an effective alternate means of verification.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

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

ENFORCEMENT

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

the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.

NONCOMPLIANCE COMPLAINT PROCEDURES

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

Informal Dispute Resolution Process

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

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

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

Request for Informal Investigation

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

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to

determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter. Within seven working days of the CPM's request, the project owner shall provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to also provide an initial verbal report within 48 hours.

Request for Informal Meeting

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

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

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

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

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

Formal Dispute Resolution Procedure-Complaints and Investigations

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

Key Events List

PROJECT: _____

DOCKET #: _____

COMPLIANCE PROJECT MANAGER: _____

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

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.
COMPLIANCE-8	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Executive Director with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner shall submit a closure plan to the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-12	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-14	Post-certification changes to the Decision	The project owner must petition the Energy Commission to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

Attachment A
Complaint Report/Resolution Form

PROJECT NAME: AFC Number:
COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number:
Date and time complaint received: Indicate if by telephone or in writing (attach copy if written): Date of first occurrence:
Description of complaint (including dates, frequency, and duration):
Findings of investigation by plant personnel: Indicate if complaint relates to violation of a CEC requirement: Date complainant contacted to discuss findings:

Description of corrective measures taken or other complaint resolution: Indicate if complainant agrees with proposed resolution: If not, explain: Other relevant information:
If corrective action necessary, date completed: _____ Date first letter sent to complainant: _____ (copy attached) Date final letter sent to complainant: _____ (copy attached)
This information is certified to be correct. Plant Manager's Signature: _____ Date:

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

PREPARATION TEAM

PALMDALE HYBRID POWER PROJECT
FINAL STAFF ASSESSMENT
PREPARATION TEAM

Executive Summary ..... Felicia Miller

Introduction ..... Felicia Miller

Project Description ..... Felicia Miller

Air Quality..... Steve Radis

Biological Resources..... Chris Huntley

Cultural Resources..... Pamela Daly and Beverly Bastian

Hazardous Materials Management..... Alvin J. Greenberg, Ph.D. and Rick Tyler

Land Use..... Negar Vahidi and Susanne Huerta

Noise and Vibration..... Erin Bright and Shahab Koshmashrab

Public Health ..... Alvin J. Greenberg, Ph.D.

Socioeconomic Resources..... Kristin Ford

Soils and Water Resources..... Christopher Dennis, P.G.

Traffic and Transportation ..... James Adams

Traffic and Transportation: Plume Traffic Impact ..... Will Walters

Transmission Line Safety and Nuisance ..... Obed Odoemelam, Ph.D.

Visual Resources ..... James Adams

Visual Resources: Plume Visual Impact..... Will Walters

Waste Management ..... Suzanne Phinney, D.Env.

Worker Safety and Fire Protection ..... Alvin J. Greenberg, Ph.D. and Rick Tyler

Facility Design ..... Erin Bright

Geology and Paleontology ..... Dal Hunter, PH.D., C.G.E.

Power Plant Efficiency..... Shahab Khoshmashrab

Power Plant Reliability..... Shahab Khoshmashrab

Transmission System Engineering..... Laiping Ng and Mark Hesters

Alternatives ..... Hedy B. Koczwara

Appendix A..... Suzanne L. Phinney D.Env.and multiple authors

General Conditions.....Chris Davis

Project Assistant .....Teraja Golston

DECLARATION OF
Felicia Miller

I, Felicia Miller declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Office of the Energy Facilities Siting Division as Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared staff testimony on Introduction, Project Description and Executive Summary for the Palmdale Hybrid Power Power Plant 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 herein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently hereto.

   I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/18/10 Signed: Felicia Miller

At: Sacramento, California

Felicia Miller

California Energy Commission
1516 Ninth Street, MS-15
Sacramento, California 95814
(916) 654-4640

Professional Experience

April 2007 to present ***California Energy Commission*** – ***Planner III - Siting Project Manager***
Plan, organize, direct and manage the State regulatory process for electric generating plants from application through issuance of permit. Plan, organize and direct the efforts of 23 disciplinary environmental and engineering staff in actions related to the California Environmental Quality Act (CEQA) requirements. Recommend actions, policies and procedures affecting the project and commission program direction. Conduct public workshops and hearings related to proposed projects. I Compile, edit, and issue staff environmental assessments and other CEQA related documents.

2006-2007 ***California State Parks***
Associate Parks & Recreation Specialist – Off Highway Vehicle Division/Prairie City Off-Highway Vehicle Park
Development of resources study to determine watershed and hydrology, soil taxonomy and geology of State park. Lead on assessment and recommendations for watershed remediation and sediment control project. Climate prediction study to determine weather and hydrology patterns of park over a 25-year period. Research analysis for master and general plan update for district off highway vehicle parks.

2005-2006 ***California State Department of Mental Health***
Senior Mental Health Specialist – Program Compliance
Program lead in Fingerprinting Analysis/Criminal Background Checks and Investigations Unit. Coordinated and directed assignments and deadlines for staff. Project lead in development of 2 new database programs used to automate data from fingerprint program and facility investigations. Unit coordinator for compilation, coordination and analysis of sections monthly measures and outcomes report, contributed significantly in eliminating CBC unit backlog. Conducted incident investigations to determine regulatory compliance.

2000-2005 ***California State Parks***
Associate Parks & Recreation Specialist – Grants and Local Services
Administration of park and recreation grants under State and Federal funding to local agencies in over 19 counties statewide and Bureau of Land Management. Provided technical assistance and interpretation of regulations and policy to local agencies, evaluate project status, billing support and documentation, and field inspections to determine compliance with project agreement. Team leader in development of program procedural guides including research of state and federal regulations,

assignments coordination and participation at public hearings and coordinated assignments to meet critical deadlines. Development of program regulations and procedural guide, workshop lead.

1998-2009 ***California State Parks***
Personnel Services Specialist – Human Resources
Personnel and salary transaction functions for a roster of +400 district and HQ employees. Personnel contact with DPR employees for the purpose of responding to questions and dispensing accurate information to HQ and field timekeepers and employees. Contact with outside agencies for purpose of salary and payroll interpretation and processing. Translated bargaining unit contractual information to managers and employees and translated reference guidelines for laws and rules as set forth by DPA, SCO and SPB. Developed and initiated HQ new employee orientation and improved sign up procedures.

1997-1998 ***Department of the Youth Authority***
Public Service and Support Division
Analyzed and reconciled monthly reported from facilities and prepared monthly reimbursement claims to exceed $650K. Compiled data, analyzed and prepared intricate spreadsheets for monthly, quarterly and yearly accounting. Responsible for Mac training and support for division. Chair for United Way campaign.

1994-1997 ***Department of Fish and Game***
Office of Oil Spill Response-Scientific Division
Coordinated and prioritized assignments for division and supervised work of support staff. Coordination of interagency efforts as agency liaison during emergency response efforts during a coastline oil spill. Developed Operations Protocol manual for Incident Command Center and emergency response support team. Facilitated public surveys to determine economic value of recreation and natural resources and determine user trends.

1991-1994 ***John F. Kennedy High School***
Office of Oil Spill Response-Scientific Division
Using district graduation and special education requirements; planned, collected, evaluated and analyzed data from a variety of sources to develop a master schedule for educational programs; critical analysis of all phases of student programs to determine eligibility of curriculum prerequisites and high school graduation eligibility; translated high school graduation requirements and policy from district and inter-district transcripts to make curriculum recommendations, conducted curriculum training program to incoming students and parents, supervised team of student assistants. Program lead for targeted youth.

Education/Credentials

- Bachelor of Arts, Cum Laude, Sacramento State University in Communication Studies, concentration in Rhetorical Criticism
- California Real Estate Sales License, September 1999, license current

DECLARATION OF
Steven R. Radis

I, **Steven R. Radis** declare as follows:

1. I am presently employed as a consultant to the California Energy Commission in the **Environmental Protection Office** of the **Energy Facilities Siting Division**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Air Quality and Air Quality Alternatives**, for the **Palmdale Hybrid Power Plant 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: 16 Dec 10 Signed: [signature]

At: Ventura, California

Steven R. Radis

Mr. Radis is a Principal with MRS. Before joining MRS, he was a Principal in Arthur D. Little, Inc.'s Environmental Health & Safety Practice located in the Santa Barbara and Ventura, California offices. His expertise includes meteorological modeling and analysis, physical oceanographic modeling and analysis, consequence and risk analysis, fire and explosion dynamics, hazard evaluation, external events analysis, fault tree analysis, and model development. Mr. Radis has worked on a wide variety of studies for utilities, commercial, and government clients involving meteorological modeling, quantitative risk assessments, health risk assessments, consequence analysis, risk management, air quality modeling (inert/photochemical pollutants, toxic air contaminants), and Environmental Impact Reports (EIR)/Statements (EIS) prepared in compliance with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). His experience includes the following:

- Mr. Radis completed a safety and vulnerability analysis of the Diablo Canyon Power Plant (DCPP) and the San Onofre Nuclear Generating Station (SONGS) Steam Generator Replacement Projects for the California Public Utilities Commission. The EIR analyses evaluated a range of equipment and operational failure modes and quantitatively evaluated the associated radiological consequences of core damage accidents and releases. Failure modes, release mechanisms and consequences associated with terrorist attacks were also evaluated.
- For the County of San Luis Obispo, Mr. Radis completed a safety and vulnerability analysis of the Diablo Canyon Power Plant (DCPP) Independent Spent Fuel Storage Installation (ISFSI). The EIR analysis evaluated a range of equipment and operational failure modes and quantitatively evaluated the associated radiological consequences of spent fuel pool and dry cask storage accidental releases. Failure modes, release mechanisms and consequences associated with terrorist attacks were also evaluated.
- Mr. Radis was the project Manager and Public Safety coordinator for the Venoco Ellwood Marine Terminal Lease Renewal Project EIR that was recently prepared for the California State Lands Commission. This is the last marine oil terminal in Santa Barbara County and the continuing operation of the terminal is raising a lot of public opposition. Critical environmental issues include the increased risk of an accidental release of oil and its impact on marine and terrestrial water quality and biological resources, recreation, land use, and visual resources.
- Mr. Radis has participated on power plant siting projects before the California Energy Commission in a variety of roles. He is currently assisting the CEC on the GWF Tracy Combined Cycle Power Plant, City of Palmdale Hybrid Power Plant, Watson Cogeneration Steam and Electric Reliability, and the Kings River Conservation District Community Power Plant projects. Mr. Radis also participated as an intervener on the Metcalf Energy Center and Potrero Unit 7 siting cases. Mr. Radis has also represented applicants on the Occidental Elk Hills project, and several siting cases in the 1980's for Southern California Edison.
- Mr. Radis prepared two sections of the Plains All American Crude Oil Marine Terminal SEIS/EIR, the project that includes construction of a marine terminal on

Steven R. Radis (continued)

Pier 400 in the Port of Los Angeles. Marine Vessel Transportation and System Safety/Risk of Upset. The Marine Vessel Transportation analysis considers the specific type and number of vessels that currently visit the Port and pass by Pier 400, and evaluates the number and characteristics of tankers that would be calling at the new Pier 400 marine terminal after project implementation.

- For the California Coastal Commission, Mr. Radis provided technical assistance in the reviews of the BHP Billiton Liquefied Natural Gas (LNG) Cabrillo Port Project and the Port of Long Beach Sound Energy Solutions (SES) Long Beach LNG Project. The review of the proposed projects is focused on the adequacy and completeness of risk analysis, especially in terms of the safety review requirements of 49 CFR 193 Subpart B and NFPA Design Standard 59A. Mr. Radis is also acting as a technical advisor to CCC staff on risk analysis, vapor dispersion modeling, etc., as well as identifying deficiencies, if any, in the analysis or recommended mitigation measures. Mr. Radis is also currently providing technical assistance to the California Coastal Commission on the OceanWay and Clearwater LNG projects.
- Mr. Radis managed the preparation of an Environmental Impact Report for the Nacimiento Water Project. The EIR that evaluated environmental impacts associated with construction and operation of a 65-mile water pipeline and associated facilities in San Luis Obispo County. The pipeline would draw water from Nacimiento Reservoir and deliver it to various purveyors in the County. The pipeline would cross numerous jurisdictions and would affect a number of landowners and agencies. The proposed project included two equal options: (1) Raw Water Option that entailed construction of the pipeline and facilities that would deliver raw water to the purveyors; and (2) Treated Water Option that also entailed construction of a water treatment plant; in this case, potable water would be delivered to the purveyors. This EIR contained more than 800 pages, not including the Executive Summary and technical appendices. Over 140 mitigation measures were developed to lessen impacts from the proposed project.
- Mr. Radis was a Project Manager on the Point Pedernales Project Supplemental EIR that was prepared for Santa Barbara County. Mr. Radis was also the Principal Investigator for the Air Quality and Risk-of-Upset Project portions of the Supplemental EIR.
- Mr. Radis conducted system safety and reliability studies for several oil and gas projects for Santa Barbara County. These studies included hazard identification, external event and offsite consequence analyses. Facilities included oil and gas processing plants, offshore platforms, onshore production facilities, as well as sour gas and crude oil pipelines. Quantitative Risk Analyses (QRA) were prepared for several of the projects.
- As part of an EIR/EIS for the Unocal Avila Beach Cleanup Project, Mr. Radis served as the Project Manager for San Luis Obispo County, California Regional Water Quality Control Board, and the U.S. Army Corps of Engineers. The EIR/EIS included the evaluation of site contamination and a variety of cleanup strategies, including air

Steven R. Radis (continued)

sparging/bioventing, solidification/ stabilization, solvent flooding, steam stripping, excavation, and thermal desorption. Leaking Unocal Marine Terminal pipelines had resulted in approximately 400,000 gallons of petroleum hydrocarbon contamination beneath the town of Avila Beach and the adjacent beach and intertidal zone. San Luis Obispo County certified the EIR/EIS, and Mr. Radis assisted the Regional Water Quality Control Board in establishing cleanup levels for the site.

- For the Center for Chemical Process Safety (CCPS) of the American Institute of Chemical Engineers (AIChE), Mr. Radis co-authored a book entitled *Guidelines for Postrelease Mitigation Technology in the Chemical Process Industry*. As part of this effort, Mr. Radis quantitatively evaluated the effectiveness of a variety of hazardous chemical mitigation technologies.
- For a Texas-based law firm, Mr. Radis prepared an analysis of external events and provided expert testimony to the Texas Water Commission related to the safety of a hazardous waste disposal facility proposed for the Houston Ship Channel. This study included a review of past external events in the region and centered on hurricane, tornado, and storm surge hazards. The study required the development of a wind field model to simulate hurricanes passing over the site and to estimate potential maximum wind speeds and wind load on the proposed equipment, as well as projected changes in ship channel water levels.
- For a large Southern California utility, Mr. Radis evaluated the feasibility and system safety of converting a fuel oil pipeline distribution network into a regional crude oil and petroleum product storage and distribution system. An analysis of safety and environmental issues was prepared for the CPUC and the South Coast Air Quality Management District. Both agencies approved the conversion project, which is now operating at full capacity. An expansion of the pipeline system was evaluated to increase overall system pipeline throughput capacity, as well as to accommodate unit train and VLCC tanker deliveries.
- Mr. Radis has been involved in the preparation of EIR/EISs for a wide variety of facilities including power generating facilities (coal, fuel oil, natural gas, geothermal, hazardous waste), hazardous waste disposal facilities (chemical and nuclear), crude oil and natural gas transmission pipelines and distribution networks, oil and gas development projects, and military development or conversion projects. Mr. Radis has managed a majority of these projects and was also responsible for the system safety, public health, and air quality issue areas.
- For four Local Emergency Planning Committees (LEPCs) in Alaska, Mr. Radis developed emergency response planning procedures through the preparation of a comprehensive regional hazard and risk analysis.
- For a large engineering company, Mr. Radis prepared a quantitative risk assessment for a LNG marine terminal and power plant project in Puerto Rico. The project included conducting a hazard assessment, fault tree analysis, consequence analysis,

Steven R. Radis (continued)

and quantitative risk analysis. An analysis of external events that could potentially affect the proposed facility was also conducted.

- Mr. Radis has worked on the development of several models, including the development or revisions to several accidental release models, an oil spill model, a multi-component pool model, atmospheric diffusion models, an integrated human exposure and health risk assessment model, and several meteorological models.

Mr. Radis earned his M.A. and B.A degrees in Climatology from California State University, Northridge. He is a member of the American Meteorological Society, and the Air and Waste Management Association.

Steven Richard Radis

Qualifications:

Mr. Radis is a Principal at Marine Research Specialists (MRS) and is located in their Ventura, California office. His expertise includes consequence and risk analysis, fire and explosion dynamics, hazard evaluation, external events analysis, fault tree analysis, meteorological modeling and analysis, air quality modeling and health risk assessment, and model development.

Mr. Radis earned an M.A. and B.A in Climatology from California State University, Northridge. He is a member of the American Meteorological Society, and the Air and Waste Management Association. He has also periodically served as a guest lecturer at the University of California Santa Barbara in the areas of meteorology and atmospheric diffusion modeling.

Prior to joining MRS, Mr. Radis worked for Arthur D. Little, Inc. as a Principal in their Global Environment and Risk Practice, Dames & Moore as a Senior Meteorologist, Radian Corporation as an Atmospheric Scientist, Southern California Edison Company as a Research Meteorologist and California State University, Northridge as a technical assistant. He has more than sixteen years of numerical modeling experience and over twenty years of experience in conducting meteorological and climatological studies.

Mr. Radis has worked on a wide variety of studies for commercial and government clients involving meteorological modeling, quantitative risk assessments, health risk assessments, consequence analysis, risk management, air quality modeling (inert/photochemical pollutants, toxic air contaminants) and environmental impact reports/statements.

- Mr. Radis has prepared air quality impact and dispersion modeling analyses for hundreds of projects ranging from power plants, oil and gas development and site remediation. These analyses have included the development of meteorological data sets, emission inventories, terrain simulations, and in some cases, the development of site-specific models. These analyses included the use of several meteorological models, including the Mesoscale Meteorological Model and CALMET, and a wide variety of EPA and proprietary dispersion models. Dispersion models that have been used include the Urban Airshed Model (UAM), CALPUFF, CALGRID, AERMOD, Complex Terrain Dispersion Model (CTDM and CTDM+), Rough Terrain Dispersion Model (RTDM), Offshore and Coastal Dispersion Model (OCD), Industrial Source Complex Short Term (ISCST3) model, and many others.

- For a consortium of companies including Royal Dutch Shell and the Chinese National Offshore Oil Company, Mr. Radis prepared an air quality study of the Pearl River Delta region of Southern China. This analysis involved the preparation of emission inventories (criteria, hazardous and greenhouse gas pollutants) for petrochemical development projects in Guangdong Province in Southern China. A regional emission inventory was also developed for Guangdong Province, the Pearl River Delta and Hong Kong. Regional meteorological modeling was conducted using the MM5 model utilizing local meteorological data and NCEP/NCAR Reanalysis data. Air quality modeling was conducted for criteria pollutants, hazardous air pollutants, and secondary photochemical and particulate constituents using the Urban Airshed Model (UAM). Modeling results were compared to

World Bank and Peoples Republic of China (PRC) standards for air quality impacts and greenhouse gas emissions.

- Mr. Radis conducted accident investigations and numerical simulations of the consequences related to explosions and resulting fires at a refineries located in Louisiana and California. As part of these analyses, Mr. Radis developed a three-dimensional mesoscale meteorological dataset to evaluate pollutant transport. Project specific dispersion models were developed to evaluate scenario specific transport issues such as soot aerosol and oil droplet formation and deposition.

- As part of an Environmental Impact Report/Statement prepared for San Luis Obispo County, the California Central Coast Regional Water Quality Control Board and the US Army Corps of Engineers, Mr. Radis prepared a dispersion modeling analysis and health risk assessment of potential remedial alternatives for the Unocal Avila Beach Cleanup Project. This dispersion modeling and health risk assessment included the evaluation of acute and chronic health hazards associated with site contamination and a variety of cleanup strategies including air sparging/bioventing, solidification/stabilization, solvent flooding, steam stripping, excavation, and thermal desorption. Leaking Unocal Marine Terminal pipelines have resulted in approximately 400,000 gallons of petroleum hydrocarbon contamination beneath the town of Avila Beach and the adjacent beach and intertidal zone. Mr. Radis also served as the Project Manager for the preparation of the Environmental Impact Report/Statement.

- As part of an Environmental Impact Report prepared for San Luis Obispo County and the California Central Coast Regional Water Quality Control Board, Mr. Radis prepared a dispersion modeling analysis and health risk assessment of potential remedial alternatives for the Unocal Guadalupe Oil Field Remediation and Abandonment Project. This dispersion modeling and health risk assessment included the evaluation of acute and chronic health hazards associated with site contamination and a variety of cleanup strategies including air sparging/bioventing, hot water and steam flooding, excavation, and thermal desorption. The Guadalupe Oil Filed has been contaminated with between eight and 40 million gallons of diluent, which is a petroleum hydrocarbon similar to diesel fuel that was injected into production wells for enhanced crude oil recovery. Mr. Radis was also responsible for the evaluation of worker and public safety associated with site remediation and abandonment activities.

- Mr. Radis recently completed an emission inventory of both criteria pollutant and greenhouse gases emissions for a proposed West African oil development project. This project included a wide variety of emission sources associated with the construction and operation of offshore crude oil production and processing facilities. As part of this project, he identified numerous areas where energy use and emissions could be significantly reduced. He also prepared a verification protocol that will be implemented during the remaining design, drilling, construction and operation phases of the project. An air quality modeling analysis was also prepared to review potential impacts associated with project construction, operations, upset flaring and crude oil tankering.

- For the Center for Chemical Process Safety (CCPS) of the American Institute of Chemical Engineers (AIChE), Mr. Radis co-authored a book entitled *Guidelines for Postrelease Mitigation Technology in the Chemical Process Industry*. As part of this effort, Mr. Radis prepared numerical simulations and quantitatively evaluated the effectiveness of a variety of mitigation technologies.

- Mr. Radis has prepared several Liquefied Natural Gas (LNG) Marine Terminal and Regasification Facility Siting and Feasibility Studies in California and New Jersey. These studies examined a number of options for siting an LNG terminal along the California coast, including a number of existing ports, and a single site in New Jersey. The siting studies also included evaluation of various onshore and offshore marine terminal designs and regasification alternatives. As part of these studies a detailed permitting matrix was developed, along with permitting timelines and constraints. The studies included a regulatory analysis of the key permitting issues for each potential site and an analysis of key stakeholders with influential roles in permitting this type of facility in California and New Jersey.

- For a large, bankrupt engineering and energy trading company, Mr. Radis prepared a quantitative risk assessment for a liquefied natural gas (LNG) marine terminal and power plant project in Puerto Rico. The project included conducting a hazard assessment, fault tree analysis, consequence analysis and quantitative risk analysis. An analysis of external events that could potentially affect the proposed facility was also conducted.

- For four Local Emergency Planning Committees (LEPCs) in Alaska, Mr. Radis helped develop emergency response planning procedures through the preparation of a comprehensive regional hazard and risk analysis.

- Mr. Radis has conducted more than 100 offsite consequence analyses as part of California's Risk Management and Prevention Program (RMPP) and the US EPA Risk Management Program. Mr. Radis also served as an expert reviewer for numerous public agencies.

- For a Texas-based law firm, Mr. Radis prepared an analysis of external events and provided expert testimony to the Texas Water Commission related to the safety of a hazardous waste disposal facility proposed for the Houston Ship Channel. This study included a review of past external events in the region and centered on hurricane, tornado and storm surge hazards. The study required the development of a wind field model to simulate hurricanes passing over the site and to estimate potential maximum wind speeds and wind load on the proposed equipment.

- Mr. Radis has participated in several power plant certification projects in the areas of air quality, public health and hazardous materials. These projects included numerous Applications for Certification and Small Power Plant Exemptions for projects such as: Elk Hills, Metcalf Energy Center, Sycamore, Omar, Midway Sunset, Hanford, U.S. Borax, Santa Maria Aggregate, AES Placertia and several others. Mr. Radis has also prepared air quality,

public health and hazardous materials analyses for most generating stations formerly operated by Southern California Edison and San Diego Gas and Electric.

- For a large Southern California utility, Mr. Radis evaluated the feasibility and system safety of converting a fuel oil pipeline distribution network into a regional crude oil and petroleum product storage and distribution system. A multi-component spill model was developed to evaluate flammability hazards associated with the products that would be shipped in the pipeline system. An analysis of safety and environmental issues was prepared for the California Public Utilities Commission and the South Coast Air Quality Management District. Both agencies approved the conversion project which is now operating at full capacity.

- Mr. Radis has worked on the development of several models including the development or revisions to several accidental release models, an oil spill model, a multi-component pool model, atmospheric diffusion models, an integrated human exposure and health risk assessment model, and several meteorological models.

- Mr. Radis has been involved in the preparation of Environmental Impact Reports/Statements for a wide variety of facilities including power generating facilities (coal, fuel oil, natural gas, geothermal, hazardous waste), hazardous waste disposal facilities (chemical and nuclear), crude oil and natural gas transmission pipelines and distribution networks, oil and gas development projects, and military development or conversion projects. Mr. Radis has managed a majority of these projects and was also responsible for the system safety, public health, and air quality issue areas.

- Mr. Radis has prepared health risk assessments for a variety of facilities including power plants, oil and gas projects, hazardous waste sites (both State and Superfund listed sites), chemical milling facilities, the mining industry and waste disposal sites.

- Mr. Radis has conducted system safety and reliability studies for several oil and gas projects for the County of Santa Barbara. These studies included hazard identification, external event and offsite consequence analyses. Quantitative risk assessments were prepared for several of the projects.

- Mr. Radis has conducted oil spill modeling simulations for several oil and gas projects in California. These analyses included the simulation of multicomponent land based spills, spills to rivers and creeks, as well as ocean and harbor spills.

DECLARATION OF
Testimony of Chris Huntley

I, **Chris Huntley,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission's Siting, Transmission and Environmental Protection Division, as a senior associate in 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 **Palmdale Hybrid 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: December 16, 2010 Signed: _____

At: Agoura Hills, California

CHRISTIAN S. HUNTLEY

Senior Associate/Senior Biologist

ACADEMIC BACKGROUND

Graduate Studies, Biology, California State University Northridge
B.A., Biology, University of California at Santa Cruz, 1992

PROFESSIONAL EXPERIENCE

Mr. Huntley has eleven years of experience with Aspen supporting and managing CEQA/NEPA projects including EIR/EIS, IS/MND, EA, BE/BA, and BA. In addition, Mr. Huntley has extensive experience conducting biological assessments, managing large-scale construction and restoration projects, and supporting agency clients through the Section 7 process. With over 15 years experience as a biologist, Mr. Huntley also has proven experience working with the sensitive biological resources that occur in California. Mr. Huntley has also completed detailed vegetation mapping, sensitive species surveys, and revegetation plans for projects throughout southern California. With extensive experience in managing large scale construction projects, Mr. Huntley has unique experience in resolving conflicts and ensuring compliance with environmental regulations. Supported by a solid background in biological resources, experience in completing CEQA, NEPA, USDA Forest Service Biological Assessments, sensitive species consultation, and over a decade of construction management experience, he works closely with resource agency personnel, contractors and affected jurisdictions to ensure that projects are constructed on time and in compliance with applicable laws, ordinances, regulations and standards.

Aspen Environmental Group — 1998 to present

- **California Energy Commission Emergency Siting Team, Power Plant Development, Compliance Project Manager.** For two years, Mr. Huntley's duties included management of technical staff for the completion of CEQA equivalent environmental permitting for over nine new emergency power plants, review of applicant submittals, drafting of Memoranda of Understanding with Chief Building Officials, conducting audits of building officials, and coordinating with affected agencies to resolve concerns with potential resource impacts. Other duties included maintaining contractor construction milestones, compliance monitoring and reporting, development of mitigation measures and conflict resolution for power plant compliance issues.
- **California Energy Commission Coastal Power Plant Study, Deputy Project Manager/Biologist.** Conducted biological surveys at 21 coastal power plants as part of the CEC's coastal power plant study. Site visits characterized habitat within the footprint of the power plant, landscaping, and identified potential environmental and permitting issues associated with potential expansion of the power plants.
- **California Energy Commission Hydroelectric Power Plant Inventory Study, Deputy Project Manager/Natural Resources Analyst.** Mr. Huntley coordinated a team that collected power and environmental data on over 200 hydroelectric power plants located in California. Physical power data included electrical output, system upgrades, water storage capacity and peaking availability. Environmental information included developing a data base addressing sensitive species issues, fish

screens and ladders, monitoring parameters and a map of known hydroelectric facilities and barriers to anadromous fish passage. Mr. Huntley also obtained water use information on thermal power plants in support of the CEC's bi-annual environmental performance report.

- **Tehachapi Renewable Transmission Line Project California Public Utilities Commission/U.S. Forest Service (2007-2009), Issue Area Coordinator/Biologist.** Mr. Huntley is acting as the issue area coordinator and principal author for biological resources on this 500 kV transmission line proposed by Southern California Edison in support of wind energy projects. This transmission line is 173 miles in length and includes two separate segments that cross the Angeles National Forest. Some of the key issues on this project include potential impacts to Mojave ground squirrel, arroyo toads, California condors, spotted owl, and a host of forest sensitive plant and wildlife species. As part of the project Mr. Huntley mapped over 190 riparian related features and completed extensive surveys of the ANF. Mr. Huntley also managed the completion of comprehensive botanical surveys for the proposed right of way. Other key issues involve the coordination with State Park, Forest, and resource agency staff.
- **El Casco Sub-Transmission Line Project EIR, California Public Utilities Commission (2006-2009), Issue Area Coordinator/Biologist.** Mr. Huntley acted as the issue area coordinator for biological resources and completed the impact analysis section of the EIR for this 17-mile subtransmission line upgrade to be completed by Southern California Edison. This line is located in the Western Riverside Multiple Species Conservation Area and crosses areas supporting several federally protected species including least Bell's vireo, southwestern willow flycatcher, and Stephens' kangaroo rat. Currently, Mr. Huntley provides technical assistance to monitoring staff.
- **Antelope/Pardee Transmission Line Project EIR/EIS-BE/BA, California Public Utilities Commission/U.S. Forest Service (2005-2009), Issue Area Coordinator/Biologist.** Mr. Huntley acted as the issue area coordinator for biological resources on this 500 kV transmission line upgrade to be completed by Southern California Edison. Key issues on this project included compliance with the USFS Forest Plan and sensitive species including California condor, burrowing owl, and rare plants. Mr. Huntley reviewed and prepared the Biological Resource Section for the EIR/EIS, developed project alternatives, coordinated with USFS staff, and conducted sensitive species surveys for arroyo toad in support of this project. Currently, Mr. Huntley provides technical assistance to monitoring staff.
- **Tortoise Monitoring at Las Vegas Wash, U.S. Army Corps of Engineers (2005-2006), Project Manager.** Mr. Huntley managed the survey and report preparation for monitoring activities associated with this task. Monitoring crews conducted work within the Tropicana, Flamingo, and Blue Diamond tributaries as part of the ongoing flood control activities.
- **Devers–Palo Verde Transmission Line Project No. 2 EIR/EIS, California Public Utilities Commission/Bureau of Land Management (2005/2009), Issue Area Coordinator/Biologist.** Mr. Huntley acted as the issue area coordinator for biological resources on this 230-mile 500 kV transmission line upgrade to be completed by Southern California Edison. This project crosses key wildlife areas including the KOFA Wildlife Sanctuary, the San Bernardino National Forest, the Mojave and Sonoran Desert habitat, and sections of the Riverside Multiple Species Conservation Area.
- **Joint Red Flag '05 Exercise Environmental Assessment, U.S. Army Corps of Engineers/ Bureau of Land Management, Nellis Air Force Base Nevada (2004-2005), Project Manager/ Biologist.** Mr. Huntley managed and coordinated the EA process for the ground component of the Joint Red Flag '05 Exercise which was conducted Bureau of Land Management (BLM) lands surrounding Nellis Air Force Base in Lincoln County, Nevada. Mr. Huntley conducted extensive field surveys of the proposed anti-aircraft sites, completed the assessment for biological and visual

resources, prepared the DR/FONSI, managed sensitive species surveys, identified and flagged populations of noxious weeds, and prepared of military training guides for the soldiers in the field.

- **March Air Reserve Base Cactus and Heacock Channels Environmental Assessment and Biological Technical Report U.S. Army Corps of Engineers (2005-2009), Project Manager/Biologist.** Mr. Huntley conducted and managed the preparation of a Biological Technical Report for two channels located along the perimeter of the March Air Reserve Base in Riverside California. Mr. Huntley and a team of biologists conducted burrowing owl surveys, vegetation and vernal pool mapping, and documented existing biological conditions at the two channels. As part of this project detailed GIS maps were created to assist the Corps in preparing environmental documents for the area. Mr. Huntley managed the completion of an Environmental Assessment to evaluate impacts of construction of approximately three miles of flood control channel located at Cactus and Heacock Drainages. Currently, Mr. Huntley provides technical assistance to Corps staff for this project.
- **Patriot Integrated Air Defense Exercise Project Environmental Assessment and Environmental Baseline Survey, Nellis Air Force Base Nevada (2006-2008), Project Manager/Biologist.** Mr. Huntley managed the preparation of an EA for ongoing military activities conducted on Bureau of Land Management (BLM) lands surrounding Nellis Air Force Base in Lincoln and Nye County, Nevada. Mr. Huntley coordinated with the USAF regarding field surveys of the proposed anti-aircraft sites, the assessment of biological and cultural resources, and prepared the DR/FONSI and Right-Of-Way document for the USAF. Mr. Huntley also prepared sections and managed the completion of an Environmental Baseline Report for each of the artillery sites.
- **Lower Colorado Flood Control Project EIR/EIS, U.S. Army Corps of Engineers (2003-2004), Deputy Project Manager/Biologist.** Mr. Huntley conducted reconnaissance surveys and vegetation mapping along a 23-mile section of the Lower Colorado River in Yuma Arizona. In addition, Mr. Huntley updated the biological resource section of the current baseline conditions and is working with a team of State and federal agencies in an effort to determine the future alignment of the Lower Colorado River in this location. As part of this process Mr. Huntley developed project alternatives that met the criteria identified by the United States Boundary Water Commission and State and federal resources agencies.
- **Fort Irwin Environmental Baseline Survey Reports U.S. Army Corps of Engineers (2005), Project Manager/Biologist.** Mr. Huntley managed the preparation of two Environmental Baseline Survey reports near Fort Irwin, San Bernardino County, California to support the land acquisition of over 95 parcels by the U.S. Army for the Fort Irwin National Training Center. Mr. Huntley conducted site investigations, documented existing biological conditions and managed the preparation of the report.
- **Angeles National Forest Fuels Reduction Project, Biological Evaluation/Biological Assessment, U.S. Department of Agriculture Forest Service (2005/2009), Biologist.** Mr. Huntley reviewed existing documents and assisted staff in responding to comments from USFS staff. Mr. Huntley met with USFS staff and conducted site inspections at several plantation and natural stands. Currently, Mr. Huntley is revising BE/BA's for the ANF.
- **Level 3 Fiber Optics Network Construction Monitoring and Supplemental Environmental Review Program, CPUC, Environmental Monitor.** Mr. Huntley's duties included inspection of several southern California segments including Santa Barbara to Burbank, San Bernardino, Corona to Atwood and San Diego to the California/Arizona state line. Environmental compliance during construction addressed biological and cultural resource, air and water quality, traffic control, and public utilities. Other tasks included maintaining daily documentation, review of pre-construction mitigation measures, weekly reporting of compliance activities, and coordination with Level 3 personnel and subcontractors, and affected agencies.

- **Pacific Pipeline Project EIR/EIS for the U.S. Forest Service, Angeles National Forest, and the California Public Utilities Commission, Environmental Monitor.** Served as an Environmental Monitor and supervised mitigation monitoring for all sensitive resources for a construction segment along a 132-mile crude oil pipeline within southern California.
- **SCE Valley-Auld Power Line Project, CPUC, Environmental Monitor.** Conducted inspections of construction of this 11-mile power line upgrade for compliance with the project's Mitigated Negative Declaration mitigation measures and compliance plans. Other tasks included review of pre-construction compliance materials, maintaining inspection documentation, and coordination with SCE and its subcontractors.
- **Piru Creek Repairs Project IS/MND, California Department of Water Resources, Biologist.** Mr. Huntley completed sections of the U.S. Forest Service Biological Assessment/Biological Evaluation, and biological technical report for the Piru Creek Repairs Project. In addition, Mr. Huntley has conducted sensitive species surveys and coordinated with CDFG, USFS and RWQCB regarding permits and sensitive species issues.
- **Compliance and Mitigation Development, California Public Utilities Commission, State Lands Commission, California Department of Water Resources, Biologist.** Working with technical experts Mr. Huntley developed mitigation measures for a number of State and federal projects including the Kinder Morgan pipeline, Santa Ana pipeline and Viejo transmission line project.
- **San Antonio Creek Erosion Repairs Project BA/EA, U.S. Army Corps of Engineers, Biologist.** Mr. Huntley conducted botanical surveys and prepared detailed vegetation maps within San Antonio Creek. Mr. Huntley also prepared the Biological and Environmental Assessments for the project and developed mitigation for sensitive plant and wildlife species.
- **Santa Fe Pacific Pipeline, CPUC, Environmental Monitor.** Inspected construction of three petroleum distribution station sites for compliance with approved project mitigation measures and compliance plans.

SELECTED TECHNICAL EXPERIENCE/TRAINING AND CERTIFICATIONS

- SWPPP trained 2006
- California Energy Commission Outstanding Performance Award, 2001
- CDFG Scientific Collecting Permit for pond turtle and garter snake.
- Certified Caltrans Horizontal Directional Drilling Inspector 2001
- Desert Tortoise Handling Workshop, Ridgecrest California 2001
- CEC Expert Witness Training 2001
- Railroad Right-of-Way Safety Training 2002
- Small boat handling, licensed and certified since 1993
- Research Scuba-diving certification and training since 1989

DECLARATION OF
Beverly E. Bastian

I, Beverly E. Bastian, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission, and Environmental Office 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 Cultural Resources, for the Palmdale Hybrid Power Plant, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 1, 2010 Signed: _____

At: Sacramento, California

Beverly E. Bastian
1516 Ninth Street MS 40, Sacramento, CA 95814-5504
(916) 654-4840 email: bbastian@energy.state.ca.us

Education	Field	Degree	Year
University of California, Davis	Anthropology	B.A	1967
University of California, Davis	Anthropology	M.A	1969
Tulane University	Anthropology	P.H.C.	1975
University of Mississippi	American History	(courses only)	1989
University of California, Santa Barbara	Public (American) History and Historic Preservation	P.H.C.	1996

Experience

State of California, California Energy Commission *2005 to present*
Planner II, Siting, Transmission, and Environmental Protection Division
Environmental Office, Cultural Resources Unit
All tasks related to the production of the cultural resources sections of CEQA-equivalent (California Environmental Quality Act) documents for the environmental review of proposed 50-MW+ power plants in California, including: Evaluating data in applications; writing data requests to applicants and doing independent research to compile an inventory of and evaluate the historical/cultural significance of cultural resources subject to significant impacts from proposed projects; providing and receiving information in public hearings on applications; analyzing all pertinent data; writing Staff Assessments of impacts; identifying California Register of Historical Resources-eligible cultural resources; developing mitigation measures to reduce to insignificant any impacts to Register-eligible cultural resources; providing expert testimony on my analyses and recommendations in public hearings; and reviewing compliance with mitigation measures during the construction, operation, and decommissioning of certified power plants. Additional tasks include: providing prefiling assistance to applicants; coordinating the joint environmental review of power plant projects with cultural resources specialists in sister state agencies and in federal agencies; supervising and reviewing the work of Commission cultural resources consultants; reviewing the CEQA documents of sister state agencies; and developing internal procedures and guidelines to improve cultural resources review of applications.

State of California, Department of Parks and Recreation *2001 to 2005*
Historian II, Cultural Resources Division, Cultural Resources Support Unit
Major and complex historical and historic architectural investigations and studies dealing with the significance, integrity, and management of historic buildings, structures, and landscapes in California's state parks; participation in interdisciplinary teams and project assignments; preparation of technical reports and correspondence; inventorying and evaluating historic properties; coordinating the statewide registration of historical properties; assessing the eligibility of historic properties to the National Register of Historic Places and the California Register of Historical Resources; reviewing environmental documents and providing technical analyses of major Departmental projects to determine impacts to cultural resources under State and federal laws; identifying resource issues and constraints; establishing allowable use and development guidelines; developing approaches to protect, enhance, and perpetuate cultural resources under relevant State and federal laws, regulations, and standards; proposing and developing programs, policies, and budgets to meet Department's historic preservation missions.

Department of Social Sciences, American River College *2000 to 2002*
Instructor (part-time), American History
Creation and presentation of classroom lectures, selection of assigned texts and readings, creation and administration of quizzes and examinations, assignment and supervision of student research papers, student consultation in office hours, grading of all quizzes, tests, and papers, and assigning final student grades. These research, organizing, and teaching skills demonstrate the ability to organize information, to speak effectively to the public, and to train and direct other personnel.

Department of Sociology and Anthropology, University of Mississippi *1987 to 1989*
Archaeologist, Center for Archaeological Research
All tasks for the completion of the historical archaeological part of an archaeological survey and testing program final report related to a U. S. Army Corps of Engineers erosion control project in twelve north-central Mississippi counties, including: Coordinating the activities of a field crew and the research of historians working in archives; setting up an artifact database using survey data to generate statistical summaries for discovered historical archaeological sites; gathering historical settlement and land-use data for twelve counties; conducting a special statistical analysis and synthesis of historical data only, focusing on pre-and post-Civil War land tenure and agricultural production for plantations in two counties where soil fertility contrasted; synthesizing data from all sources, collaborating on the final cultural resources management report with archaeologists specializing in prehistory and survey and sampling methodology; presenting findings at the annual meeting of the Society for Historical Archaeology in 1989.

Gilbert Commonwealth, Inc. *1984 to 1987*
Historical Archaeologist and Project Manager, Environmental Unit
All tasks as Principal Investigator for six major historical archaeological and/or historical architectural cultural resources management projects done under contract to federal, state, and local governments, including: Writing winning proposals for these projects; negotiating and managing project budgets; gathering/supervising the gathering of historical, oral historical, and archaeological data; analyzing/supervising the analysis of gathered data; and writing/supervising the writing of reports of findings, along with the creation of maps, illustrations, and data tables for these reports; serving as the historian and historical preservationist on several multidisciplinary teams tasked with siting the routes for several major power lines in east Texas.

Tennessee Valley Authority (personal services contract) *1979 to 1981, 1983-1984*
Historical Archaeologist (self-employed)
All tasks as Principal Investigator for various cultural resources management projects in areas affected by TVA construction, the most significant of which were: the complete excavation of and report on seven nineteenth-century log cabin sites in Cedar Creek Reservoir in northwestern Alabama; and all historical research, the field work, and the report for the underwater remote-sensing reconnaissance and underwater videotaping of sunken Civil War cargo boats and gunboats at Johnsonville, Tennessee, in the western part of the Tennessee River.

Other Archaeological Projects *1966 to 1981*

Professional Societies
Register of Professional Archaeologists, #10683
Society for Historical Archaeology
California Council for the Promotion of History
Vernacular Architecture Forum
Society for California Archeology

DECLARATION OF
Alvin J. Greenberg, Ph.D.

I**, Alvin J. Greenberg, Ph.D.** declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the Final Staff Assessment and the Alternatives Appendix A sections on **Public Health, Hazardous Materials Management,** and **Worker Safety/Fire Protection** for the **Palmdale Hybrid Power Project Application** based on my independent analysis of the application for certification, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the 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: _____ Signed: _____

At: Sacramento, California

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
415-479-7560 fax 415-479-7563
e-mail agreenberg@risksci.com

Name & Title: **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP**
Principal Toxicologist

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader for hazardous waste site characterization, preparation of human and ecological risk assessments, air quality assessments, interaction with regulatory agencies in obtaining permits, hazardous materials handling and risk management prevention, infrastructure vulnerability assessments, conducting lead surveys and studies, with particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, and the intrusion of subsurface contaminants into indoor air. 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. In addition to providing security expertise to the State of California, Dr. Greenberg is Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 25

Education:

B.S. 1969 Chemistry, University of Illinois Urbana

Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California, San Francisco

Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of California, San Francisco

Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002
Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)
September 2000 – February 2001
Member, State Water Resources Control Board Noncompliant Underground Tanks Advisory Group
January 1999 – June 2001
Member, California Air Resources Board Advisory Committee on Diesel Emissions
January 1994 - September 1999
Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee
September 1998
Member, US EPA Workgroup on Cumulative Risk Assessment
April 1997 - September 1997
Member, Cal/EPA Private Site Manager Advisory Committee
January 1986 - July 1996
Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)
January 1988 - June 1995
Member: California Department of Toxic Substance Control Site Mitigation Program Advisory Group
January 1989 - February 1995
Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992
Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991
Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988
ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987
California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987
Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987
Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986
Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985
Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983
Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

Present Position

January 1983- present
Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, 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 Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Materials Management and Security, Hazardous Waste Site Characterization and Toxic Substances Control Policy for over 25 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 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 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 also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Since the events of 9/11, Dr. Greenberg has taken the lead for the California Energy Commission in developing a power plant vulnerability assessment methodology and model power plant security plan. He also assisted the CEC in the preparation of a “background” report on the risks and hazards of siting LNG terminals in California and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. 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.

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 oxide contaminated soil at DOD facilities.

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.

DECLARATION OF
Rick Tyler

I, **Rick Tyler** declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission, and Environmental Protection Division as a Senior Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I supervised preparation of the Final Staff Assessment for Hazardous Materials Management and Worker Safety Fire Protection Sections for the Palmdale Hybrid Power Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 12/21/10 Signed: _____

At: Sacramento, California

RICK TYLER

Associate Mechanical Engineer

CALIFORNIA ENERGY COMMISSION

EDUCATION B.S., Mechanical Engineering, California State University, Sacramento. Extra course work in Statistics, Instrumentation, Technical Writing, Management; Toxicology, Risk Assessment, Environmental Chemistry, Hazardous Materials Management, Noise Measurement, and regulations regarding control of toxic substances.

Near completion of course work necessary to obtain a certificate in hazardous materials management from University of California, Davis.

EXPERIENCE

Jan. 1998-Present — California Energy Commission - Senior Mechanical Engineer
Energy Facility Siting and Environmental Protection Division

Responsible for review of Applications for Certification (applications for permitting) for large power plants including the review of handling practices associated with the use of hazardous and acutely hazardous materials, loss prevention, safety management practices, design of engineered equipment and safety systems associated with equipment involving hazardous materials use, evaluation of the potential for impacts associated with accidental releases and preparation and presentation of expert witness testimony and conditions of certification. Review of compliance submittals regarding conditions of certifications for hazardous materials handling, including Risk Management Plans Process Safety Management.

April 1985-Jan. 1998 — California Energy Commission - Health and Safety
Program Specialist; Energy Facility Siting and Environmental Protection Division.

Responsible for review of Public Health Risk Assessments, air quality, noise, industrial safety, and hazardous materials handling of Environmental Impact Reports on large power generating and waste to energy facilities, evaluation of health effects data related to toxic substances, development of recommendations regarding safe levels of exposure, effectiveness of measures to control criteria and non-criteria pollutants, emission factors, multimedia exposure models. Preparation of testimony providing Staff's position regarding public health, noise, industrial safety, hazardous materials handling, and air quality issues associated with proposed power plants. Advise Commissioners, Management, other Staff and the public regarding issues related to health risk assessment of hazardous materials handling.

Nov. 1977-
April 1985

California Air Resources Board - Engineer (last 4 years Associate level)

Responsible for testing to determine pollution emission levels at major industrial facilities; including planning, supervision of field personnel, report preparation and case development for litigation; evaluate, select and acceptance-test instruments prior to purchase; design of instrumentation systems and oversight of their repair and maintenance; conduct inspections of industrial facilities to determine compliance with applicable pollution control regulations; improved quality assurance measures; selected and programmed a computer system to automate data collection and reduction; developed regulatory procedures and the instrument system necessary to certify and audit independent testing companies; prepared regulatory proposals and other presentations to classes at professional symposia and directly to the Air Resources Board at public hearings. As state representative, coordinated efforts with federal, local, and industrial representatives.

PROFESSIONAL AFFILIATIONS/ LICENSES

Past President, Professional Engineers in California Government Fort Sutter Section;
Past Chairman, Legislative Committee for Professional Association of Air Quality Specialists. Have passed the Engineer in Training exam.

PUBLICATIONS, PROFESSIONAL PRESINTATIONS AND ACCOMPLISHMENTS

Authored staff reports published by the California Air Resources Board and presented papers regarding continuous emission monitoring at symposiums.

Authored a paper entitled "A Comprehensive Approach to Health Risk Assessment", presented at the New York Conference on Solid Waste Management and Materials Policy.

Authored a paper entitled "Risk Assessment A Tool For Decision Makers" at the Association of Environmental Professionals AEP Conference on Public Policy and Environmental Challenges.

Conducted a seminar at University of California, Los Angeles for the Doctoral programs in Environmental Science and Public Health on the subject of "Health Risk Assessment".

Authored a paper entitled "Uncertainty Analysis -An Essential Component of Health Risk Assessment and Risk Management" presented at the EPA/ORNL expert workshop on Risk Assessment for Municipal Waste Combustion: Deposition, Uncertainty, and Research Needs.

Presented a talk on off-site consequence analysis for extremely hazardous materials releases. Presented at the workshop for administering agencies conducted by the City of Los Angeles Fire Department.

Evaluated, provided analysis and testimony regarding public health and hazardous materials management issues associated with the permitting of more than 20 major power plants throughout California.

Developed Departmental policy, prepared policy documents, regulations, staff instruction, and other guidance documents and reference materials for use in evaluation of public health and hazardous materials management aspects of proposed power plants.

Project Manager on contracts totaling more than $500,000.

RES.RT

DECLARATION OF
Testimony of Negar Vahidi

I**, Negar Vahidi,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Siting, Transmission and Environmental Protection Division, as a **Senior Project Manager/Senior Land Use Technical Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use** for the **City of Palmdale Hybrid Power Plant 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: November 29, 2010 Signed: _____

At: Agoura Hills, California

NEGAR VAHIDI

Senior Associate
Group Leader: Land Use, Policy Analysis, and Socioeconomics

ACADEMIC BACKGROUND

Master of Public Administration, University of Southern California, 1993
B.A. (with Highest Honors), Political Science, University of California, Irvine, 1991

PROFESSIONAL EXPERIENCE

Ms. Vahidi has over 17 years of experience managing and preparing a variety of federal, State, and local environmental, planning, and analytical documents for large-scale energy and water infrastructure and development projects. She currently serves as a Senior Project Manager and Aspen's Group Leader for social science issues. She brings the experience of being both a public and private sector planner, specializing in the integration and completion of NEPA and CEQA documentation, land use and public policy analyses, socioeconomics and environmental justice analyses, and public involvement programs. Her diversity and experience in management and technical analyses can be shown through a sample of her projects described below.

Aspen Environmental Group — 1992 to 1998 and 2001 to present

Ms. Vahidi has participated in CEQA and NEPA analyses of major utility development projects throughout the State, providing land use, agriculture, public policy, and socioeconomics expertise as well as managing Public Participation Programs. Her specific projects are described below.

California Energy Commission (CEC)

In response to California's power shortage, Aspen has assisted the CEC in evaluating the environmental and engineering aspects of new power plant applications throughout the State under four separate contracts. Ms. Vahidi has served as expert witness and Technical Senior for land use (since 2001), and a specialist for socioeconomics and environmental justice, and alternatives analyses and special studies. Her specific projects are listed below.

- Technical Assistance in Application for Certification Review (Contract # 700-99-014; 3/6/2000 through 12/31/2003)
  - **Woodland Generation Station No. 2, Modesto, CA**. As the land use Technical Specialist, prepared the Land Use and Recreation, and Agricultural Resources Staff Assessments of this 80-megawatt nominal, natural gas-fired power generating facility and associated linear facilities (i.e., gas and water pipeline and transmission line. The Staff Assessment evaluated potential impacts on nearby residential, recreational, and agricultural land uses, including important farmlands being traversed by linear faculties.
  - **Valero Cogeneration Project, Benicia, CA**. Prepared the Socioeconomics Staff Assessment for a proposed cogeneration facility at the Valero Refinery in Benicia. Issues addressed included impacts on public services and other project-related population impacts such as school impact fees.
  - **Rio Linda/Elverta Power Project, Sacramento, CA**. Prepared the Socioeconomics Staff Assessment for a 560-megawatt natural gas power plant in the northern Sacramento County. Issues of importance included environmental justice and impacts on property values.

- **Magnolia Power Project, Burbank, CA**. As the Socioeconomics technical specialist, prepared the Staff Assessment for this nominal 250-megawatt natural gas combined-cycle fired electrical generating facility to be located at the site of the existing City of Burbank power plant. Environmental justice issues and potential impacts on local economy and employment were evaluated
- **Potrero Power Plant Project, San Francisco, CA**. Prepared the land use portion of the Alternatives Staff Assessment for this proposed nominal 540 MW natural gas-fired, combined cycle power generating facility. Analysis included review of several alternative sites for development of the power plant and the comparative merits of those alternatives with the proposed site located on the San Francisco Bay.
- **Los Esteros Critical Energy Facility, San Jose, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment of this 180-megawatt natural-gas-fired simple cycle peaking facility. Issues included potential impacts resulting from loss of agricultural land, and impacts associated with the project's non-compliance with local General Plan land use and zoning designations.
- **East Altamont Energy Center, Alameda County, CA.** Senior Technical Specialist for the Land Use Assessment for a 1,100-megawatt nominal, natural gas-fired power plant and associated linear facilities. Provided expert witness testimony on Land Use Staff Assessment. Major issues addressed in the Staff Assessment included loss of Prime Farmlands, recommendation of land preservation mitigation, and the project's non-compliance with local General Plan land use and zoning designations.
- **Tracy Peaker Project, Tracy, CA.** Senior Technical Specialist for the Land Use Staff Assessment of this 169-megawatt simple-cycle peaking facility in an unincorporated area of San Joaquin County. Provided expert witness testimony on Land Use Staff Assessment. Issues included potential impacts resulting from loss of agricultural land under Williamson Act Contract, and evaluation of cumulative development in the fast-growing surrounding area. The agriculture Condition of Certification from the Land Use Staff Assessment resulted in an Agricultural Mitigation Plan currently being implemented, and amended for continued implementation for the Tracy Combined Cycle Power Plant (see below).
- **Avenal Energy Project, Kings County, CA.** Socioeconomics Technical Specialist for this 600-megawatt combined cycle electrical generating facility, and associated linear facilities.
- **Tesla Power Project, Alameda County, CA.** Land Use Technical Senior and Alternatives Technical Specialist in charge of preparation of two Staff Assessments for this nominal 1,120-MW electrical generating power plant with commercial operation planned for third quarter of 2004. The Tesla Power Project would consist of a natural gas-fired combined cycle power generator, with 0.8 miles of double-circuit 230-kilovolt transmission line connected to the Tesla PG&E substation, 24-inch 2.8-mile natural gas pipeline, and 1.7-mile water line constructed along Midway Road.
- **Sacramento Municipal Utility District Consumes Power Plant Project, Sacramento, CA.** Socioeconomics and Alternatives Technical Specialist in charge of preparation of two Staff Assessments for this nominal 1,000-megawatt (MW) combined-cycle natural gas facility. Provided expert witness testimony on Socioeconomics Staff Assessment. The project would include the construction and operation of a natural gas power plant at the Rancho Seco Nuclear Plant, 25 miles southeast of the City of Sacramento, in Sacramento County. The project would be located on a 30-acre portion of an overall 2,480-acre site owned by SMUD.
- **Inland Empire Energy Center, Riverside County, CA.** Senior Technical Specialist for the Land Use Assessment for a 670-megawatt natural gas-fired, combined-cycle electric generating facility and associated linear facilities including, a new 18-inch, 4.7-mile pipeline for the disposal of non-reclaimable wastewater, and a new 20-inch natural gas pipeline. Provided expert witness testimony on Land Use Staff Assessment. The project would be located on approximately 46-acres near Romoland, within Riverside County. Major issues addressed in the Staff Assessment included potential loss of agricultural lands, impacts to planned school uses, and the project's potential non-compliance with local General Plan land use and zoning designations.
- **Senior Technical Lead, Land Use Resources.** The California Energy Commission (CEC) requested that the Aspen Team provide Technical Seniors for the Land Use Resources area in order to help coordinate and review Land Use Resource Assessments. As a Technical Senior, Negar Vahidi was responsible for the technical review of Land Use sections of Staff Assessments for various power plants.

- **Legislative Bill Review.** As a Land Use Technical Senior for the CEC, Ms. Vahidi conducted legislative bill review related to energy facilities siting. She conducted portions of the CEC Systems Assessment & Facilities Siting Division analysis of Senate Bill 1550 which was intended to give the Superintendent of Public Instruction/CDE approval authority over siting of power plants within one mile of existing or proposed K-12 school sites by requiring the CDE (in coordination with the State Architect, and the commission) to develop appropriate siting guidelines.

- Engineering & Environmental Technical Assistance to Support the Energy Facility Planning and Licensing Program Contract (Contract # 700-02-004; 6/30/03 through 3/30/06)

  - **Environmental Performance Report (EPR).** Ms. Vahidi managed the preparation of the Socioeconomics chapter of the EPR for the California Energy Commission, which eventually became part of the State of California's Integrated Energy Policy Report (IEPR). The Socioeconomics chapter addressed: the importance of reliable and affordable electricity supply power plant construction and operation impacts, including labor force, taxation, etc.; and trends in the energy section, including renewable power sources such as wind and solar. She also conducted the analysis of a new portion of the Land Resources Chapter, which addressed the siting and land use issues associated with renewable power. This new portion of the land use analysis compared the land use and siting constraints associated with renewable power infrastructure such as wind and solar versus other forms of power infrastructure, such as gas pipelines, transmission lines, LNG facilities, and power plants.

  - **Coastal Plant Study.** Ms. Vahidi served as the Social Sciences Task Manager for this special study being conducted as part of Aspen's contract with the California Energy Commission. The study included identification and evaluation of potential issues associated with the possible modernization, re-tooling, or expansion of California's 25 coastal power plants including: northern California power plants such as Humboldt, Potrero, Hunter's Point, Pittsburg, and Oakland; central coast power plants such as Contra Costa, Diablo Canyon Nuclear, Morro Bay, Moss Landing, Elwood, Mandalay, and Ormond Power Plants; and southern California power plants such as the Alamitos, Long Beach, Los Angeles Harbor, Haynes, Redondo Beach, Scattergood, El Segundo, Huntington Beach, Encina, Silver Gate, South Bay, and San Onofre Nuclear. As Task Manager her responsibilities included, identification of potential political, social, community, and physical land use impacts that may arise from the potential increased output of energy from plants in highly sensitive coastal communities. The intent of the study is to identify red flag items for the Energy Commission in order to streamline future licensing processes. Her task as the Social Science Task Manager also included a thorough review of applicable Local Coastal Plans, and Coastal Commission regulations associated with Coastal Development Permits and Consistency Determinations.

  - **Natural Gas Market Outlook Report (NGMOR**). Ms. Vahidi assisted the CEC's Natural Gas Unit as a technical editor in their preparation and publication of the NGMOR. She managed Aspen's efforts, including format and graphics, to edit technical sections prepared by Natural Gas Unit Staff under a condensed time frame. The Preliminary NGMOR was released for public review in June 2003.

- Peak Workload Support for the Energy Facility Siting Program and the Energy Planning Program (Contract #700-05-002; and 4/11/06 through 3/30/10); and Siting, Transmission, and Environmental Protection Peak Workload (STEP) (Contract #700-08-001; 6/30/09 through 5/31/12)

  - **Chula Vista Energy Upgrade Project, Chula Vista, CA.** Senior Technical Specialist for the Land Use Staff Assessment for MMC Energy, Inc.'s Application for Certification (AFC) to construct and operate replacements and upgrades of equipment at the Chula Vista Power Plant, located on a 3.8-acre parcel in the City of Chula Vista's Main Street Industrial Corridor and within the City's Light Industrial zoning district. Issues of concern include the impacts of the power plant on adjacent residential and open space land uses, and compliance with applicable local LORS, including recently adopted city environmental justice policies. Provided expert witness testimony on Land Use Staff Assessment.

  - **Ivanpah Solar Electric Generating System Project, San Bernardino County, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessment/BLM EIS for a 400-megawatt solar thermal electric power generating system. The project's technology would include heliostat mirror fields focusing solar energy on power tower receivers producing steam for running turbine generators. Related facilities would include administrative buildings, transmission lines, a substation, gas lines, water lines, steam lines, and well water pumps. The proposed project would be developed entirely in the Mojave Desert region of San Bernardino County, California. The document was prepared in compliance with both NEPA and CEQA

requirements. Issues of concern included taxation, property values, environmental justice, local labor force concerns, project-related worker housing.

- **Sentinel Energy Project, Riverside County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for CPV Sentinel's Application for Certification (AFC) to construct and operate an 850-megawatt (MW) peaking electrical generating facility near SCE's Devers Substation. The proposed project site consisted of 37 acres of land situated approximately eight miles northwest of the center of the City of Palm Springs with portions of the construction laydown area and natural gas pipeline within the Palm Springs city limits. Land use issues of concern included the project's compliance with local LORS, and parcel legality to comply with the Subdivision Map Act.
- **Carrizo Energy Solar Farm, San Luis Obispo County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for Carrizo Energy, LLC's Application for Certification (AFC) to build the Carrizo Energy Solar Farm (CESF), which would consist of approximately 195 Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air-cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The CESF site was proposed to be located in an unincorporated area of eastern San Luis Obispo County, west of Simmler and northwest of California Valley, California. The CESF included the solar farm site, a minimal offsite transmission system connection, and construction laydown area. The CESF site encompassed approximately 640 acres of fenced area in an area zoned for agricultural uses as specified in the San Luis Obispo County General Land Use Plan. Issues of concern included the impacts of the power plant on agricultural land conversion, compatibility with adjacent land uses, and compliance with applicable local LORS. The development of the agriculture mitigation to reduce impacts resulting from the loss of 645 acres of Important Farmlands required extensive coordination with the California Department of Conservation, San Luis Obispo County Agriculture Department, and the San Luis Obispo County Land Conservancy.
- **Carlsbad Energy Center Project, Carlsbad, CA.** Senior Technical Specialist and expert witness for the Land Use and Alternatives Staff Assessments for Carlsbad Energy Center, LLC's Application for Certification (AFC) to build the Carlsbad Energy Center Project (CECP), which will consist of a 558 MW gross combined-cycle generating facility configured using two units with one natural-gas-fired combustion turbine and one steam turbine per or unit. Issues of concern include major incompatibilities with local LORS, and cumulative impacts from widening of I-5. Ms. Vahidi conducted the California Coast Act Consistency Determination in lieu of the California Coastal Commission (CCC), because the CCC opted to have the CEC conduct the consistency analysis with the Coastal Act.
- **Marsh Landing Generating Station, Contra Costa County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for the Mirant Marsh Landing, LLC AFC for a 930 MW natural gas-fired power plant, which would be would be sited adjacent to the existing Contra Costa Power Plant in unincorporated Contra Costa County, near the City of Antioch. Issues of concern included impacts to nearby agricultural resources, compatibility with adjacent land uses, compliance with local LORS, and parcel legality to comply with the Subdivision Map Act.
- **Canyon Power Plant, Anaheim, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessments for a nominal 200 megawatt (MW) simple-cycle plant, using four natural gas-fired combustion turbines and associated infrastructure proposed by Southern California Public Power Authority (SCPPA). This project is a peaking power plant project located within the City of Anaheim, California. Issues of concern included impacts to local employment and housing.
- **Willow Pass Generating Station, Pittsburg, CA.** Senior Technical Specialist for the Land Use Staff Assessment for a new, approximately 550-megawatt (MW) dry-cooled, natural gas-fired electric power facility proposed by Mirant. Development of Willow Pass would entail the construction of two generating units and ancillary systems including, adjacent electric and gas transmission lines, and water and wastewater pipelines. Issues of concern include impacts to nearby agricultural resources, compatibility with adjacent land uses, compliance with local LORS, and parcel legality to comply with the Subdivision Map Act. This project is currently on hold.
- **Calico Solar One Project (a.k.a, Stirling Energy Systems Solar One), San Bernardino County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment/BLM EIS for a nominal 850-megawatt (MW) Stirling engine project, with construction planned to begin late 2010. The primary equipment for the generating facility would include the approximately 30,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support

infrastructure. Major issues of concern include the conversion of approximately 8,230 acres of open space to industrial uses, compliance with BLM's CDCA Plan, access to land-locked private parcels, compatibility with the on-site BNSF railroad right-of-way, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands. Currently, staff is working on analyzing two new reduced project alternatives, because of the significant impacts of the project as proposed.

- **Imperial Valley Solar Project (a.k.a., Stirling Energy Systems Solar Two), Imperial County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment/BLM EIS for a nominal 750-megawatt (MW) Stirling engine project, with construction planned to begin either late 2009 or early 2010. The primary equipment for the generating facility would include the approximately 30,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. Major issues of concern include conversion of 6,500 acres of public recreation land used for OHV use and camping, compliance with the BLM's CDCA plan and local LORS, parcel legality issues in compliance with the Subdivision Map Act, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands.. Ms. Vahidi coordinated extensively with Imperial County regarding the project's inconsistencies with local LORS.
- **GWF Tracy Combined Cycle Power Plant, San Joaquin County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment for GWF's proposal to modify the existing TPP (see description above), a nominal 169-megawatt (MW) simple-cycle power plant, by converting the facility into a combined-cycle power plant with a nominal 145 MW, net, of additional generating capacity. Major issues of concern included conversion of Important Farmlands, and the continued implementation of the Agricultural Mitigation Plan resulting from the agriculture Condition of Certification imposed on the Tracy Peaker Project.
- **City of Palmdale Hybrid Power Plant Project, Palmdale, CA.** Senior Technical Specialist for the Land Use Staff Assessment for the Palmdale Hybrid Power Project (PHPP) proposed by the City of Palmdale. The PHPP consists of a hybrid of natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment to be developed on an approximately 377-acre site in the northern portions of the City of Palmdale (City). Major issues of concern include compatibility impacts of the proposed project's linear facilities on adjacent land uses, and the proposed Gen-Tie's LORS inconsistency impacts in both the City of Palmdale and Los Angeles County.
- **Lodi Energy Center, Lodi, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessment for a combined-cycle nominal 225-megawatt (MW) power generating facility. Issues of concern included impacts to local workforce and employment, and taxation.
- **Abengoa Mojave Solar One Project, San Bernardino County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment of a nominal 250 megawatt (MW) solar electric generating facility to be located near Harper Dry Lake in an unincorporated area of San Bernardino County. Issues of concern include the impacts associated with the conversion of 1,765 acres of Important Farmlands, and over 2,000 acres of open space lands. The analysis of agricultural land conversion impacts and associated mitigation required extensive coordination with the California Department of Conservation, San Bernardino County, and Transition Habitat Conservancy.
- **Genesis Solar Energy Project, Riverside County, CA.** Senior Technical Specialist for the Land Use Staff Assessment/BLM EIS for two independent solar electric generating facilities with a nominal net electrical output of 125 megawatts (MW) each, for a total net electrical output of 250 MW. Electrical power would be produced using steam turbine generators fed from solar steam generators. The project is located approximately 25 miles west of the city of Blythe. Major issues of concern include conversion of 4,460 acres of BLM lands to an industrial use, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands..
- **Contra Costa Generating Station, Contra Costa County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 624 megawatts (MW). The project would be located in the City of Oakley. Issues of concern include compatibility with adjacent land uses, and compliance with City of Oakley LORS.

- **Topaz Solar Project EIR, San Luis Obispo County, CA.** (Applicant: First Solar). Aspen is managing preparation of an EIR for this 500 MW solar photovoltaic project in the Carrizo Plain area.

A major issue of concern is the conversion of approximately 6,000 acres of open space (60 percent of which are under land preservation contracts) to an industrial use. Ms. Vahidi is the senior in charge of developing the methodology, approach, and thresholds of significance for analysis of impacts related to agricultural land conversion using the CA Department of Conservation LESA Model. One major issue of concern related to agricultural resources is impacts to lands under Williamson Act contracts. She will be guiding the analysis.

- **California Valley Solar Ranch EIR, San Luis Obispo County, CA.** (Applicant: SunPower). Aspen is managing preparation of an EIR for this 250 MW solar photovoltaic project in the Carrizo Plain area. A major issue of concern is the conversion of approximately 4,000 acres of open space to an industrial use. Ms. Vahidi is the senior in charge of developing the methodology, approach, and thresholds of significance for analysis of impacts related to agricultural land conversion using the CA Department of Conservation LESA Model. She will be guiding the analysis.
- **EIR for South San Joaquin Irrigation District's (SSJID) Plan to Provide Retail Electric Service, Sphere Plan, MSR, and Annexation, San Joaquin County, CA.** This Subsequent EIR (SEIR) evaluates environmental impacts associated with the SSJID application to provide retail electric service, and evaluates changes in the project and changes with respect to the circumstances under which the project would be undertaken that have occurred since the original 2006 Final EIR was certified. LAFCo may then certify the Final SEIR and take action to adopt the Sphere Plan and MSR, adopt the proposed SOI, approve the annexation, and approve the application to provide retail electric service. Ms. Vahidi is providing CEQA expertise to SSJID, and serves as the Senior Technical lead for the social science sections of the SEIR, including agriculture, land use, policy analysis, and socioeconomics.
- **San Onofre Nuclear Generating Station (SONGS) Steam Generator Replacement Project, San Clemente, CA.** Ms. Vahidi served as the Technical Senior in charge of developing the methodology and guiding the analysis for the Land Use and Recreation Section of this EIR. This project EIR addressed the environmental effects of SCE's proposed replacement of Steam Generator Units 2 & 3 at the SONGS Nuclear Power Plant located entirely within the boundaries of the U.S. Marine Corps Base Camp (MCBCP) Pendleton. Issues of concern included potential conflicts resulting from the transport of the large units through sensitive recreation areas such as beaches, and the San Onofre State Park.
- **Diablo Canyon Power Plant (DCPP) Steam Generator Replacement Project, San Luis Obispo County, CA.** Ms. Vahidi served as the Technical Senior in charge of developing the methodology and guiding the analysis for the Land Use and Recreation Section of this EIR. The EIR addressed impacts associated with the replacement of the eight original steam generators (OSGs) at DCPP Units 1 and 2 due to degradation from stress and corrosion cracking, and other maintenance difficulties. The Proposed Project would be located at the DCPP facility, which occupies 760 acres within PG&E's 12,000-acre owner-controlled land on the California coast in central San Luis Obispo County. Land use issues of concern include impacts to agricultural lands, recreational resources, and potential Coastal Act inconsistencies.
- **Tule Wind EIS, Third Party NEPA Review, San Diego County, CA.** Under contract to the BLM, Ms. Vahidi is serving as Aspen's Project Manager and assisting the BLM in reviewing the Draft and Final EIS/EIR for the proposed Tule Wind Project (EIS) to meet BLM and NEPA requirements. The EIS/EIR is being prepared by a consultant under contract to the CPUC, also directed by BLM, together with San Diego County, Bureau of Indian Affairs, and California State Lands Commission. The joint document evaluates the proposed Tule Wind Project and the proposed East County Substation Project (ECO), along with other related parts of both projects. The BLM is the lead agency for NEPA compliance and the CPUC is the lead agency for CEQA compliance.

Transmission Line Projects

- **TANC Transmission Project (TTP), several Northern California Counties.** Ms. Vahidi served as the Deputy Project Manager in charge of preparation of the EIR/EIS and guiding the CEQA/NEPA analysis. The Transmission Agency of Northern California (TANC) and Western Area Power Administration (Western), an agency of the U.S. Department of Energy (DOE), are the CEQA lead agency and NEPA lead agency, respectively. The TTP generally would consist of approximately 600 miles of new and upgraded 500 kilovolt (kV) and 230 kV transmission lines, substations, and related facilities generally extending from northeastern California near Ravendale in Lassen County to the California Central Valley through Sacramento and Contra Costa Counties and westward into the San Francisco Bay Area. Ms. Vahidi worked with TANC and Western to initiate the scoping process, including preparation of the NOP, preparing for scoping meetings, frameworking the EIR/EIS document, etc. She also led the preparation of the project scoping report. The project was cancelled in July 2009.
- **El Casco System Project, Riverside, CA.** Ms. Vahidi served as the Project Manager for this EIR prepared for the CPUC to evaluate SCE's application for a Permit to Construct (PTC) the El Casco System Project. The Proposed Project would be located in a rapidly growing area of northern Riverside County, which includes the Cities of Beaumont, Banning, and Calimesa. A 115 kV subtransmission line begins at Banning Substation and extends westward toward the proposed El Casco Substation site within the existing Banning to Maraschino 115 kV subtransmission line and Maraschino–El Casco 115 kV subtransmission line ROWs. Major issues of concern include impacts to existing and residential land uses, which have led to the development of a partial underground alternative and a route alternative different than the project route proposed by SCE (the Applicant). The 1,200-page Draft EIR was released for a 45-day public review and comment on December 12, 2007, and evaluates project alternatives at the same level of detail as the Proposed Project analysis. The project is currently under construction.
- **Sacramento Area Voltage Support Supplemental Environmental Impact Statement (SEIS), Western Area Power Administration.** Ms. Vahidi served as the task leader for several social science sections for the SEIS for a double-circuit 230 kV circuit between Western's O'Banion/Sutter Power Plant and Elverta Substation/Natomas Substation. New transmission lines and transmission upgrades are needed to mitigate transmission line overload, reduce the frequency of automatic generation and load curtailment during the summer peak load periods, and help maintain reliability of the interconnected system operation. Ms. Vahidi directed the preparation of the land use, aesthetics, socioeconomics, and environmental justice sections of the SEIS.
- **Sunset Substation and Transmission and Distribution Project CEQA Documentation, Banning, CA.** The City of Banning proposes to construct the Sunset Substation and supporting 33-kilovolt (kV) transmission line that would interconnect with the City's existing distribution system. The purpose of this new substation and transmission is to relieve the existing overloads that are occurring within the City's electric system and to accommodate projected growth in the City. Ms. Vahidi served as the Environmental Project Manager for the initial stages of CEQA documentation prepared for the City's Utility Department.
- **Devers–Palo Verde 500 kV Transmission Line Project EIS/EIR, southern California/western Arizona.** For this EIR/EIS prepared by U.S. Bureau of Land Management and CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator for SCE's proposed 250-mile transmission line project from the Palo Verde Nuclear power plant in Arizona to the northern Palm Springs area in California. Major issues of concern include EMF and visual impacts on property values, impacts on the area's vast recreational resources and tribal lands, and the development and evaluation of several route alternatives, including the Devers-Valley No. 2 Route Alternative, which eventually was approved by the CPUC.

- **Antelope-Pardee 500 kV Transmission Line Project (a.k.a, TRTP Segment 1) EIR/EIS, Los Angeles County, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator for SCE's proposed 25-mile transmission line project from the Antelope Substation in the City of Lancaster, through the ANF, and terminating at SCE's Pardee Substation in Santa Clarita. Major issues of concern included impacts to biological, recreational, and cultural resources within Forest lands, EMF and visual impacts on property values, impacts on residences in the urbanized southern regions of the route, and the development and evaluation of several route alternatives.
- **Antelope Transmission Project [a.k.a., TRTP], Segments 2 & 3 EIR, Los Angeles and Kern Counties, CA.** For this EIR being prepared by the CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator. The proposed Project includes both Segment 2 and Segment 3 of the Antelope Transmission Project, and involves construction of new transmission line infrastructure from the Tehachapi Wind Resource Area in southern Kern County, California, to SCE's existing Vincent Substation in Los Angeles County, California. The Tehachapi Wind Resource Area is one of the State's greatest potential sources for the generation of wind energy. A variety of wind energy projects are currently in development for this region. Major issues of concern include EMF and visual impacts on property values, impacts on residences and agricultural resources, and the development and evaluation of several substation and route alternatives.
- **Tehachapi Renewable Transmission Project (TRTP, Segments 4 through 11) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Ms. Vahidi is served as the Deputy Project Manager in the early stages (i.e., during Scoping) of the project for SCE's proposal to construct, use, and maintain a series of new and upgraded high-voltage electric transmission lines and substations to deliver electricity generated from new wind energy projects in eastern Kern County. Approximately 46 miles of the project would be located in a 200- to 400-foot right-of-way on National Forest System land (managed by the Angeles National Forest) and approximately three miles would require expanded right-of-way within the Angeles National Forest. The proposed transmission system upgrades of TRTP are separated into eight distinct segments: Segments 4 through 11. Segments 1 (Antelope-Pardee) and Segments 2 and 3 (Antelope Transmission Project) were evaluated in separate CEQA and NEPA documents as described above.
- **Jefferson-Martin 230 kV Transmission Line Project EIR, San Francisco Bay Area, CA.** Ms. Vahidi served as the Issue Area Coordinator for the Social Science issues of the EIR, and was responsible for preparation of the socioeconomics, recreation, and public utilities sections of the EIR prepared on behalf of the California Public Utilities Commission (CPUC) to evaluate a proposed 27-mile transmission line in San Mateo County. Major issues of concern included EMF and visual impacts on property values, impacts on the area's vas recreational resources, and evaluation of several route alternatives.
- **Miguel-Mission 230 kV #2 Project EIR, San Diego, CA.** Ms. Vahidi conducted the land use, recreation, socioeconomics, and environmental justice analyses for this EIR for a proposed 230 kV circuit within an existing transmission line ROW between Miguel and Mission substations in San Diego County. The proposed project included installing a new 230 kV circuit on existing towers along the 35-mile ROW, as well as relocate 69 kV and 138 kV circuits on approximately 80 steel pole structures. In addition, the Miguel Substation and Mission Substation would be modified to accommodate the new 230 kV transmission circuit.
- **Viejo System Project, Orange County, CA.** Ms. Vahidi served as the Deputy Project Manager for the project's CEQA documentation, including and Initial Study, prepared on behalf of the CPUC to evaluate Southern California Edison's (SCE) Application for a Permit to Construct the Viejo System Project, which was in SCE's forecasted demand of electricity and goal of providing reliable electric service in southern Orange County. The Viejo System Project would serve Lake Forest, Mission Viejo, and the surrounding areas. Components of the project included, construction of the new 220/66/12 kilovolt (kV) Viejo Substation, installation of a new 66 kV subtransmission line within an

existing SCE right-of-way, replacement of 19 double-circuit tubular steel poles with 13 H-frames structures, and minor modification to other transmission lines. Major issues of concern include visual impacts of transmission towers, EMF effects, and project impacts on property values.

- **Cabrillo Port Liquefied Natural Gas (LNG) Deepwater Port, Ventura County, CA.** Under contract to the City of Oxnard, Aspen was tasked to review the Draft EIS/EIR for this the proposed construction and operation of an offshore floating storage and regasification unit (FSRU) that would be moored in Federal waters offshore of Ventura County. As proposed, liquefied natural gas (LNG) from the Pacific basin would be delivered by an LNG Carrier to and offloaded onto, the FSRU; re-gasified; and delivered onshore via two new 21.1-mile (33.8-kilometer), 24-inch (0.6-meter) diameter natural gas pipelines laid on the ocean floor. These pipelines would come onshore at Ormond Beach near Oxnard, California to connect through proposed new onshore pipelines to the existing Southern California Gas Company intrastate pipeline system to distribute natural gas throughout the Southern California region. Ms. Vahidi reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Aesthetics, Land Use, Recreation, Socioeconomics, and Environmental Justice.

- **Long Beach LNG Import Project, Long Beach, CA.** Under contract to the City of Long Beach, Aspen was tasked to review the Draft EIS/EIR for the proposed construction and operation of this onshore LNG facility to be located at the Port of Long Beach. Ms. Vahidi reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Aesthetics, Land Use, Recreation, Socioeconomics, Environmental Justice, and Port Master Plan Amendment.

- **Post-Suspension Activities of the Nine Federal Undeveloped Units and Lease OCS-P 0409, Offshore Southern California**. Aspen assisted the U.S. Department of the Interior, Minerals Management Service (MMS) to prepare an Environmental Information Document (EID) evaluating the potential environmental effects associated with six separate suspensions for undeveloped oil and gas leases Pacific Outer Continental Shelf (OCS) located offshore Southern California. These undeveloped leases lie between 3 and 12 miles offshore Santa Barbara, Ventura and southern San Luis Obispo Counties and are grouped into nine units, with one individual lease that is not unitized. As the Senior Aspen social scientist, Ms. Vahidi guided the analysis of community characteristics and tourism resources, recreation, visual resources, social and economic environment, and military operations.

- **Otay River Watershed Management Plan (ORWMP) and Special Area Management Plan (SAMP) in San Diego County, CA.** Ms. Vahidi served as a Technical Senior for social science and land use issues. The ORWMP focused on developing strategies to protect and enhance beneficial uses within this watershed and thereby comply with the San Diego Region's NPDES permit, and the SAMP intended to achieve a balance between reasonable economic development and aquatic resource preservation, enhancement, and restoration in this 145-square-mile (93,000 acres) area through the issuance of Corps and CDFG programmatic permits.

- **Littlerock Reservoir Sediment Removal Project EIS/EIR, Palmdale, CA.** Ms. Vahidi is the Project Manager for this joint EIS/EIR evaluating the impacts of sediment removal alternatives for the Littlerock Reservoir and Dam on USFS Angeles National Forest (NEPA Lead Agency) lands in Los Angeles County. The Palmdale Water District (District) [CEQA Lead Agency] proposes to remove approximately 540,000 cubic yards of sediment from the reservoir (behind the dam) and haul it to off-site commercial gravel pits located 6 miles north of the dam site in the community of Littlerock. The project involves impacts to the arroyo toad, extensive coordination with USFWS for a Section 7 consultation, incorporation of new Forest Service Plan updates and requirements into the analysis, preparation of the Forest Service required BE/BA, and analysis of compliance with federal air quality conformity requirements. Under Ms. Vahidi's direction, Aspen developed six different project alternatives for sediment removal, involving detailed hydraulics analysis and preparation of a hydraulics technical report. The most feasible of these alternatives (grade control structure) was

chosen by the PWD as their proposed project to be evaluated in the EIS/EIR. In addition, the PWD is currently considering an additional alternative (use of a slurry line for sediment removal) presented by Aspen. Aspen is currently working on the Administrative Draft EIR/EIS and assisting the PWD with portions of their Proposition 50 grant application to the DWR.

- **Santa Ana Valley Pipeline Repairs Project, San Bernardino and Riverside Counties, CA.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation and permitting efforts related to the repair of 12 sites along the pipeline portion of the East Branch of the California Aqueduct. The repair of the 12 sites was crucial because, eight of the Priority 1 sites included areas of the pipeline that were under high stress and subject to rupture. Issues of concern included, potential impacts to special status species, sensitive receptors, and traffic. As the DWR's CEQA consultant, Ms. Vahidi determined that the proposed SAPL Repairs Project would qualify for a CEQA Categorical Exemption, and recommended the preparation of a Technical Memorandum to justify this exemption. The Technical Memorandum and supporting documentation, including a Biological Constraints Report, and analyses of proposed project potential construction-related air quality, noise, and traffic impacts, were prepared and presented to DWR as one packet to support both a Class 1 and Class 2 CEQA Exemption. Subsequent to preparation of this packet, DWR filed a Notice of Exemption on June 13, 2003 for their repair activities.
- **Piru Creek Erosion Repairs and Bridge Seismic Retrofit Project, Northern Los Angeles County, CA.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation for this project. An IS/MND was prepared to evaluate the impacts of the project, which proposed to maintain four access routes to DWR's facilities along the West Branch of the California Aqueduct downstream of the Pyramid Dam. Repair and improvement activities would occur on Osito Canyon (an intermittent tributary to Piru Creek) at Osito Adit, adjacent to Old Highway 99 at North Adit (or access tunnel), alongside an eroded section of Old Highway 99 along Piru Creek, and at Pyramid Dam Bridge. Repair activities would serve to improve conditions of access routes, as well as strengthening and reinforcing them against seismic or flood events. Project-related construction could result in potentially significant impacts to biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, and transportation and traffic.
- **Pyramid Lake Repairs and Improvements Project, northern Los Angeles County.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation, ADA (Americans with Disabilities Act) compliance, and permitting efforts for this project. DWR and the Department of Boating and Waterways (DBW) are planning repairs and improvements at various recreational sites at Pyramid Lake, which is located on the border between Los Padres National Forest and Angeles National Forest; recreation is managed by Angeles National Forest. The lake is also part of Federal Energy Regulatory Commission Project 2426. Aspen worked with DWR and DBW to determine ADA compliance components at each site. CEQA documentation in support of a Class 1 and 2 Categorical Exemption was prepared to evaluate the potential impacts of the repairs and improvements, and provide CEQA clearance for filing of required permit applications, including but not necessarily limited to 404, 401, and 1602 permits. In addition to the CEQA documentation and preparation of permit applications, Aspen coordinated DWR and DBW's efforts with the USFS, and the permitting agencies (i.e., CDFG, RWQCB, and USACE). Through coordination with the USAC, Aspen prepared the NEPA EA for Corps 404 permit process, and reviewed and coordinated revisions to the 1602 with CDFG.
- **Mulholland Pumping Station and Lower Hollywood Reservoir Outlet Chlorination Station Project, Los Angeles, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Project Manager for preparation of CEQA documentation for this project. LADWP proposed to replace the existing historic pumping/chlorination station building as well as the existing lavatory and unoccupied Water Quality Laboratory buildings with a new single structure pumping/chlorination station within the

LADWP's Hollywood Reservoir Complex located in the Hollywood Hills section of the City Los Angeles. These improvements were required due to the age and deterioration of the facility and the potential risk of seismic damage to existing structures. An Initial Study was prepared in support of a City of Los Angeles General Exemption.

- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles and Burbank, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Task Leader for land use issues and is in charge of development and analysis of project alternatives for the CEQA document for this project. The RSC is a major transmission pipeline in the LADWP water distribution system. The existing RSC pipeline's purpose is to transport large amounts of water from the Los Angeles Reservoir Complex and local ground water wells to reservoirs and distribution facilities located in the central areas within of the City of Los Angeles. The LADWP proposed a new larger RSC pipeline to replace and realign the Upper and Lower Reaches of the existing RSC pipeline, which would involve the construction of approximately 69,600 linear feet (about 13.2 miles) of 42-, 48-, 60-, 66-, 72-, 84-, and 96-inch diameter welded steel underground pipeline.
- **Valley Generating Station Site Survey & Documentation Report, Los Angeles, CA.** Ms. Vahidi managed the preparation of a comprehensive report (over 150 pages) documenting all of the structures and facilities located at the Valley Generating Station (VGS). The report includes exhibits that illustrate locations of each structure at the VGS, a detailed appendix of color photos of each structure, and a written description of each structure. The report also provides a general discussion of the history and background of the VGS and its development to provide a context for the structures on site.
- **Taylor Yard Water Recycling Project (TYWRP), Los Angeles and Glendale, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Project Manager for preparation of CEQA documentation for this project. LADWP proposed to construct the TYWRP in order to provide recycled water produced by the Los Angeles–Glendale Water Reclamation Plant (LAGWRP) to the Taylor Yard. An important part of the City of Los Angeles' expanding emphasis on water conservation is the concept that water is a resource that can be used more than once. Because all uses of water do not require the same quality of supply, the City has been developing programs to use recycled water for suitable landscaping and industrial uses. The project is located in the southernmost part of the City of Glendale and northeastern part of the City of Los Angeles. The IS/MND was adopted in the Summer of 2007.
- **MARS EIR/EIS, Monterey, CA.** Ms. Vahidi served as the technical specialist in charge of preparing the Environmental Justice analysis for this EIR/EIS, which would evaluate the effects associated with the installation and operation of the proposed Monterey Accelerated Research System (MARS) Cabled Observatory Project (Project) proposed by Monterey Bay Aquarium Research Institute (MBARI)[NEPA Lead Agency]. The goal of the Project was to install and operate, in State and Federal waters, an advanced cabled observatory in Monterey Bay that would provide a continuous monitoring presence in the Monterey Bay National Marine Sanctuary (MBNMS) as well as serve as the test bed for a state-of-the-art regional ocean observatory, currently one component of the National Science Foundation (NSF) Ocean Observatories Initiative (OOI). The Project would provide real-time communication and continuous power to suites of scientific instruments enabling monitoring of biologically sensitive benthic sites and allowing scientific experiments to be performed. The environmental justice analysis evaluated the potential for any disproportionate project impacts to both land-based populations and fisheries workers. The CEQA Lead Agency was CSLC.
- **Kinder Morgan Concord-Sacramento Pipeline EIR**. Ms. Vahidi prepared the environmental justice and utilities and service systems sections of an EIR evaluating a proposed 70-mile petroleum products pipeline for the California State Lands Commission. Analysis included consideration of potential impacts of pipeline accidents in Contra Costa, Solano, and Yolo Counties.

- **Shore Marine Terminal Lease Consideration Project EIR, Contra Costa County, CA.** Served as Aspen's Project Manager (under contract to Chambers Group, Inc.) in charge of conducting the preparation of the Land Use, Recreation, Air Quality, and Noise sections of this EIR evaluating Shore Terminal, LLC's application to the California State Lands Commission (CLSC) to exercise the first of two 10-year lease renewal options, with no change in current operations. Shore Terminals operations comprise the marine terminal and on-land storage facilities in an industrial part of the city of Martinez. The marine terminal is on public land leased from the CSLC with the upland storage facilities located on private land.
- **Looking Glass Networks Fiber Optic Cable Project IS/MND, northern and southern California.** As part of Aspen's ongoing contract with the CPUC for review of Telecommunications projects, this document encompassed the evaluation of project impacts and network upgrades in the San Francisco Bay Area and the Los Angeles Basin Area. Ms. Vahidi served as the Deputy Project Manager and Study Area Manager for the Los Angeles Basin for this comprehensive CEQA document reviewing the potential impacts of hundreds of miles of newly proposed fiber optic lines throughout northern and southern California, including Los Angeles and Orange Counties. Issues of concern focused on potential construction impacts of linear alignments in highly urbanized rights-of-way, and resultant land use, traffic and utilities conflicts.
- **U.S. Army Corps of Engineers, Los Angeles District.** Ms. Vahidi is responsible for managing Delivery Orders and conducting the analyses of the social science issue areas for 16 projects throughout southern California and Arizona as part of two environmental services contracts. Delivery orders have included:
  - **Northeast Phoenix Drainage Area Alternatives Analysis Report, Phoenix and Scottsdale, AZ.** As the project manager guided the preparation of an alternatives analysis report that evaluated the potential environmental impacts associated with channel and detention basin alternatives to control flooding problems resulting from fast rate of development in the northeast Phoenix area.
  - **Imperial Beach Shore Protection EIS/EIR, Imperial Beach, CA.** Responsible for preparing the affected environment and environmental consequences sections for the land use, recreation, aesthetics, and socioeconomics issue areas. This EIS will analyze the impacts of shore protection measures along a 4.7-mile stretch of beach in southwest San Diego County.
  - **U.S. Food and Drug Administration Laboratory EIS/EIR, Irvine, CA.** Prepared the land use and recreation; socioeconomics, public services, and utilities; and visual resources/aesthetics analyses for this proposed "mega-laboratory" on the University of California Irvine Campus. Also developed the cumulative projects scenario for analyses of cumulative impacts. As the Public Participation Coordinator for the EIS/EIR review process, prepared the NOP, set up the scoping meeting and public hearing, prepared meeting handouts, and developed the project mailing list.
  - **San Antonio Dam EIS, Los Angeles and San Bernardino Counties, CA.** Responsible for preparing the cultural resources, land use and recreation, and aesthetics sections for the analysis of impacts resulting from the re-operation of San Antonio Dam to increase flood protection.
  - **Rio Salado Environmental Restoration EIS, Phoenix and Tempe, AZ.** Conducted the land use and recreation, and aesthetics analyses for this environmental restoration project in the Salt River and Indian Bend Wash located in the Cities of Phoenix and Tempe. Incidental to the primary objective of the Proposed Action (environmental restoration) is the creation of passive recreational opportunities associated with the restored habitat areas, such as trails for walking and biking, and areas for observing wildlife and learning about the natural history of the river.
  - **Airspace Restrictions EA, Ft. Irwin, CA.** Conducted the land use, recreation, aesthetics, and socioeconomics analyses of impacts for the conversion of unrestricted airspace to restricted airspace above Ft. Irwin in the Mojave Desert.
  - **National Guard Armory Building EA, Los Angeles, CA.** Conducted the land use, aesthetics, and socioeconomics analyses and prepared the cumulative impacts and policy consistency sections.

- **Supplemental EA for the Seven Oaks Dam Woolly Star Land Exchange, San Bernardino County, CA.** Prepared the land use and recreation analyses and policy consistency section.
- **Lower Santa Ana River Operations and Maintenance EA, Orange County, CA.** Responsible for conducting the land use, recreation, aesthetics, socioeconomics, and cultural resources analyses.
- **EA for Area Lighting, Fencing, and Roadways at the International Border, San Diego, CA.** Conducted the land use, aesthetics, and socioeconomics analyses and prepared the policy consistency section.
- **Border Patrol Checkpoint Station EA, San Clemente, CA.** Analyzed the aesthetic impacts of the installation of a concrete center divider and a Pre-inspected Automated Lane adjacent to and parallel to Interstate 5.
- **Upper Newport Bay Environmental Restoration Project, Newport Beach, CA.** Prepared physical setting, socioeconomics, land and water uses, and cultural resources sections for the Baseline Conditions Report and the Environmental Planning Report.
- **Whitewater/Thousand Palms Flood Control Project, Thousand Palms, CA.** Prepared the land use and recreation, aesthetics, and socioeconomics affected environment sections for the project's Baseline Conditions Report that was incorporated into the project EIS.
- **San Antonio Creek Bridges Project, Vandenberg Air Force Base, CA.** Prepared the physical setting, land use, socioeconomics, utilities, and aesthetics sections for analyses of bridge alternative impacts for missile transport on Vandenberg Air Force Base.
- **Ft. Irwin Expansion Mitigation Plan, Mojave Desert, CA.** Responsible for developing Ft. Irwin's Public Access Policy based on mitigation measures from the Army's Land Acquisition EIS for the National Training Center. Policy includes provisions for access by research and scientific uses.

- **Los Angeles Unified School District (LAUSD), Los Angeles County, CA.** Between 2002 and 2008, Ms. Vahidi served as the Program/Contract Manager for Aspen's Environmental Master Services Agreement with the LAUSD (nation's second largest school district) to prepare CEQA documents (EIRs, IS/MNDs, Categorical Exemptions) in review of the LAUSD's four-phased new school construction program intended to meet existing and projected overcrowded conditions (200,000 seat shortfall) within the LAUSD (i.e., City of Los Angeles and all or parts of 28 surrounding jurisdictions cover 700 square miles of land). As the Program Manager, she was responsible for client interface and providing CEQA expertise to the LAUSD on day-to-day basis, QA/QC activities for all Aspen documents submitted, budget tracking and allocation, staff assignments, and the general day-to-day management of this contract. Aspen was awarded 54 work authorizations, of which 48 were CEQA document assignments for new school projects, school expansions and additions. In addition to her duties as the contract manager, Ms. Vahidi managed the preparation of several CEQA documents under this contract, including:
  - **East Valley Middle School No. 2 EIR.** This middle school was proposed to be located at the previous Van Nuys Drive-In site. The EIR focused on impacts associated with air quality, hazards and hazardous materials, noise, land use and planning, and traffic and transportation. Major issues of concern included traffic and noise generated by school operation activities. The EIR included LAUSD design standards and measures employed to minimize environmental impacts.
  - **Canoga Park New Elementary School IS/MND.** This elementary school would be developed on a parcel of land owned by the non-profit organization, New Economics For Women (NEW). This "Turn-Key" project consisted of a Charter Elementary School to be developed by NEW and sold to the LAUSD for operation. It was later decided that NEW would lease the school back and run it as a charter school. Issues of concern included, pedestrian safety, traffic, air quality, noise, and land use.
  - **Mt. Washington Elementary School Multi-Purpose Room Addition Project IS/MND.** This project proposed the development of a multi-purpose room facility, including a library, auditorium, and theater, to the existing Mt. Washington Elementary School campus located in Los Angeles. The surrounding residential community had concerns regarding the proposed project's impacts on aesthetics, traffic, air quality, and noise. Of particular concern, were impacts generated due to the after-hours use of the multi-purpose room facility by civic and community groups.

- **New School Construction Program EIR.** Serves as a Study Area Manager (Valley Districts), and Issue Area Coordinator (IAC) (i.e., technical lead and reviewer) for social science issues, including land use, socioeconomics, public services, population and housing, and utilities and service systems. As the IAC, she has formulated the scope of work and methodology for analysis of issues and mitigation options. In addition to her managerial duties, Ms. Vahidi is preparing the Land Use section of the EIR, and directing the preparation of the Project's Scoping Report.
- **Belmont Senior High School 20-Classroom Modular Building Addition Project.** Under Aspen's on-going master services agreement with the LAUSD, served as the project manager for CEQA documentation and permitting efforts related to the addition of modular classrooms to the existing Belmont Senior High School campus. Issues of concern included, potential impacts to sensitive receptors adjacent to the school from construction-related air quality, noise, and traffic, and operation-related noise generated by the new classrooms. As the LAUSD's CEQA consultant, Ms. Vahidi directed the preparation of technical documentation in support of a Class 32 In-Fill CEQA Categorical Exemption. This technical documentation included analyses of potential project-related air quality, noise, and traffic impacts, which were then submitted to LAUSD as one packet. Subsequent to preparation of this packet, LAUSD filed a CEQA Notice of Exemption for the classroom addition project.
- **Narbonne High School Stadium Lighting Project MND Addendum.** Served as the project manager for this project proposed to add a new stadium, lighting, and associated sport facilities needed to address existing needs at Narbonne High School. Issues of concern include lighting impacts to the surrounding neighborhood, and available parking stock.

- **SCE Calnev Power Line and Substation Project IS/MND.** Aspen was contracted to thoroughly review and analyze Southern California Edison Company's Application for a Permit to Construct and Proponent's Environmental Assessment (PEA) for the Calnev Power Line and Substation Project in the City of Colton. Ms. Vahidi served as the Deputy Project Manager for preparation of the IS/MND. Tasks include: a site visit, and evaluation of the project's compliance with the Commission's General Order 131D, Rule 17.1, and associated information submittal requirements; and preparation of a letter report identifying data deficiencies of the Application and PEA. Upon formal CPUC acceptance of the Application and PEA, Aspen prepared a CEQA Initial Study Checklist by identifying baseline data, project characteristics, and determining impact significance for each issue area. Each issue area's impact determination was supported by a paragraph or more of analysis describing the rationale for the impact identified, or for the lack of a significant impact. Upon completion of the Initial Study, the Mandatory Findings of Significance were prepared and Aspen determine that a Mitigated Negative Declaration should be prepared per CEQA Guidelines.
- **SCE Six Flags Substation and Power Line Project IS/MND.** Ms. Vahidi served as Deputy Project Manager for preparation of the IS/MND. Reviewed and provided comments on the permit application by SCE to construct a substation and power line to provide electrical service to Six Flags Amusement Park in Valencia, CA. Subsequent to the application completeness review, she prepared the project's Initial Study Checklist and Mitigated Negative Declaration for the California Public Utilities Commission (CPUC). Identified possible deficiencies and provided recommendations.
- **Industrywide Survey for the South Coast Air Quality Management District.** Ms. Vahidi coordinated Aspen's work for an Air Toxics Survey of harmful emissions by auto body and paint shops, performed in compliance with AB2588. She was responsible for development of an industrywide emission inventory for these facilities; she also performed information management, facility verifications, survey mail-outs, emissions calculations, analysis of calculated results, and preparation of the final report.
- **Technical Support to NEPA Lawsuit, Angeles National Forest, CA.** Ms. Vahidi prepared a detailed project chronology and a list of all applicable federal, State, and local laws and regulations in support of the USDA Office of General Counsel and National Forest's response to the City of Los Angeles' 1996 lawsuit on the adequacy of the Pacific Pipeline EIS.
- **Yellowstone Pipeline EIS, Lolo National Forest, Montana.** Environmental Justice and Public Services Issue Area Specialist. Responsible for conducting the analysis of project impacts on minority and

low-income populations to comply with Presidential Executive Order 12898 on Environmental Justice using Census data to determine population density, minority population percentages and unemployment rates to determine the potential for disproportionate project impacts on affected communities. Also responsible for conducting analysis of project impacts such as population inmigration and pipeline accidents on public services in western Montana. During the EIS scoping process, she served as the project public participation coordinator and was responsible for preparation of the project newsletter, setup of the first round of scoping meetings, and determination of project information centers.

- **Santa Fe Pacific Pipeline Project EIR.** Ms. Vahidi was responsible for development and screening of alternatives for a 13-mile petroleum products pipeline from Carson to Norwalk, CA. Prepared analyses of project impacts on socioeconomics, public services, utilities, and aesthetics.
- **Pacific Pipeline Project Mitigation Monitoring, Compliance, and Reporting Program (MMCRP).** Ms. Vahidi served as the expert technical reviewer for the socioeconomics and environmental justice issues. As the MMCRP Agency Liaison, was responsible for developing protocol for efficient interagency communication procedures in coordination of mitigation activities with the CPUC, USFS, Responsible Agencies, and the project proponent. Also responsible for the development and management of the MMCRP Community Outreach and Public Access Program.
- **Pacific Pipeline Project EIR.** For the California Public Utilities Commission's (CPUC) EIR on the originally proposed route of this proposed pipeline (from Santa Barbara County to Los Angeles), Ms. Vahidi developed and coordinated a public participation program to comply with CEQA's mandate for information disclosure and public involvement in decision-making. The Final EIR was certified in September 1993.
- **Pacific Pipeline Project EIS and Subsequent EIR.** Ms. Vahidi prepared the socioeconomics and public services analysis, the Environmental Justice analysis in compliance with Presidential Executive Order 12898, as well as portions of the Land Use and Public Recreation analyses, including a comprehensive comparative analysis of project alternatives on this EIS/Subsequent EIR for the U.S. Forest Service (Angeles National Forest) and the CPUC. Ms. Vahidi managed the subsequent GIS mapping of socioeconomic data relative to pipeline corridor alternatives and other industrial facilities. She also prepared the cumulative projects list (covering a five county area for the Proposed Project and its alternatives) used for the cumulative scenario analyses of the various issue areas in the EIS/SEIR. As the Public Participation Program Coordinator for the project, she developed, implemented, and managed the public involvement efforts for the NEPA and CEQA environmental review processes. This included: setup and logistics for 20 separate scoping meetings, informational workshops, and public hearings along the project route; preparation of all meeting handouts; preparation of project newsletters and public notices; placement of project documents on Internet; and maintenance of the a project telephone information hotline. She also reviewed over 2,000 public comments (written and verbal) received on the Draft EIS/SEIR, for subsequent distribution to the project team.
- **Alturas Transmission Line Project EIR/EIS.** Ms. Vahidi conducted the analysis of potential impacts on minority populations and low-income populations in compliance with Presidential Executive Order 12898 on Environmental Justice using Census data to determine population density, minority population percentages and unemployment rates, and the potential impacts of the transmission line on affected communities. She also prepared the cumulative projects list and map used for analyses of cumulative impacts. She managed development of meeting handouts; scheduling and logistics for four scoping meetings; developed and maintained project mailing list; reviewed public scoping comments and prepared the Scoping Report; coordinated four sets of informational workshops and public hearings for the Draft EIR/EIS; supervised the distribution of comments on the Draft EIR/EIS to the project team; and coordinated the distribution of the Draft and Final EIR/EIS to affected public agencies, organizations, and citizens.

EIP Associates 1998 to 2001

- **Program EIR for the Divestiture of PG&E's Hydroelectric Generation Assets.** For the CPUC's EIR evaluating the Pacific Gas & Electric Company's (PG&E) proposal to divest their hydroelectric facilities in California, served as the land use technical analyst for two watershed areas, and the Task Manager for the Socioeconomics and Transportation sections of the EIR covering five watershed areas. PG&E owns and operates the largest private hydroelectric power system in the nation. Situated in the Sierra Nevada, Southern Cascade, and Coastal mountain ranges of California, this system is strung along 16 different river basins and annually generates approximately five percent of the power consumed each year in California. The proposed sale of assets also includes approximately 140,000 acres of land proposed for sale with the hydroelectric system. The EIR analyzes the range of operational changes that could occur under new ownership, including complex integrated models that analyze power generation and water management. The land use section of the EIR examines the implications of the change in ownership of lands and the potential for impacts due to development or potential changes in use. Contributed significantly to the extensive GIS analysis, which was conducted to determine the development suitability and potential intensity of development that might occur on the lands if sold. These results served as one of the primary bases for analysis of impacts associated with the sale of the hydroelectric assets.
- **Section 108 Loan Guarantee EA/FONSI for the Waterfront Development Project.** Served as the Manager and Principal Preparer for this EA/FONSI for the City of Huntington Beach Economic Development Department. Prepared NEPA documentation evaluating the impacts resulting from the use of HUD Section 108 Loan guarantee funds for the Waterfront Resort Expansion Project in accordance with The HUD NEPA Guidelines and Format 1 (Environmental Assessments at the Community Level). Tasks included: (1) Evaluation of activities that would be categorically excluded from NEPA based on an assessment of the NEPA Implementing Guidelines for HUD Projects; (2) Evaluation of proposed actions compliance with all applicable federal statutes, regulations, and policies; and (3) Preparation of an Environmental Assessment/Mitigated Finding of No Significant Impact (EA/FONSI) for proposed actions that are not categorically excluded. Proposed actions to be evaluated consisted mainly of infrastructure improvement projects, rehabilitation and/or development of affordable housing, provision of relocation assistance, facilitation of development and/or redevelopment plans, property acquisition, provision of open space, etc.
- **MTA Mid Cities/Westside Transit Corridor Study EIS/EIR.** Served as the EIS/EIR Deputy Project Manager (DPM) for this 3-phase (including prepared the Major Investment Study (MIS), the Environmental Impact Statement (EIS), and an evaluation of the urban design implications of transit interventions on selected routes) study intended to address current and long range traffic congestion in the central and westside areas of the Los Angeles, Basin. Three east/west corridors and a range of transit alternatives ranging including Rapid Bus, light rail, and heavy rail are being evaluated. In addition to her duties as DPM for this comprehensive joint EIS/EIR, Ms. Vahidi prepared the Environmental Justice Analysis (per Executive Order 12898), the Section 4(f) Parklands discussion, and the land use and socioeconomics sections of the EIS/EIR.
- **Wes Thompson Ranch Development Project EIR.** Served as the EIR Project Manager for this hillside residential development in the City of Santa Clarita. Issues of concern included seismic and air quality impacts associated with the excavation of 2 million cubic yards of soil, the project's non-compliance with the City's hillside ordinance for innovative design, and traffic generated by project-related population growth in the area. Four different site configuration alternatives were developed as part of the EIR analysis. Other issues of concern included sensitive biological resources, the potential for hydrological impacts due to disturbance of the hillside, and cultural resources.
- **City of Santa Monica Environmental Assessments.** As one of the City's qualified CEQA consultants managed several environmental assessment documents for housing, commercial, institutional, and mixed-use developments in compliance with CEQA, including:

- **Berkeley Manor Condominium EIR and Technical Reports**. This one-issue EIR originally was a CEQA Categorical Exemption per direction of the City. During preparation of the Categorical Exemption documentation, it was determined that project-generated traffic would have potentially significant impacts. As a result, a traffic technical report was prepared as the background document for and EIR. In addition, shade and shadow impacts were evaluated in a technical report to ensure that shading impacts from the proposed structure on surrounding uses would not be significant. A simple Excel model was developed for calculation of shade and shadow angles.
- **Seaview Court Condominiums IS/MND.** This comprehensive Initial Study/Mitigated Negative Declaration included six technical reports including traffic, cultural resources, parking survey, shade and shadow analysis, and a geotechnical assessment to evaluate the level of severity of this development in the waterfront area of Santa Monica. Major issues of concern were; parking and project-generated traffic on adjacent narrow residential streets; visual obstruction and shading impacts of the proposed structure; liquefaction and seismic impacts to adjacent properties as result of the project's excavation for a subterranean parking garage; and the potential impacts of the project to impact the integrity of a historic district and the historic Seaview Walkway to the beachfront.
- **Four-Story Hotel IS/MND.** A comprehensive Initial Study/Mitigated Negative Declaration was prepared for this four-story hotel adjacent to St. John's Hospital in Santa Monica. Major issues of concern included project-generated traffic on surrounding multi-family residential uses and emergency access to the hospital.
- **Santa Monica College Parking Structure B Replacement EIR.** This focused EIR addressed issues related to traffic and neighborhood land use impacts associated with the addition of a 3-story parking structure in the center of the SMC campus. Major issues of concern included the potential for project-generated traffic to cause congestion at the school's main entrance on Pico Boulevard, and the potential for overflow traffic to impact the Sunset Community of single-family homes adjacent to the school.
- **North Main Street Mixed-Use Development Project EIR.** This EIR included evaluation of impacts resulting from the development of a mixed-use development in Santa Monica's "Commercial Corridor" on Main Street, with ground-floor residences and boutique commercial uses. Major issues of concern included traffic and parking impacts to Main Street and surrounding residential land uses, shade and shadow impacts, and neighborhood impacts.

- **Specific Plans and Redevelopment Projects.** As the senior technical lead for land use, prepared the project description, alternatives screening and development, cumulative scenario, and land use analysis for:
  - **Cabrillo Plaza Specific Plan EIR in Santa Barbara.** This project consisted of a mixed-use commercial development on Santa Barbara's waterfront on Cabrillo Boulevard. On-site uses included an aquarium, specialty retail, restaurants, and office space.
  - **Culver City Redevelopment Plan and Merger EIR.** This programmatic EIR evaluated the impacts of the City's redevelopment of its redevelopment zones. A major land use survey and calculation of acreage of redevelopment lands was conducted as part of the EIR.
  - **Dana Point Headlands Specific Plan EIR.** This EIR evaluated the development of coastal bluff in the City with hotel, single- and multi-family residential, and commercial uses. Major issues of concern included ground disturbance as a result of excavation, impacts to terrestrial and wildlife biology, recreation impacts to beachgoers, and project-generated population inducement.
  - **Blocks 104/105 Redevelopment Project EIR in Huntington Beach (Project Manager).** This EIR evaluated the development of a supermarket, retail shops, and office space in the City's Waterfront Redevelopment Zone. Issues of concern evaluated included traffic, land use, and impacts to on-site historic structures.

HONORS AND AWARDS

- 2006 American Planning Association, Los Angeles Section Environmental Award for the Los Angeles Unified School District New School Construction Program, Program EIR
- 2004 Association of Environmental Professionals Statewide Best EIR Award for the Jefferson-Martin 230 kV Transmission Project EIR.
- 2001 Outstanding Performance Award from the State of California Energy Commission.

- 1992-93 recipient of the USC Merit ("Ides of March") Scholarship from the Southern California Association of Public Administrators (SCAPA).
- University of California, Irvine, School of Social Sciences. Graduated with Highest Honors in Political Science.

PROFESSIONAL ASSOCIATIONS

- American Planning Association (APA), Los Angeles Section Executive Board Member 1999-2001
- Association of Environmental Professionals (AEP)

DECLARATION OF
Testimony of Susanne Huerta

I**, Susanne Huerta,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Siting, Transmission and Environmental Protection Division, as a **Land Use Technical Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use** for the **City of Palmdale Hybrid Power Plant 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: November 29, 2010 Signed:_____

At: Agoura Hills, California

SUSANNE R. HUERTA

Associate
Land Use, Agriculture, Public Policy

ACADEMIC BACKGROUND

Master of Urban Planning, New York University, 2007
B.A., Geography, University of California, Los Angeles, 2004

PROFESSIONAL EXPERIENCE

Ms. Huerta is an Environmental Planner with five years of experience in environmental consulting, city planning, economic development, and GIS analysis. She has worked with Aspen Environmental Group since earning her Master's degree in 2007. While attending graduate school, Ms. Huerta interned for a city planning firm in New Jersey. Her city planning background includes experience in the preparation of master plans, the evaluation of site plans and subdivisions, and conducting land use surveys. At Aspen Environmental Group, Ms. Huerta conducts research and prepares environmental analyses in accordance with CEQA, NEPA, and various other environmental laws and regulations. She is currently conducting the technical analysis for land use and agricultural resources for several renewable energy projects, including solar and wind energy generating facilities, and transmission line projects. In addition, Ms. Huerta is regularly involved with document coordination and production, public involvement, and client interaction. Her project-specific efforts are provided below.

Aspen Environmental Group — 2007 to present

California Energy Commission (CEC)

In response to California's power shortage, Aspen has assisted the CEC in evaluating the environmental and engineering aspects of new power plant applications throughout the State under four separate contracts. Ms. Huerta has served as a Staff Professional for Land Use Staff Assessments since 2008.

- Peak Workload Support for the Energy Facility Siting Program and the Energy Planning Program (Contract #700-05-002; and 4/11/06 through 3/30/10); and Siting, Transmission, and Environmental Protection Peak Workload (STEP) (Contract #700-08-001; 6/30/09 through 5/31/12)
  - **Carrizo Energy Solar Farm, San Luis Obispo County, CA.** Staff Technical Analyst for the Land Use Staff Assessment for Carrizo Energy, LLC's Application for Certification (AFC) to build the Carrizo Energy Solar Farm (CESF), which would consist of approximately 195 Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air-cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The proposed CESF included the solar farm site, a minimal offsite transmission system connection, and construction laydown area. The CESF site would encompass approximately 640 acres of fenced area in an area zoned for agricultural uses as specified in the San Luis Obispo County General Land Use Plan. Issues of concern include the impacts of the power plant on adjacent land uses, compliance with applicable local LORS, and the conversion of agricultural land. The development of the agriculture mitigation to reduce impacts resulting from the loss of 645 acres of Important Farmlands required extensive coordination with the California Department of Conservation, San Luis Obispo County Agriculture Department, and the San Luis Obispo County Land Conservancy.

- **Willow Pass Generating Station, Pittsburg, CA.** Staff Technical Analyst for the Land Use Staff Assessment for a new, approximately 550-megawatt (MW) dry-cooled, natural gas-fired electric power facility proposed by Mirant. Development of Willow Pass would entail the construction of two generating units and ancillary systems including, adjacent electric and gas transmission lines, and water and wastewater pipelines. Issues of concern include impacts to nearby agricultural resources, compatibility with adjacent land uses, compliance with local LORS, and parcel legality to comply with the Subdivision Map Act. This project is currently on hold.
- **Calico Solar Project, (a.k.a., Stirling Energy Systems Solar One), San Bernardino County, CA.** Staff Professional for the Land Use Staff Assessment/BLM EIS for a nominal 850-megawatt (MW) Stirling engine project, with construction planned to begin late 2010. The primary equipment for the generating facility would include the approximately 30,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. Major issues of concern include the conversion of approximately 8,230 acres of open space to industrial uses and compliance with BLM's CDCA Plan, access to land-locked private parcels, compatibility with the on-site BNSF railroad right-of-way, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands. Currently, staff is working on analyzing two new reduced project alternatives, because of the significant impacts of the project as proposed.
- **Imperial Valley Solar Project, (a.k.a, Stirling Energy Systems Solar Two), Imperial County, CA.** Staff Professional for the Land Use Staff Assessment/BLM EIS for a nominal 750-megawatt (MW) Stirling engine project, with construction planned to begin either late 2009 or early 2010. The primary equipment for the generating facility would include the approximately 30,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. Major issues of concern include conversion of 6,500 acres of public recreation land used for OHV use and camping, and compliance with the BLM's CDCA plan, and local LORS, parcel legality issues in compliance with the Subdivision Map Act, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands. Ms. Huerta was involved in staff's extensive coordination efforts with Imperial County regarding the project's inconsistencies with local LORS.
- **City of Palmdale Hybrid Power Plant Project, Palmdale, CA.** Staff Professional for the Land Use Staff Assessment for the Palmdale Hybrid Power Project (PHPP) proposed by the City of Palmdale. The PHPP consists of a hybrid of natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment to be developed on an approximately 377-acre site in the northern portions of the City of Palmdale (City). Major issues of concern include compatibility impacts of the proposed project's linear facilities on adjacent land uses, and the proposed Gen-Tie's LORS inconsistency impacts in both the City of Palmdale and Los Angeles County.
- **Abengoa Mojave Solar One Project, San Bernardino County, CA.** Staff Professional for the Land Use Staff Assessment of a nominal 250 megawatt (MW) solar electric generating facility to be located near Harper Dry Lake in an unincorporated area of San Bernardino County. Issues of concern include the impacts associated with the conversión of 1,765 acres of Important Farmlands, and over 2,000 acres of open space lands. The analysis of agricultural land conversion impacts and associated mitigation required extensive coordination with the California Department of Conservation, San Bernardino County, and Transition Habitat Conservancy.
- **Oakley Generating Station, Contra Costa County, CA.** Staff Professional for the Land Use Staff Assessment for a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 624 megawatts (MW). The project would be located in the City of Oakley. Issues of concern include compatibility with adjacent land uses, and compliance with City of Oakley LORS.

- **Topaz Solar Farm Project Environmental Impact Report (EIR), San Luis Obispo County, CA, Project Assistant/Technical Specialist (2009-Present).** Ms. Huerta prepared the Project Description, the alternatives analysis, and the technical analysis for the agriculture resources for this 550 MW solar photovoltaic power plant on the Carrizo Plain of eastern San Luis Obispo County. The project includes solar arrays that would cover approximately 4,200 acres, as well as an electric substation and switching station. A major issue of concern is the conversion of agricultural land, including approximately 1,200 acres of land under Williamson Act contracts. Ms. Huerta has conducted

extensive coordination with the San Luis Obispo County Agriculture Department to develop the approach and analysis for land conversion.

- **California Valley Solar Ranch Project EIR, San Luis Obispo County, CA, Technical Specialist (2009-Present).** Ms. Huerta prepared the technical analysis for the agricultural resources for this 250 MW solar photovoltaic power plant on the Carrizo Plain of eastern San Luis Obispo County. The project includes solar arrays that would cover nearly 2,000 acres, as well as an electric substation, a 2.5-mile transmission line, and expansion of a surface aggregate mine. Conversion of Important Farmlands, and disturbance to nearby agricultural production activities are major concerns.
- **Tule Wind EIS, Third Party NEPA Review, San Diego County, CA, Technical Specialist (2010).** Under contract to the BLM, Ms. Huerta assisted the BLM in reviewing the land use and agricultural analyses of the Draft and Final EIS/EIR for the proposed Tule Wind Project (EIS) to meet BLM and NEPA requirements. The EIS/EIR is being prepared by a consultant under contract to the CPUC, also directed by BLM, together with San Diego County, Bureau of Indian Affairs, and California State Lands Commission. The joint document evaluates the proposed Tule Wind Project and the proposed East County Substation Project (ECO), along with other related parts of both projects. The BLM is the lead agency for NEPA compliance and the CPUC is the lead agency for CEQA compliance.
- **Ocotillo Express Wind Project, Imperial County, CA, Technical Specialist (2010- Present).** Ms. Huerta is currently preparing the technical analysis for lands (including agriculture and grazing), realty, and recreation resources. The project is proposed to be a 550-MW wind generation facility on approximately 15,000 acres in Imperial County.
- **Alcoa Dike Project Supplemental Environmental Assessment EA/EIR, US Army Corps of Engineers, Technical Specialist (2009-Present).** Ms. Huerta is a preparing the land use and visual analysis for the Supplemental EA/EIR Addendum under the NEPA/CEQA for the United States Army Corps of Engineers. A Supplemental EA/EIR Addendum is being performed to address design changes to the approved Alcoa Dike located in the Prado Basin, Riverside County.
- **Auxiliary Dike Project Supplemental Environmental Assessment (EA)/EIR, US Army Corps of Engineers, Technical Specialist (2009).** Ms. Huerta prepared the land use and visual analysis for the Supplemental EA/EIR Addendum under the NEPA/CEQA for the United States Army Corps of Engineers. A Supplemental EA/EIR Addendum is being performed to address design changes to the approved Auxiliary Dike located in the Prado Basin, Riverside County.
- **Pacific Wind Project EIR, Kern County, CA, Technical Specialist (2009-2010).** Ms. Huerta prepared the technical analysis for land use and public services. The project is proposed to be located on approximately 8,300 acres of land with up to 250 wind turbines to produce up to 250 MW of wind energy.
- **Baldwin Hills Community Standards District (CSD), City of Culver City, Technical Specialist (2009).** Technical Specialist for the review of a County of Los Angeles environmental document and preparation of an oil and gas drilling ordinance for the City of Culver City in Los Angeles County. Ms. Huerta reviewed the technical comments on the Baldwin Hills Community Standards District EIR prepared by the County of Los Angeles for the Inglewood Oil Field. The technical review included the evaluation of the County's proposed CSD (drilling ordinance), which the County revised based on public comments. The City used the review comments as part of their formal comments submitted on the County's EIR and CSD.
- **California River Parkways Trailhead Project Initial Study/Mitigated Negative Declaration (IS/MND), Ventura County Watershed Protection District, Technical Specialist, (2009).** The project would provide a new point of entry to the Ventura County-maintained Ojai Valley Trail and the Ventura River Trail, building on an existing trails network, and would include a new parking lot and crosswalk. Ms. Huerta performed the analyses for land use, agricultural and mineral resources, public services, and recreation resources.

- **TANC Transmission Project, Transmission Agency of Northern California, Staff Professional (2009).** Public scoping for 600 miles of proposed 230-kV and 500-kV transmission lines and associated infrastructure extending from eastern Lassen County south through the Sacramento Valley, and branching west to the Bay Area and east to Tuolumne County: Ms. Huerta assisted in the acquisition and processing of 6,600 scoping comments and information requests; responded via phone, email, and postal mail to public and agency inquiries throughout the twice extended, five-month scoping period; quantitatively evaluated scoping data; and authored sections of the scoping report. The project was cancelled in July 2009.
- **Alta-Oak Creek Mojave Project EIR, Kern County, CA, Technical Specialist (2008-2009).** Ms. Huerta prepared the technical analysis for land use, public services, population, and housing resources. The project is proposed to be located on approximately 11,000 acres of land with up to 350 wind turbines to produce up to 800 MW of wind energy. This would be the first project of the Alta Wind Energy Center which is designed to produce 1,500 MW of wind power in the Tehachapi Wind Resource Area of Kern County**.**
- **Santa Maria River Levee Repair Project, US Army Corps of Engineers, Technical Specialist (2008).** An Environmental Assessment (EA) is being performed for the corrective action to repair the design deficiency of the Santa Maria River Levee in order to avoid the potentially catastrophic consequences of a levee breach that would affect the population of the city of Santa Maria. Ms. Huerta prepared the technical analysis of potential land use and socioeconomic impacts for the EA under NEPA, including NEPA-required environmental justice issues.
- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles and Burbank, CA, Technical Reviewer (2008).** Under Aspen's environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Huerta assisted in preparation of the potential impacts to recreational resources for this EIR. The RSC is a major transmission pipeline in the LADWP water distribution system. The existing RSC pipeline's purpose is to transport large amounts of water from the Los Angeles Reservoir Complex and local ground water wells to reservoirs and distribution facilities located in the central areas within of the City of Los Angeles. The LADWP proposed a new larger RSC pipeline to replace and realign the Upper and Lower Reaches of the existing RSC pipeline.
- **Tehachapi Renewable Transmission Project (TRTP Segments 4 through 11) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, CA, Technical Specialist (2007-Present).** In preparation of a joint EIR/EIS for the CPUC and USDA Forest Service (Angeles National Forest), Ms. Huerta conducted research and analysis for impacts related to public services and utilities, and prepared the Cumulative Impact Scenario. In addition, she prepared the EIR/EIS Summary; and assisted in preparation of the Project Description, Alternative Screening Report, Scoping Report, and the public comment period of the Draft EIR/EIS.

PREVIOUS EXPERIENCE

Burgis Associates, Inc. — May 2006 to May 2007

Ms. Huerta worked as a consultant for city planning departments and private developers throughout northern New Jersey. Her primary projects were to draft a master plan reexamination report and an open space and recreation element of a master plan. Within these projects she evaluated existing socioeconomic conditions and land uses, and conducted an inventory of recreational facilities and open space. She also used ArcGIS to illustrate zoning recommendations and update land use and zoning maps. Other routine projects included the evaluation of site plan, subdivision and variance applications for compliance with local, State and federal regulations.

Brooklyn Economic Development Corporation **September to December 2005**

Ms. Huerta conducted research and field surveys for community revitalization projects. She also participated in collaborative meetings with other community organizations.

ADDITIONAL TRAINING AND COURSES

- Successful CEQA Compliance (February 2009)
- CEQA Basics Workshop Series (November 2008)
- Advanced courses in ArcGIS
- Graduate courses in Environmental Impact Assessment and Environmental Policy

PROFESSIONAL AFFILIATIONS

- American Planning Association

DECLARATION OF
Erin Bright

I**, Erin Bright,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Siting, Transmission and Environmental Protection Division as a **Mechanical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Facility Design** and **Noise and Vibration** for the **Palmdale Hybrid Power Project** (8-AFC-09) based on my independent analysis of the Application, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 17, 2010 Signed: _____

At: Sacramento, California

Erin Bright
Mechanical Engineer

Experience Summary

Two years of experience in the electric power generation field, including analysis of noise pollution, construction/licensing of electric generating power plants, and engineering and policy analysis of thermal power plant regulatory issues. One year of experience in the alternative energy field, including analysis of alternative fuel production and use.

Education

- University of California, Davis--Bachelor of Science, Mechanical Engineering and Materials Science
- University of California, Davis Extension Program--Renewable Energy Systems

Professional Experience

2007 to Present-- Mechanical Engineer, Energy Facilities Siting Division - California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

2006 to 2007--Energy Analyst, Fuels & Transportation Division - California Energy Commission

Performed analysis of use potential and environmental effects of emerging non-petroleum fuels, including compressed natural gas, biomass, hydrogen and electricity, in heavy and light duty transportation vehicles. Contributor to Energy Commission's alternative fuels plan.

DECLARATION OF
SHAHAB KHOSHMASHRAB

I**, SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Noise and Vibration** for the **Palmdale Hybrid 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: _____ Signed: _____

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 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 participated in the preparation of the staff testimony on **Power Plant Efficiency** for the **Palmdale Hybrid 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: _____ Signed: _____

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 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 participated in the preparation of the staff testimony on **Power Plant Reliability** for the **Palmdale Hybrid 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: _____ Signed: _____

At: Sacramento, California

Shahab Khoshmashrab
Mechanical Engineer

Experience Summary

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-2004--Mechanical Engineer, Systems Assessment and Facilities Siting– California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

1998-2001--Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

1995-1998--Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

DECLARATION OF
Kristin Ford, Planner I

I, Kristin Ford, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting, Transmission & Environmental Protection Division as a Planner I.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff supplemental testimony on Socioeconomics for the Palmdale Hybrid Power Plant 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: 11/19/10 Signed: _____

At: Sacramento, California

Kristin S. Ford

Experience

Environmental Planner November 2009 to Present
California Energy Commission, Sacramento, California

- Conduct CEQA-equivalent environmental review for proposed and existing power plants.
- Write analysis for Socioeconomics, Traffic, Visual Resources and Land Use sections for staff assessments.
- Provide expert witness testimony on Socioeconomics, Traffic, Visual Resources and Land Use issues at Energy Commission hearings.

Assistant Planner June 2006 to July 2009
City of Sacramento, Environmental Planning Services, Sacramento, California

- Evaluated, prepared and supervised the preparation of a variety of environmental documents under the California Environmental Quality Act (CEQA); analyzed data and made recommendations on complex planning matters involving issues related to land use, traffic, utilities, aesthetics, noise, energy, historic preservation, air quality and biological resources.
- Prepared, researched and reviewed Mitigation Monitoring Plans per CEQA, the California State & Federal Endangered Species Acts (CESA & FESA), the Clean Water Act (CWA), the Migratory Bird Treaty Act (MBTA) and the Natomas Basin Habitat Conservation Plan.
- Conducted biological resources site assessments for proposed development projects. Determined the need for preparation and/or review of specific studies, such as Wetland Delineations, Nesting Raptor Surveys, and Arborist Reports, to identify resources and provide mitigation measures.
- Coordinated the release of the City of Sacramento's 2030 General Plan Draft/Final Environmental Impact Report between various City departments, the Planning Commission, City Council and the consultant team.

Environmental Coordinator August 2005 to June 2006
Nella Oil Company, Auburn, California

- Coordinated company-wide environmental regulatory compliance activities, including:
  - site investigations;
  - underground fuel-storage tank environmental compliance recommendations and subsequent tank upgrades; and
  - hazardous waste removal.
- Maintained and managed Air Quality Management District and Environmental Health Department permits for 60+ gas stations.

Student Assistant March 2005 to August 2005
California Energy Commission, Sacramento, California

- Conducted research and provided technical writing support to Biology and Water Departments for the annual Energy Policy Report impact analyses.
- Maintained and managed compliance files on power plant facilities.

Student Assistant June 2004 to March 2005
Central Valley Regional Water Quality Control Board, Sacramento, California

- Supported National Pollutant Discharge Elimination System (NPDES) staff by:
  - maintaining waste water treatment plant discharge self-monitoring reports and case files; and
  - analyzed (Amador, Sutter, Placer and Yolo county) wastewater treatment plant monthly monitoring reports for possible permit violations.

Education

2005 Bachelor of Arts, Environmental Studies, *California State University, Sacramento*
2001 Associate of Arts, Liberal Studies, *Allan Hancock College, Santa Maria, California*

DECLARATION OF
Christopher B. Dennis, P.G.

I, **Christopher B. 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 **Soil and Water Resources** for the Palmdale Hybrid 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: December 16, 2010 Signed:_____

At: Sacramento, California

CHRISTOPHER B. DENNIS, P.G., J.D.

EXPERIENCE SUMMARY

Mr. Dennis is a licensed Professional Geologist with the State of California. His professional experience includes over 17 years of innovative technical and management experience. He has worked with a wide variety of CEQA and environmental management issues including soil, water, and waste compliance, investigation, and remediation. He has recently worked with siting and compliance of natural gas-fired and solar power plants. He has been a portfolio manager for several major oil companies and the East Bay Municipal Utility District's trench spoils program. He actively managed Unocal CERT, ExxonMobil, and ChevronTexaco pipeline, service station, bulk fueling, and terminal sites. He is knowledgeable of California's regulatory structure and laws, and is proficient in CEQA analysis, risk assessment, site assessment, remediation, environmental due diligence, and database/GIS development and management.

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
Licensed Professional Geologist, State of California #7184
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., Senior Geologist
2000 to 2001 Alisto Engineering, Inc, Senior Geologist
1998 to 2000 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

Siting, Transmission, and Environmental Protection Division. Focusing on siting and compliance for simple-cycle, combined cycle, solar, and hybrid power plants. Developed a broad knowledge of CEQA impact analysis and mitigation involving water resources, water quality, soil resources, and waste management. Developed preliminary and final staff assessments involving issues of basin water management, overdraft, water quality, water conservation, water transfers, flood potential, and wind and water soil erosion. Deeply involved in issues surrounding the recently proposed large-scale solar power projects including project grading designs, flood management, water use, biological resource impacts, interagency cooperation, and laws, ordinances, regulations, and standards compliance. Also participating in the Quarterly Fuels and Energy Reporting (QFER) program and Environmental Policy Report. Oversaw the development of a QFER database for the collection and management of water use and wastewater discharge by all power plants 20 MW and greater in California.

2004 to 2007 Science Applications International Corporation, Sacramento, CA

Chevron, Northern California (various sites). Managed several former pipeline right-of-way and pump stations sites within the Central California region. Developed and implemented new written field quality assurance/quality control procedures for the entire portfolio of sites. Developed and implemented an analytical laboratory evaluation plan. Managed the groundwater monitoring and sampling program for the portfolio. Initiated low-flow sampling and the use of pre-packed filter screens in boreholes to reduce turbidity in groundwater samples and attain low risk-assessment level detection limits. Initiated a crude oil remediation study for the portfolio that is proving to be a pivotal tool for closure of the pipeline sites. Submitted the first soil vapor survey workplan to the RWQCB for the portfolio and was given approval of that workplan without comment. 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 for-end planning and coordination. Developed and managed all sites budgets and billing.

2004 to 2004 Bay Consulting Services, LLC, Rocklin, CA

Chevron, Northern California (various sites). Completed several closure requests with Tier I/II risk analysis. Started and operated this experimental company for two months.

2001 to 2004 Cambria Environmental Technology, San Ramon and Rocklin, CA

Chevron, Northern California (various sites). Responsible for a large portfolio (40 - 60+ active sites) of ChevronTexaco service station, bulk fueling, and terminal sites in Northern California, some of which were located in the sensitive Lake Tahoe area. 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. Helped develop and received State Underground Storage Tank (UST) Fund pre-approved for ~100 low-risk ChevronTexaco sites as part of a management transfer initiative. Through good regulatory communication, solid analysis, and hard work, closed over 30 sites in two years (half of one portfolio). Site closures were risk-based using both natural attenuation and active remediation approaches. Worked with Caltrans on a freeway (CA I-80) expansion project that required excavation and dewatering beneath a former Chevron site. Through a series of constructive meetings, built into the Caltrans request for bid, specifications for handling petroleum impacted excavated soils and water. The expansion project has proceeded as expected and planned. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

East Bay Municipal Utility District, Northern California (various sites). 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 on trench spoils sampling/analyses for soil disposal. Developed a small group of professionals to manage this portfolio. As part of this project, managed several EPA SW-846 statistical soil analysis projects at District landfill sites with volumes up to ~180,000 cubic yards of landfilled soil. Created and surveyed statistical grids on the landfills and characterized the soil for removal to Class III or Class II landfills. Conducted site investigations and quarterly groundwater monitoring projects. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

2000 - 2001 Alisto Engineering, Lafayette, CA

Caltrans, Northern California (various sites). Conducted statistical analyses of the soil from the shoulders of several Caltrans highways in Southern California. Performed the statistical

analyses to determine lead hazard levels for use soil management planning in proposed construction corridors. The statistical analyses were performed on sample populations ranging from approximately 80 to 300. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

Industrial Facilities, Northern California (various sites). Conducted site investigations at several industrial sites in Northern California. Developed storm water pollution prevention plans (SWPPPs) for development projects in downtown San Jose and a Caltrans project along CA I-680. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

1998 - 2000 TRC, Concord, CA

ExxonMobil, Northern California (various sites). Responsible for a mid-size portfolio (15 - 20+ active sites) of ExxonMobil service station and bulk fueling sites in Northern California. Through good regulatory communication, solid analysis, and hard work, closed over 30 sites. Site closures were risk-based using both natural attenuation and active remediation approaches. For one bulk plant on the sensitive Napa River, secured a public recession of a RWQCB cleanup and abatement order and site closure for Mobil after two years of negotiations, technical presentations, and meetings. Conducted high vacuum, dual-phase extraction at several ExxonMobil sites. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

Quick Stop Markets, Northern California (various sites). Developed and managed a small portfolio of Quick Stop Market sites in Northern California. Saved the client thousands of dollars in lease fees by closing a site through solid regulatory negotiation and communication, and aggressive site assessment and remediation. The site was located a few blocks upgradient from Lake Merritt in Oakland. Conducted high vacuum, dual-phase extraction at several Quick Stop sites. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

Miscellaneous Sites, Northern California. Team member of the Level 3 Communications environmental impact report (EIR) submittals, preparing geologic hazard evaluations. Conducted site investigations at several industrial sites in Northern California. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

1993 - 1995 Project Manager, GeoResearch, Long Beach, CA

Unocal CERT, Southern California (various sites). Project manager of a portfolio of active Unocal CERT sites. Frequently utilized mobile laboratories to assist in the placement of soil borings, vapor extraction, and groundwater wells. Conducted risk assessments, site assessments, tanks pulls, station demolitions, aquifer and vapor extraction tests, and remediation system designs and installations.

1990 - 1993 Staff Geologist, AeroVironment, Monrovia, CA

Project manager and project geologist for industrial sites and government projects. Team leader for documenting homestead well locations and archaeological and biological concerns at over 400 former homestead sites at Edwards AFB using GPS technology. Conducted groundwater sampling according to AFCEE protocols, and soil-vapor and geophysical surveys at Vandenberg AFB. Member of the design team of a mobile soil-vapor laboratory. Lead designer of an insitu soil-vapor sample collection system. Managed two teams for monitoring landfill vapor emissions and subsurface migration at active county operated landfills, and wrote the standard operating procedures, conducted field training, and prepared quarterly AQMD reports.

DECLARATION OF
James Adams

I, James Adams declare as follows:

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.

2. I prepared staff testimony related to Traffic and Transportation and Visual Resources for the Final Staff Assessment for the Palmdale Hybrid Power Project (08-AFC-9) 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.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/29/10 Signed: James Adams

At: Sacramento, California

James S. Adams
Environmental Protection Office
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5504
PH (916) 653-0702, FAX (916) 654-3882
Jadams@energy.state.ca.us

5/1999
Present **Environmental Planner**
Review applications for certification to acquire permits from the California Energy Commission to build electric generating power plants. Specific technical fields include socioeconomics and traffic and transportation.

11/1997
Present **Energy and Resource Consultant**
Provide clients with technical expertise on various issues related to natural resource use and development. Current activities include managing an Intervention by the Redwood Alliance before the California Public Utilities Commission regarding the decommissioning of the Humboldt Bay Power Plant's nuclear reactor.

9/1994--
10/1997 **Senior Analyst - Safe Energy Communication Council (SECC)**
Responsible for developing and/or implementing campaigns on various energy issues involving the promotion of energy efficiency and renewable energy and advocating less reliance on nuclear power. Managed educational outreach efforts to newspaper editorial writers throughout the U.S. to encourage coverage of energy issues. Participated in meetings and negotiations with key Clinton administration officials, members of Congress and staff, national coalitions, and grassroots organizations on important energy issues (e.g. U.S. Department of Energy Budget for Fiscal Years 1996-1998). Successfully raised $140,000 from private foundations to support SECC activities.

6/1978--
12/1992 **Principal Consultant - Redwood Alliance**
Provided consulting services to the Alliance; a renewable energy/political advocacy organization. Major responsibilities included managing and/or participating in several interventions/appearances before the California Public Utilities Commission, California Energy Commission, California Legislature, U.S. Congress and the U.S. Nuclear Regulatory Commission. Issues included electric utility planning options, greater reliance on energy efficiency and renewable energy, nuclear power economic analyses, decommissioning cost estimates, and nuclear waste management and disposal.

2/1983--
8/1986 **Natural Resource Specialist**
Assisted private consulting, firms, non-profit corporations and government agencies in various projects related to the enhancement and protection of national forests in Northern California and Southern Oregon. This included contracts with the U.S. Forest Service, Fish and Wildlife Service, National Park Service, the California Coastal Conservancy, and private landowners.

6/1978--
present Consultant/Journalist/Paralegal/Lobbyist
Throughout the period of work outlined above, I have written a considerable amount of news articles and reports connected to ongoing-projects and issues of personal interest. The leg, al/administrative interventions have required extensive paralegal work to support attorneys, and technical expertise to identify and assist consultants. In addition, many of the projects required consulting services and lobbying, at the local, state and federal level whenever necessary, as well as working with the print and television media as appropriate.

From 1978 through 1984 1 served on the Board of Directors for two locals non-profit agencies devoted to sustainable community development, Redwood Community Development Council and Redwood Community Action Agency (RCAA). I also was hired on staff at RCAA as a natural resource specialist which is explained more fully above. I am proficient with computers, printers, fax machines and related equipment.

EDUCATION

M.A. Social Science. Political science and natural resources emphasis. California State University at Humboldt. Graduated December 1988.

B.A. Political Science. Political and economic aspects of natural resource development, with a particular emphasis in forest ecology and appropriate technology. California State University at Humboldt. Graduated June 1978.

Academic Honors. Member of PI GAMMU MU Honor Society since 1986.

MILITARY SERVICE

7/1969--
9/1975 U.S. Navy. Air Traffic Controller.
Honorable Discharge.

DECLARATION OF
Testimony of William Walters, P.E.

I**, William Walters,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission's Siting,Transmission and Environmental Protection Division, as a senior associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Traffic and Transportation** (Plume Velocity Analysis - Appendix TT-2) and **Visual Resources** (Visible Plume Modeling Analysis - Appendix VR-3) for the **Palmdale Hybrid Power Project** staff assessment based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: January 3, 2011 Signed: Original Signature in Dockets

At: Agoura Hills, California

WILLIAM WALTERS, P.E.
Air Quality Specialist

ACADEMIC BACKGROUND
B.S., CHEMICAL ENGINEERING, 1985, CORNELL UNIVERSITY

PROFESSIONAL EXPERIENCE

Mr. Walters has over 20 years of technical and project management experience in environmental compliance work, including environmental impact reports, emissions inventories, source permitting, energy and pollution control research RCRA/CERCLA site assessment and closure, site inspection, and source monitoring.

Aspen Environmental Group 2000 to present

Responsible as lead technical and/or project manager of environmental projects, including the following specific relevant recent (2000 and forward) responsibilities and projects:

- **Engineering and Environmental Technical Assistance to Conduct Application for Certification Review for the California Energy Commission:**
  - Preparation and project management of the air quality section of the Staff Assessment and/or Initial Study and the visual plume assessment for the following licensing projects: Hanford Energy Park; United Golden Gate, Phase I; Huntington Beach Modernization Project*; Woodland Generating Station 2; Ocotillo Energy Project, Phase I; Magnolia Power Project*; Colusa Power Project; Rio Linda/Elverta Power Plant Project; Roseville Energy Center; Henrietta Peaker Project; Tracy Peaking Power Plant Project*; Avenal Energy Project; San Joaquin Valley Energy Center*; Salton Sea Unit 6 Project*; Modesto Irrigation District Electric Generation Station*; Walnut Energy Center*; Riverside Energy Resource Center*; Pastoria Energy Facility Expansion; Bullard Energy Center; Panoche Energy Center; Starwood Power Plant; Riverside Energy Resource Center Units 3 and 4 Project; Colusa Generating Station*; Chula Vista Energy Upgrade Project*; Orange Grove Power Plant Project*; Carlsbad Energy Center Power Project*; Hydrogen Energy California (in process); Canyon Power Plant Project*; Imperial Valley Solar Project*; Beacon Solar Energy Project; Calico Solar Power (in process); Abengoa Mojave Solar Project; Genesis Solar Energy Project; Blythe Solar Power Project; Palen Solar Power Project (in process); Ridgecrest Solar Power Project; Rice Solar Energy Project (in process); Ivanpah Solar Electric Generating Station project.
  - Preparation and project management of the visible plume assessment for the following licensing projects: Metcalf Energy Center Power Project*; Contra Costa Power Plant Project*; Mountainview Power Project; Potrero Power Plant Project; El Segundo Modernization Project; Morro Bay Power Plant Project; Valero Cogeneration Project; East Altamont Energy Center*; SMUD Cosumnes Power Plant Project*; Pico Power Project; Blythe Energy Project Phase II; City of Vernon Malburg Generating Station; San Francisco Electric Reliability Project; Los Esteros Critical Energy Facility Phase II; Roseville Energy Park; City of Vernon Power Plant; South Bay Replacement Project; Walnut Creek Energy Park; Sun Valley Energy Project; Highgrove Power Plant; Colusa Generating Station; Russell City Energy Center; Avenal Energy Project; Community Power Project; San Gabriel Generating Station; Sentinel Energy Project; Victorville 2 Hybrid Power Project; City of Palmdale Hybrid Energy Project (in process); Chevron Richmond Power plant Replacement Project; Tracy Combined Cycle Power Plant; Lodi Energy Center; and San Joaquin Solar 1&2 Power Plant.
  - Assistance in the aircraft safety review of thermal plume turbulence for the Riverside Energy Resources Center; Russell City Energy Center Amendment*; Eastshore Energy Power Plant*; Carlsbad Energy Center (in progress), City of Palmdale Hybrid Energy Project; Riverside Energy Resource Center Units 3 and 4 Project; Victorville 2 Hybrid Power Project; Blythe Energy Project Phase II*, Tracy Power Plant; Avenal Energy Project; and Blythe Solar Energy Project siting cases. Assistance in the aircraft safety review of

* - Includes providing expert witness testimony.

thermal and visual plumes of the operating Blythe Energy Power Plant. Preparation of a white paper on methods for the determination of vertical plume velocity determination for aircraft safety analyses.

- **Other California Energy Commission and relevant project experience:**
  - Preparation and instruction of a visual water vapor plume modeling methodology class for the CEC.
  - Preparation and project management of the public health section of the Initial Study for the Woodland Generating Station 2 Energy Commission licensing project.
  - Preparation of project amendment or project compliance assessments, for air quality or visual plume impacts, for several licensed power plants, including: Metcalf Energy Center; Pastoria Power Plant; Elk Hills Power Plant; Henrietta Peaker Project; Tracy Peaker Project; Magnolia Power Project; Delta Energy Center; SMUD Cosumnes Power Plant; Walnut Energy Center; San Joaquin Valley Energy Center; City of Vernon Malburg Generating Station; Otay Mesa Power Plant; Los Esteros Critical Energy Facility; Pico Power Project; Riverside Energy Resource Center; Blythe Energy Project Phase II; Inland Empire Energy Center; Salton Sea Unit 6 Project; Black Rock 1, 2, and 3 Geothermal Power Project, and Starwood Power-Midway Peaking Power Plant.
  - Preparation of the air quality section of the staff paper "A Preliminary Environmental Profile of California's Imported Electricity" for the Energy Commission and presentation of the findings before the Commission.
  - Preparation of the draft staff paper "Natural Gas Quality: Power Turbine Performance During Heat Content Surge", and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.
  - Preparation of the staff paper "Emission Offsets Availability Issues" and preparation and presentation of the Emission Offsets Constraints Workshop Summary paper for the Energy Commission.
  - Preparation of information request and data analysis to update the Energy Commission's Cost of Generation Model capital and operating cost factors for combined and simple cycle gas turbine projects. Additionally, performed a review of the presentation for the revised model as part of the CEC's 2007 Integrated Energy Policy Report workshops, and attended the workshop and answering Commissioner questions on the data collection and data analysis. Prepared an update to the Energy Commission's capital and operating cost factors for combined and simple cycle gas turbine projects within the Cost of Generation model as part of the 2009 Integrated Energy Policy Report process.
  - Preparation of the Air Quality Section, air quality emission calculations, or other technical studies, is support of the environmental documentation for renewable energy projects including; the Liberty Energy XXIII Renewable Energy Project; the Topaz Solar Farm, the Pacific Wind Energy Project, and the Pine Tree Wind Development Project.
  - Preparation of comments on the Air Quality, Alternatives, Marine Traffic, Public Safety, and Noise section of the Cabrillo Port Liquefied Natural Gas Deepwater Port Draft EIS/EIR for the City of Oxnard.

CERTIFICATION

- Chemical Engineer, California License 5973

AWARDS

- California Energy Commission Outstanding Performance Award 2001

DECLARATION OF

Dr.Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting, 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 Palmdale Hybrid 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:_____ Signed:_____

At: Sacramento, California

RESUME

DR. OBED ODOEMELAM

EDUCATION:

1979-1981 University of California, Davis, California. Ph.D., Ecotoxicology

1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.

1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989
The Present: California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

DECLARATION OF
Suzanne L. Phinney, D.Env.

I, Suzanne L. Phinney, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Senior Associate.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared staff testimony on **Waste Management** and **Alternatives Appendix A** for the **Palmdale Hybrid Power Plant Final Staff Assessment** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 12/16/2010 Signed: Suzanne Phinney

At: Sacramento, California

SUZANNE L. PHINNEY

Senior Associate, Energy and Infrastructure

ACADEMIC BACKGROUND

Doctorate, Environmental Science & Engineering (D.Env.), University of California, Los Angeles, 1981
M.S., Marine Biology, Dalhousie University, Halifax, Nova Scotia, Canada, 1975
B.A., Biological Sciences, University of California, Berkeley, 1973

PROFESSIONAL EXPERIENCE

Dr. Phinney has 30 years of experience in the environmental and energy field, providing technical and policy support in energy analysis, environmental assessment, environmental remediation, air and water quality assessments, risk assessment, regulatory compliance, permitting, and project/program management. Her particular emphasis is energy and infrastructure with projects addressing climate change, alternative energy generation technologies, liquefied natural gas, petroleum infrastructure, advanced transportation vehicles and fuels, land use and energy, and power plant siting. Prior to employment at Aspen, Dr. Phinney worked for 16 years with Aerojet, where she oversaw all environmental and safety issues.

Aspen Environmental Group — 2001 to present

Dr. Phinney manages energy and infrastructure projects for Aspen and provides environmental support on major projects. She has provided energy and environmental expertise to the following clients:

California Energy Commission (CEC). Dr. Phinney has supported CEC staff since 2001. She has prepared analyses for several power plants throughout the State, and has authored or contributed to over a dozen special studies. She is currently Deputy Program Manager for planning studies conducted by the Aspen team. Her major efforts for the CEC include the following.

- **Power Plant Siting, CEC, Project Management/Technical Support (2001 – Present).** Dr. Phinney prepared the alternatives analysis for the following power plants under review by the Energy Commission:
  - **Palomar Energy Project –** 500 MW combined-cycle natural gas facility in Escondido, San Diego County
  - **Russell City Energy Center –** 600 MW combined-cycle natural gas facility in Hayward, Alameda County
  - **Eastshore Energy Center -** 115.5 MW simple-cycle natural gas facility in Hayward, Alameda County
  - **Carrizo Energy Solar Farm –** 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
  - **CPV Sentinel Energy Project –** 850 MW natural gas plant in the Coachella Valley, Riverside County
  - **Marsh Landing Generating Station-** 930 MW natural gas plant within the existing Contra Costa Power Plant in Antioch, Contra Costa County
  - **Orange Grove Project –** 96 MW natural-gas peaking facility near Pala, San Diego County
  - **Willow Pass Generating Station –** 550 MW natural gas plant within the existing Pittsburg Power Plant in Pittsburg, Contra Costa County

- **Almond 2 Peaking Power Plant Project** – 174 MW natural-gas peaking facility near Ceres, Stanislaus County
- **Abengoa Mojave Solar Project** – 250 MW solar thermal (parabolic trough) plant near Harper Dry Lake, San Bernardino County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County

Dr. Phinney prepared the waste management assessments of power plant licensing applications:

- **Eastshore Energy Center –** 115.5 MW natural gas simple-cycle plant in Hayward, Alameda County
- **Carrizo Energy Solar Farm –** 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
- **Palmdale Hybrid Power Project –** 570 MW natural gas-solar thermal (parabolic trough) hybrid plant in Palmdale, Los Angeles County
- **SES Solar Two Siting Case –** 750 MW solar thermal (Stirling dish) plant on 6,500 acres of mostly BLM land in Imperial County
- **Hanford Energy Park Peaker Plant –** 120 MW simple-cycle, natural gas facility in Hanford, Kings County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County
- **Blythe Solar Power Project** – 1,000 MW solar thermal (parabolic trough) plant on 9,400 acres of BLM land near Blythe, Riverside County
- **Palen Solar Power Project** – 500 MW solar thermal (parabolic trough) plant on 5,200 acres of BLM land in the Chuckwalla Valley, Riverside County

Dr. Phinney also coordinated the study of cooling water alternatives for the Tesla and Tracy natural gas, combined-cycle power plants.

- **Environmental Performance Report, CEC, Project Manager/Technical Support (2001, 2003, 2005)**.Dr. Phinney was Project Manager for Aspen's technical contributions, graphics and production efforts for the 2001 Environmental Performance Report (EPR) which detailed the current and historical air, water and biological impacts from in-state generation facilities. She provided support to the water resources discussion in the 2003 EPR and managed the analysis of out-of-state generation facilities for the 2005 EPR.
- **Advanced Electric Generation Technologies, CEC, Project Manager (2001 - 2002).** Dr. Phinney served as Project Manager for a report defining the technical development, developmental capacity, commercial status, costs and deployment constraints of selected alternative electric generation technologies. Technologies included geothermal, fuel cell, solar thermal, solar photovoltaic, wind and hydro. The focus was on development and application of the technology in California. Two page fact sheets on each technology and a matrix comparing all technologies was developed. Finally, an updated discussion of renewable technologies was developed for insertion into the alternatives section of Staff Assessments for power plant applications.
- **Liquefied Natural Gas Support, CEC, Technical Author (2002 – 2007**). Dr. Phinney has been instrumental in the preparation of numerous safety and policy reports on liquefied natural gas (LNG). She authored the Commission document: *International and National Efforts to Address the Safety and Security of Importing Liquefied Natural Gas: A Compendium*. This report reviewed national and international LNG regulations, standards and guidelines, reviewed risk assessment techniques, and identified, compiled and reviewed LNG safety/risk studies. Dr. Phinney helped organize LNG Access Workshops held in June 2005 and prepared a 40 page summary of presentations made at the workshops. She developed over 30 fact sheets on LNG subject areas for distribution to the public. Dr. Phinney compiled state and local comments on a proposed LNG terminal at the Port of Long Beach;

these were presented in the *Safety Advisory Report on the Proposed Sound Energy Solutions Natural Gas Terminal at the Port of Long Beach, California,* which was delivered to the Federal Energy Regulatory Commission within the mandated 30-day period imposed by the 2005 federal Energy Bill. She provided technical review for the report *The Outlook for Global Trade in Liquefied Natural Projections to the year 2020.*

- **Natural Gas Market Assessment Support, CEC, Technical Author/Editorial Support (2005 –** 2007). Dr. Phinne**y c**ontributed to natural gas supply and demand analyses for the Commission document, *Natural Gas Assessment Update*. She provided technical and editorial support to the 2005 and 2007 Integrated Energy Policy Report (IEPR) documents, *Preliminary (and subsequently the Revised report) Reference Case in Support of the 2005 Natural Gas Market Assessment* and *2007 Natural Gas Market Assessment.* She edited the Commission document *Natural Gas Quality: Power Turbine Performance During Heat Content Surges.*
- **Petroleum Infrastructure Environmental Performance Report, CEC, Project Manager (2005)**. Dr. Phinney served as Project Manager for the 2005 IEPR document *Petroleum Infrastructure Environmental Performance Report.* In addition to managing preparation of the report and workshop presentations, she prepared responses to comments and provided policy recommendations.
- **Hydropower and Global Climate Change, CEC, Technical Author (2005)**. Dr. Phinney coauthored the document *Potential Changes in Hydropower Production from Global Climate Change in California and the Western United States*. This report investigated the effects of climate change on hydropower production in the West and compared impacts and policy actions in California, the Pacific Northwest, and the Southwest.
- **Advanced Energy Pathways, CEC, Project Manager (2006 – 2008).** Dr. Phinney provided project management support for a 3-year study evaluating the effects of advanced transportation technologies and fuels (out to 2050) on California's natural gas and electricity systems. This report involved the development of baseline and alternative energy demand and supply scenarios, in-depth technical analysis of advanced transportation technologies and fuels, and the development of an energy-rich model.
- **Land Use and Energy, CEC, Project Manager/Technical Author (2006 – 2008).** Dr. Phinney authored a CEC report on the linkages between land use and energy, which ultimately became one of the two chapters presented in the 2006 IEPR Update. The report highlighted how energy can be better integrated in land use planning, and how efforts such as smart growth can help the state meet its energy and greenhouse gas emission reduction goals. She organized a full-day workshop involving over a dozen speakers representing state agencies, local governments, research entities, environmental groups, utilities, and non-profits. Dr. Phinney was one of the authors of the 2007 land use and energy follow-up report which further defined the role of land use in meeting California's energy and climate change goals. She helped synthesize the report into a chapter for the 2007 IEPR. Dr. Phinney helped edit the Land Use Subgroup of the Climate Action Team report prepared for submission to the California Air Resources Board AB 32 Scoping Plan.
- **AB 1632 Nuclear Power Plant Assessment, CEC, Technical Author (2007 – 2008).** Dr. Phinney was a key member of a team evaluating nuclear power issues in the state in response to AB 1632 legislation. She managed and prepared report sections regarding the impacts to local communities and the environmental issues and costs associated with alternatives, including renewables, to the state's two nuclear facilities. These sections were incorporated in the report *An Assessment of California's Nuclear Power Plants.*
- **Environmental Screening Tool for Out-of-State Renewable Energy Facilities, CEC, Project Manager (2009).** Dr. Phinney prepared an environmental screening tool/analysis allowing CEC to determine quickly whether out-of-state renewable facilities requesting RPS certification met California laws, ordinances, regulations and standards.

- **Energy Aware Facility Planning and Siting Guide, CEC, Project Manager (2009-2010).** Dr. Phinney is updating a 1997 version of the Energy Aware Guide to help local governments plan for and permit electricity generation facilities and transmission lines that will be needed in the upcoming years. The Guide informs planners, decision makers and the public about what, how, and why electricity infrastructure may be developed.

California Public Utilities Commission. Dr. Phinney has managed several environmental assessments for the CPUC and has been heavily involved in editorial support of many other CPUC documents prepared by Aspen.

- **Looking Glass Network Initial Study/Mitigated Negative Declaration, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the preparation of Initial Study/Mitigated Negative Declarations (IS/MND) for this telecommunication project that involved construction in the San Francisco Bay Area and the Los Angeles Basin to allow fiber optic connections in numerous locations.
- **Williams Communications Sentry Marysville Project IS/MND, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the installation of fiber optic connection to a Beale Air Force Base in Yuba County.
- **Kirby Hills II Natural Gas Storage Facility IS/MND, CPUC, Project Manager (2007).** Dr. Phinney managed an IS/MND for expansions at a natural gas storage facility in Solano County.
- **Multiple EIR Documents, CPUC, Technical Editor (2004 - 2008).** Dr. Phinney provided editorial and QA/QC review for the Diablo Canyon Steam Generator Replacement EIR, the Miguel Mission 230 kV Transmission Line EIR and the Sunrise Powerlink EIR/EIS.

California Institute of Technology/University of California. Dr. Phinney provided project management support to the following project.

- **Combined Array for Research in Millimeter-wave Astronomy EIS/EIR**, **U.S. Forest Service and the University of California (2001 – 2002).** Dr. Phinney was the Project Manager for this EIS/EIR for a radio telescope antenna array to be placed at a high altitude site in the Inyo National Forest. The evaluation of alternatives was especially contentious, and Aspen's field analyses of several potential sites were pivotal in the ultimate selection of one of these alternative sites.

Western Area Power Administration. Dr. Phinney provided editorial and QA/QC support to the following projects.

- **North Area ROW Maintenance Project Environmental Assessment, Western, Technical Editor/QA/QC (2006-2008).** Dr. Phinney provided technical editing and QA/QC support for all documents relating to the development of 800 miles of transmission lines in Northern California.
- **Sacramento Area Voltage Support Supplemental EIS/EA, Technical Editor/QA/QC (2006 – 2008).** Dr. Phinney provided technical editing and QA/QC support for all environmental documentation and permitting for new construction and reconstruction of transmission lines in the greater Sacramento area.

Vermont Yankee Nuclear Power Plant Report, Vermont Department of Public Service, Project Manager (December 2008 to January 2009). Dr. Phinney was the Project Manager and provided technical support for the environmental analysis of the continued operation of the Vermont Yankee Nuclear Power Station in Vernon, Vermont. The report assessed the environmental impacts to land, water and air resources (including climate change), soil and seismicity, on-site and off-site storage and disposal of high-level and low-level nuclear waste.

GenCorp 1999 to 2000

- As Vice President, Environmental and Regulatory Affairs, Dr. Phinney held primary responsibility for coordinating the company's aerospace and automotive environmental activities with various federal, State, and local regulatory agencies. Her specific responsibilities included: working with external groups and entities to develop responsible environmental legislation, regulations, and standards and the implementation of sound public policy; developing stakeholder base and strategy to ensure that company objectives were achieved; facilitating company and regulatory agency discussions to achieve more comprehensive and quicker remediation of sites; and spearheading a stakeholder group to develop and fund scientific studies on selected chemicals of concern.

Aerojet General Corporation 1984 to 1999

As Vice President, Environmental Health and Safety, Dr. Phinney ensured that programs were in place to meet all regulatory requirements and company initiatives. Her responsibilities included: providing strategic direction and management of all superfund-related investigation and remediation activities; developing environmental management plans; communicating environmental requirements, concerns, and successes to both internal and external audiences, including the board of directors, investment banking, and the analyst community; and participating as a member of the leadership council in defining company-wide business objectives and targets.

- Dr. Phinney created the first corporate EHS department, defining and staffing key functional areas. She managed a $20,000,000 annual budget and oversaw a staff of up to 30 professionals. Select accomplishments include: the development of remediation technologies that resulted in the cleanup of over 50 billion gallons of contaminated groundwater; development of the world's first groundwater treatment facility for perchlorate; significant reductions in emissions and hazardous waste generation; representation on numerous legislative and regulatory task forces and leadership positions on external business and community EHS committees and councils; and extensive public outreach efforts.

PREVIOUS EXPERIENCE, 1976 TO 1984

Jacobs Engineering Group. Dr. Phinney conducted toxicological, ecological, and air and water quality assessments.

Department of Environmental Science and Engineering at the University of California, Los Angeles. Dr. Phinney analyzed legal, economic, public health, and administrative barriers to waste water reuse. She also conducted an analysis of ecological and institutional factors in coastal siting of power plants.

Southwest Los Angeles Junior College. Dr. Phinney taught lecture and laboratory courses in general science.

TRAINING

- Certificate, Executive Program, University of California, Davis, 1989
- Expert Witness Training, California Energy Commission, 2001

HONORS AND AWARDS

- Who's Who of American Women, 18th Edition
- YWCA Outstanding Woman of the Year (Sciences) Award, 1992
- Woman of Achievement Award, Downtown Capitol Business and Professional Women, 1993
- Individual Award for Outstanding Contribution in Air Quality, 1995
- Sacramento Safety Center Incorporated, Eagle Award for Safety, 1998
- Regional Award for Outstanding Contribution in Air Quality, 2003

ACTIVITIES AND ASSOCIATIONS

- Editorial Board, The Environmental Professional, 1987-1989
- City of Sacramento Toxic Substances Commission, 1986-1988
- Sacramento Environmental Commission, 1988-1991
- Board of Directors, League of Women Voters of Sacramento, 1989-1999; President 1996-1997; Co-President 1997-1998; 2003-2005; Energy Study Committee 2005; Moderator/Facilitator of Debates and Forums (e.g., climate change, the SACOG's MTP, and flood control)
- Toxics Consultant, League of Women Voters of Sacramento, 1988-1989
- Member, Advisory Committee on AB 3777 (Risk Management Prevention Programs)
- Board of Directors, American Lung Association of Sacramento-Emigrant Trails, 1992-2000; President 1998-1999;
- Board of Directors, Sacramento Metropolitan Chamber of Commerce, 1992-1997; Vice President, Public Policy, 1996-1997
- Board of Directors, Air and Waste Management Association, 1991-1994
- Steering Committee Chair, Cleaner Air Partnership, 1993-1996, 2000-2001; Executive Committee 1993 to present
- Co-chair, TCE Issues Group, 1994-2000
- Sacramento Water Forum, 1995-2000
- Rate Advisory Committee, Sacramento Municipal Utility District, 1999-2001

SELECTED PUBLICATIONS/PRESENTATIONS

Phinney, S.L., Panel Moderator, Climate Change Initiatives for California, AEP Annual Conference, Shell Beach, California, 2007.

Phinney, S.L., Panel Moderator, Is there a Need for LNG in California, AEP Annual Conference, Shell beach, California, 2007.

Phinney, S.L., "LNG Safety Analysis in California – Federal, State and Local Processes" Presented at California Foundation on the Environment and the Economy, 2005.

Phinney, S.L., "Energy Basics" Presented at League of Women Voters of California Annual Convention, 2005.

Phinney, S.L., Presentation to U.S. Department of Justice, Office of the U.S. Attorney, on Women and Equality, 2004.

Phinney, S.L., "Trends in Industrial Waste Generation and Management" Presented at National Ground Water Association Conference, Las Vegas, Nevada, 1996.

Phinney, S.L., "Effective Management of an RI/FS to Reduce Financial Exposure," Manufacturers Alliance Environmental Management Council, Washington, D.C., 1995.

Phinney, S.L., "Knowing Your Compliance Challenge," 7th Annual California Statewide Community Awareness and Emergency Response (CAER) Conference, Sacramento, California, 1995.

Phinney, S.L., "Industry's Role in Broadening the Use of Alternative Fuels in America," Clean Cities Ceremony, Sacramento, California, 1994.

Phinney, S.L., "Aerospace Industry Perspective on Defense Conversion," AAAS Annual Meeting, San Francisco, California, 1994.

Phinney, S.L., "Aerojet's Waste Reduction Successes," Business for the Environment Conference, Sacramento, California, 1993.

Phinney, S.L., "Company Worker Trip Reduction Programs Under the Clean Air Act Amendments." MAPI Hazardous Materials Management Council, Washington, D.C., 1993.

Phinney, S.L., Testimony Before House Government Operations Subcommittee, 1993.

Phinney, S.L., Moderator, The Clean Air Act, A Public Forum, Sacramento, California, 1993.

Phinney, S.L., Plenary Session Chairperson and Speaker, "Business and the Environment: Must You Sacrifice One for the Other?" National Association of Environmental Professionals Conference, Seattle, Washington, 1992.

Phinney, S.L., "Facing the Challenge: The New California EPA." HazMat Northern California Conference, San Jose, California, 1992.

Phinney, S.L., "Understanding the Client Perspective." Environmental Business Conference, Pasadena, California, 1991.

Phinney, S.L., Panelist – Women of Science: Secrets of Success. Workshop, AAAS Annual Meeting, Washington, D.C., 1991.

Phinney, S.L., Keynote Address, ADPA International Symposium on Compatibility and Processing, San Diego, California, 1991.

Phinney, S.L., Keynote Address, Women in Science and Technology Conference, Jackson, Mississippi, 1991.

Phinney, S.L., Guest Speaker, Sacramento County Bar Association, Environmental Law Section, Sacramento, California, 1991.

Phinney, S.L., "Managing CERCLA Compliance from the Corporate Perspective." Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Phinney, S.L., and C.A. Fegan, "Identifying a Feasible, Effective Treatment Method for an Unusual Chemical of Concern." Proceedings, American Defense Preparedness Association 16th Environmental Symposium, New Orleans, Louisiana, 1988.

Phinney, S.L., "A Proactive Superfund Cleanup by Industry." Proceedings of the 4th Annual Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Thompson, C.H., S.L. Phinney and F.R. McLaren, "Aerojet: A Regional Site Program – Problem Definition." Proceedings of the Hazardous Waste and Environmental Emergencies Conference, Cincinnati, Ohio, 1985.

Kahane S.W., S.L. Phinney and A. Wright, "The Tightening Environmental Regulatory Climate for Hazardous Waste Management – Current Mandates and Future Directions for Industrial Compliance." Proceedings of the 1984 AlChE Summer National Meeting, Philadelphia, Pennsylvania, 1984.

Bachrach, A., D.M. Morycz, S.L. Phinney and S.W. Kahane, "Regulation and Offshore Oil and Gas Facilities." In: Emerging Energy/Environmental Trends and the Engineer. Eds. R.D. Nuefeld and R.W. Goodwins, 1983.

Lindberg, R.G., S.L. Phinney, J. Daniels and J. Hastings (eds)., "Environmental Assessment of the U.S. Department of Energy's Solar Thermal Technology Program." Prepared for the U.S. Department of Energy, June 1982.

Kahane, S.W., S.L. Phinney, J.A. Hill and R.C. Sklarew, "Key Considerations in Assessing the Air Impacts of Projected Outer Continental Shelf Oil and Gas Development," presented at the 74th Annual Air Pollution Control Association Meeting, Philadelphia, Pennsylvania, 1981

Phinney, S.L., "The U.S. Environmental Protection Agency's Pesticide Registration Program: A Case Study – Chloramben." Doctoral Dissertation, Environmental Science and Engineering Program, University of California, Los Angeles, California, 1981.

Phinney, S.L., (contributing author) et al. "Institutional Barriers to Wastewater Reuse in Southern California." Environmental Science and Engineering Report Prepared for the Office of Water Research and Technology, U.S. Department of the Interior, 1979.

Phinney, S.L., "Area-Restricted Feeding in American Plaice." Masters Thesis. Dalhousie University, Halifax, Nova Scotia, Canada, 1975.

DECLARATION OF

Testimony of Dal Hunter, Ph.D., C.E.G.

I, **Dal Hunter, Ph.D., C.E.G.,** declare as follows:

1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as 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** for the **Palmdale Hybrid 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: November 19, 2010 Signed: _____

At: Black Eagle Consulting, Inc.
Reno, Nevada

REGISTERED GEOLOGIST
ROBERT DALTON HUNTER
No. 1411
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

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Robert D. Hunter, Ph.D., C.E.G.
Engineering Geologist
Vice President

Education

- Ph.D. – Geology – 1989 – University of Nevada, Reno
- M.S. – Geology – 1976 – University of California - Riverside
- B.S. – Earth Science – 1972 – California State University, Fullerton

Registrations

- Professional Geological Engineer – Nevada
- Registered Geologist – California
- Certified Engineering Geologist – California

Experience

1997 to Present: Black Eagle Consulting, Inc.; Vice President. Dr. Hunter is in charge of all phases of geochemical, geological, and geotechnical projects and is responsible for conducting, coordinating, and supervising geotechnical investigations for public and private sector clients. He is very familiar with design specifications and state and federal requirements.

Dr. Hunter has also provided geological, geotechnical, and paleontological review and written and oral testimony for California Energy Commission (CEC) power plant projects including:

- El Segundo Power Redevelopment Project (Coastal, including testimony and compliance monitoring)
- Magnolia Power Project (including compliance monitoring
- Ocotillo Energy Project (Wind Turbines)
- Vernon-Malburg Generating Station
- Inland Empire Energy Center (including testimony and compliance monitoring)
- Palomar Energy Project
- Henrietta Peaker Project
- East Altamont Energy Center
- Avenal Energy Center
- Teayawa Energy Center monitoring
- Walnut Energy Center (including compliance monitoring
- Riverside Energy Resource Center
- Salton Sea Unit 6 (Geothermal Turbines)
- National Modoc Power Plant
- Pastoria Energy Center
- Sun Valley Energy Project
- El Centro Unit 3 Repower Project
- AES Highgrove Project
- South Bay Replacement Project
- Vernon Power Plant

- Humboldt Bay Repowering Project
- Victorville Power Project
- Carlsbad Energy Center
- San Gabriel Generating Station
- Orange Grove
- Chula Vista Energy Upgrade
- Carrizo (Solar)
- Kings River
- Canyon Power Plant
- Otay Mesa Generating Project (compliance monitoring)
- Montainview Power Plant Project (compliance monitoring)
- Consumes Power Plant (compliance monitoring)
- Sunrise Power Project (compliance monitoring)
- Niland Power Project (compliance monitoring)
- Panoche Power Plant (compliance monitoring)

Attended Expert Witness Training Sponsored by CEC.

1978 to 1997: SEA, Incorporated; Geotechnical Manager, Engineering Geologist. Dr. Hunter was in charge of all phases of geotechnical projects for SEA, including project coordination and supervision, field exploration, geotechnical analysis, slope stability analysis, soil mechanics, engineering geochemistry, mineral and aggregate evaluations, and report preparation. Numerous investigations were undertaken on military, commercial, industrial, airport, residential, and roadway projects. He worked on many geothermal power plants, providing expertise in foundations design, slope stability, seismic assessment, geothermal hazard evaluation, expansive clay, and settlement problems. Project types included high-rise structures, airports, warehouses, shopping centers, apartments, subdivisions, storage tanks, roadways, mineral and aggregate evaluations, slope stability analyses, and fault studies.

1977 to 1978: Fugro (Ertec) Incorporated Consulting Engineers and Geologists; Staff Engineering Geologist; Long Beach, California.

Affiliations

- Association of Engineering Geologists

Publications

- Hunter, 1988, *Lime Induced Heave in Sulfate Bearing Clay Soils*, Journal of Geotechnical Engineering, ASCE, Vol. 14, No. 2, pp. 150-167.

- Hunter, 1989, *Applications of Stable Isotope Geochemistry in Engineering Geology*: Proceedings of the 25th Annual Symposium on Engineering Geology and Geotechnical Engineering.

- Hunter, 1993, *Evaluation of Potential Settlement Problems Related to Salt Dissolution in Foundation Soils*: Proceedings of the 29th Annual Symposium on Engineering Geology and Geotechnical Engineering.

DECLARATION OF
LAIPING NG

I, Laiping Ng declare as follows:

1. I am presently employed by the California Energy Commission in Strategic Transmission Planning Office of the Siting, Transmission & Environmental Protection Division as an Associate 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 Palmdale Hybrid 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: _____ Signed: _____

At: Sacramento, California

Laiping Ng
Associate Electrical Engineer

Education:

Master of Science: Electrical Engineering - Power
California State University, Sacramento. December 1997.

Bachelor of Science: Electrical Engineering - Power
California State University, Sacramento. May 1991.

Power Certificate – EPRI, May 1991

Experience:

April 1999 – Present:

- Review and evaluate electrical transmission system sections of the application to ensure that the transmission engineering aspects of the power plant, switchyards, substations, and the related facilities comply with applicable laws, ordinances, regulations, and standards (LORS).

- Prepare written analysis, which address the issues of the adequacy of proposed projects to meet applicable LORS.

- Perform load flow studies and fault analysis.

- Coordinate with CAISO, WSCC and other regulatory agencies and coordinate with utilities companies in the review and evaluation of the power plant siting process.

May 1991 – April 1999:

- Prepared engineering bid specifications for recommended lighting and HVAC projects. Evaluated contractor bids and recommended contractors to customers. Reviewed RFPs and RFQs. Evaluated, selected, and managed engineering consultants. Administrated and coordinated contracts.

- Designed electrical systems for indoor and outdoor lighting and lighting controls. Assisted in design cooling systems and controls for school buildings and office buildings. Reviewed and checked electrical lighting designs and drawings. Analyzed designs and made recommendations for effective actions.

- Performed facility energy audits and field surveys on schools, offices, hospitals and county jail facilities to identify energy efficiency improvements and cost estimate with respect to lighting and HVAC systems. Inspected lighting and HVAC system equipment installation.

- Worked with regulatory agencies to conduct day-to-day basis works such as participated in Nonresidential Energy Efficiency Standards development teams. Prepared and updated Standards concentrating on interior building illumination and indoor and outdoor flood lighting.

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 the **Transmission System Engineering** and **Alternatives** for the **Palmdale Hybrid Power Project** (08-AFC-9) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: Sacramento, California

Mark Hesters
Associate Electrical Engineer

Mark Hesters has fourteen years of experience in electric power regulation. He worked in the Engineering Office of the California Energy Commission's Energy Facilities Siting & Environmental Protection Division since 1998 providing analysis of California transmission systems and testimony on transmission systems in several Commission power plant certification processes. Prior to that Mark worked in the CEC's Electricity Analysis Office providing lead analysis on Southern California Edison resource issues and modeling support for all areas of California. He holds a B.S. degree from the University of California at Davis in Environmental Policy Analysis and Planning.

DECLARATION OF
Hedy Koczwara

I, **Hedy Koczwara** declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities **Siting OFFICE** of the Systems Assessments and Facilities Siting Division as a **Staff Professional**.

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 **Alternatives** for the Palmdale Hybrid Power Plant (08-AFC-09) 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: November 22, 2009 Signed: _____

At: San Francisco, California

HEDY KOCZWARA
Associate Environmental Scientist

ACADEMIC BACKGROUND
M.S., Earth Systems, Stanford University, 2001
B.S., Earth Systems, Stanford University, 2000

PROFESSIONAL EXPERIENCE

Ms. Koczwara is an environmental scientist with management and technical experience preparing Environmental Impact Reports and Statements in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Her project experience includes both linear and site-specific projects such as transmission lines, pipelines, power plants, and infrastructure development and improvement projects. She prepares technical analyses, coordinates with specialty subcontractors, and she provides management support in client interaction, public involvement, and supervises overall document coordination. She has performed the alternatives analysis for several power plant siting cases and controversial transmission line projects, which ultimately incorporated alternatives developed during the screening process into the approved project design.

Aspen Environmental Group — 2002 to present

- **California Energy Commission (CEC).** Under Aspen's CEC contract, Ms. Koczwara is an author and technical specialist in the environmental review of power plant applications. She researches and writes planning and siting reports, such as alternative analyses, in compliance with CEQA and NEPA. Each alternative site evaluation involves identifying potential locations that would meet most of the objectives stated by the applicant, but that could have less impact on the environment. Analyses have included the following proposed power plants and reports:
  - **Sentinel Power Plant (2007-ongoing).** Project manager, researcher, and writer of the Socioeconomic analysis for this proposed 850 MW power plant in unincorporated Riverside County near Desert Hot Springs.
  - **CEC Power Plant Siting Alternatives Analyses.** Ms. Koczwara has researched, updated, and written the alternatives analyses for the following 11 power plant siting projects: Palmdale Hybrid Power Plant; South Bay Replacement Project (SBRP); Avenal Energy Power Plant Project; San Francisco Electricity Reliability Project (SFERP); Blythe Energy Project, Phase Two; East Altamont Energy Center; El Segundo Power Redevelopment Project; El Segundo Cooling Options Report; Roseville Energy Facility Power Plant Project; SMUD Cosumnes Power Plant Project; and SMUD Cosumnes Cooling Options Report.
  - **Colusa Generating Station (CGS) Project (2007)**. Project manager, researcher, and writer of the Transmission System Engineering Assessment, which is attached as an appendix to the Staff Assessment and analyzes the indirect impacts of future reconductoring of the 8.75-mile Shasta-Flanagan-Keswick 230 kV transmission line and associated substation upgrades. The reconductoring project would be required as a result of the CGS project for the plant to operate at full capacity. The Final Staff Assessment was released on November 30, 2007.
  - **Chevron Richmond Power Plant Replacement Project (2007-2008).** Project manager, researcher, and writer of the Socioeconomic analysis for Chevron's proposed addition of 60 MW net generation to its existing Refinery electrical generation located within Chevron's Richmond Refinery in the City of Richmond in Contra Costa County. The Applicant withdrew its SPPE application in September 2008.

- **Blythe Energy Project Transmission Line Modifications (2004-2006).** Researched and wrote the alternatives analysis and coordinated on the level and scope of the alternatives analysis between the CEC (CEQA lead agency) and the two NEPA lead agencies, the Western Area Power Administration and U.S. Bureau of Land Management, was required for this joint Staff Assessment/Environmental Assessment. More than 23 alternatives were considered, and five transmission alternatives, plus the No Project Alternative/Action, were carried through for full evaluation.
- **WESTCARB Carbon Sequestration Demonstration Projects (2005-present).** Ms. Koczwara researched and wrote one CEQA Initial Study and three USDOE environmental documents for multi-site, multi-state pilot studies and preliminary investigations of methods for sequestering CO2 at terrestrial sites and in geologic formations for the Public Interest Energy Research (PIER) group at the CEC.
- **Comparative Study of Transmission Alternatives Background Report (2004).** Researched and wrote portions of the draft report, which presents background information related to transmission alternatives and the transmission planning process. The information in the report is being used to assess potential approaches to evaluation of non-transmission alternatives to transmission projects. Ms. Koczwara also attended the public workshop where the report was disseminated. The workshop was a forum for discussion regarding transmission alternatives methodology. Following the workshop, Ms. Koczwara prepared a summary of the workshop and comments received as an appendix to the final white paper report.
- **Hydroelectric Energy/Environment Report (2003).** Collected and logged data on over 200 hydroelectric power plants from FERC licenses. The final draft of the report was published in October 2003.
- **Coastal Study (2003).** Researched and wrote the alternative cooling technologies section for a statewide evaluation of California's 25 coastal power plants. The report was used to facilitate licensing of repower and replacement projects by providing better pre-filing guidance to developers, and minimizing data adequacy and other issues that could delay licensing.

- **Sunrise Powerlink Project EIS/EIR, California Public Utilities Commission (CPUC) and Bureau of Land Management (BLM).** Under contract to the CPUC, and under a Memorandum of Understanding with the Bureau of Land Management (BLM), Ms. Koczwara has provided management support, attended public meetings, and has written numerous EIR/EIS sections for a highly controversial 150-mile transmission line from Imperial County to coastal San Diego County. The 500 kV line would pass through Anza-Borrego Desert State Park, and a 230 kV line would continue through rural San Diego County with both overhead and underground segments. Ms. Koczwara researched and analyzed route segment alternatives for a comprehensive Alternatives Screening Report that screened over 100 alternatives, 27 of which were carried forward for full evaluation. Ms. Koczwara also wrote the Socioeconomics, Services, and Utilities section and the setting and impacts for Connected Actions, Future Transmission Expansion, Cumulative Impacts, among others. She managed the writing of the Environmental Justice analysis and was responsible for compiling and writing the Comparison of Alternatives, which identified the overall Environmentally Superior Alternative out of 27 route segments, options, transmission and system alternatives and non-wire alternatives. She also wrote the BLM Record of Decision and is assisting with implementation of the Mitigation Monitoring Compliance and Reporting Program.
- **CPUC When-Needed Environmental Services, CPUC.** Project Manager, Public Involvement Specialist, and/or technical writer for Socioeconomics, Public Utilities and Environmental Justice for Aspen's on-call contract for provision of CEQA services to the CPUC's Energy Division. Currently Project Manager for PG&E's Seventh Standard 115/21 kV Substation Project in Bakersfield.
- **Riverway Substation Project MND, CPUC (2007)**. As Deputy PM, Ms. Koczwara wrote the Project Description, website content, and assisted with all-around management support for this

substation project in Visalia. SCE proposed to built a 1.7-acre 66/12 kV low-profile substation and approximately 1,200 feet of underground 66 kV subtransmission lines.

- **Devers-Palo Verde No. 2 Transmission Line Project EIR/EIS, CPUC and BLM**. Ms. Koczwara served on the project management team and in this role she managed preparation of the 100-page Alternatives Screening Report, which evaluated and screened over 30 alternatives. She also prepared the Introduction, Alternatives, and part of the Executive Summary sections for the EIR/EIS. The EIR/EIS evaluated a proposed 280-mile 500 kV and 230 kV transmission line between the Palo Verde generating hub in Arizona and SCE's system in Riverside County.

- **Jefferson-Martin 230 kV Transmission Line Project EIR, CPUC**. Ms. Koczwara served as the assistant to the Project Manager on this major and controversial 27-mile transmission line through scenic San Mateo County in the Hwy 280 corridor, urban Colma and Daly City, and across San Bruno Mtn. This high profile project is an essential component of San Francisco's energy supply, and involved coordination with numerous local and regional jurisdictions, as well as the development of 38 alternatives including the No Project Alternative into a 200-page Alternatives Screening Report.

- **South San Joaquin Irrigation District's (SSJID) Acquisition of the Pacific Gas and Electric Company System, San Joaquin County.** On behalf of San Joaquin County, Aspen prepared an application and an EIR on SSJID's proposal to acquire specific electric distribution assets currently owned and operated by PG&E within southeastern San Joaquin County. Responsible for writing the Socioeconomics, Visual, Cultural Resources, Land Use, Public Services/Utilities, Agricultural Resources, and Recreation sections for the application and prepared the same sections for the EIR. The EIR was certified in June 2006.

- **Kirby Hills Natural Gas Storage Facility IS/MND, CPUC**. As Deputy Project Manager, Ms. Koczwara was responsible for the research and writing of the Aesthetics, Agricultural Resources, Population and Housing, Public Services, and Utilities and Service Systems sections of the IS/MND for the proposed use of a depleted gas reservoir in Solano County, for the temporary storage of natural gas by Lodi Gas. The project consists of the drilling of 10 injection/withdrawal wells, and the construction of 7 miles of pipeline and ancillary facilities. A CPCN was granted in March 2006.

PREVIOUS EXPERIENCE

Ms. Koczwara was a Facilities Coordinator at *Publicis and Hal Riney* from November 2001 to May 2002. She managed the daily office operations of a 14-department, 300-person advertising company and organized the scheduling, setup, and operation of client meetings and company events. She also has worked as a laboratory and fieldwork researcher at Stanford University (Palo Alto, California) and James Cook University (Townsville, Australia) from 1999 to 2001. Her work focused primarily on biological, ecological, and marine geochemical analyses.

TRAINING AND PROFESSIONAL ORGANIZATIONS

- 2006 Environmental Award for Los Angeles Unified School District's New School Construction Program EIR (certified in June 2004), American Planning Association (APA), Los Angeles Section
- 2004 AEP Outstanding Environmental Analysis Document, Jefferson-Martin Final EIR
- 2009 AEP Outstanding Environmental Analysis Document Merit Award, Sunrise Powerlink Project EIR/EIS
- *UC Davis Extension Courses Attended*: Planning in California: An Overview and Update; GIS for Resource Managers and Professionals; National Environmental Policy Act Overview and Refresher, Making Effective Use of Mitigated Negative Declarations, and California Environmental Quality Act Two-Day Workshop.

DECLARATION OF
Chris Davis

I, Chris Davis, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Compliance Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **General Conditions Including Compliance Monitoring and Closure Plan** for the **Palmdale Hybrid Power Project** (08-AFC-9) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 5, 2010

Signed: _____

At: Sacramento, California

Chris Davis

California Energy Commission
1516 Ninth St., MS-2000
Sacramento, California 95814
(916) 654-4842

Professional Experience

January 2008 to present

California Energy Commission
Planner III Compliance Project Manager – Oversee power plant construction. Process amendments to Energy Commission project certifications. Direct technical staff in tasks related to compliance issues regarding power plant project design, construction, operation, and associated environmental issues. Work with power plant operators, public agencies, community groups, engineering, legal and technical staff to identify and resolve issues.

2007-2008

California Energy Commission
Energy Specialist I – Education and outreach for the New Solar Homes Partnership (NSHP) and the Building Standards Office. Developed fact sheets on proposed changes to the 2008 building standards and a tutorial on how to use the PV Calculator to figure photovoltaic system power production and expected incentives. Wrote case study, articles and Web pages explaining various aspects of the NSHP program. Certified by CalCERTS (California Energy Rating and Testing Services) as a Home Energy Rating System (HERS) rater for photovoltaic systems. Organized, developed materials and staffed Energy Commission booth/tables for conferences put on by California Building Energy Consultants (CABEC), California Building Officials (CALBO) and International Air Conditioning Institute (IHACI).

2005-2007

State Water Quality Control Board
Information Officer I - Liaison between State Water Board, as well as Central Valley Regional Water Board, and media. Issues included waste (NPDES) permits, groundwater contamination and treatment, once-through cooling, emerging contaminants, contaminated beaches, stormwater containment, and areas of special biological significance. Organized, produced and served as master of ceremonies for presentations of grant awards to repair watersheds, practice sustainable forestry and construct water treatment facilities.

2005-2008

California Energy Commission
Information Officer I – Joined the Energy Commission media office during California's power crisis. Liaison between Energy

Commission and media in the area of power plant licensing. Wrote news releases about projects as they reached milestones in the approval and construction process, including a number of releases for Governor's office about new facilities beginning operations. Initiated and developed Power Plant Fact Sheet, in cooperation with Siting Office manager.

DECLARATION OF
Felicia Miller

I, Felicia Miller declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Office of the Energy Facilities Siting Division as Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared staff testimony on Introduction, Project Description and Executive Summary for the Palmdale Hybrid Power Power Plant 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 herein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently hereto.

   I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/18/10 Signed: Felicia Miller

At: Sacramento, California

Felicia Miller

California Energy Commission
1516 Ninth Street, MS-15
Sacramento, California 95814
(916) 654-4640

Professional Experience

April 2007 to present ***California Energy Commission*** – ***Planner III - Siting Project Manager***
Plan, organize, direct and manage the State regulatory process for electric generating plants from application through issuance of permit. Plan, organize and direct the efforts of 23 disciplinary environmental and engineering staff in actions related to the California Environmental Quality Act (CEQA) requirements. Recommend actions, policies and procedures affecting the project and commission program direction. Conduct public workshops and hearings related to proposed projects. I Compile, edit, and issue staff environmental assessments and other CEQA related documents.

2006-2007 ***California State Parks***
Associate Parks & Recreation Specialist – Off Highway Vehicle Division/Prairie City Off-Highway Vehicle Park
Development of resources study to determine watershed and hydrology, soil taxonomy and geology of State park. Lead on assessment and recommendations for watershed remediation and sediment control project. Climate prediction study to determine weather and hydrology patterns of park over a 25-year period. Research analysis for master and general plan update for district off highway vehicle parks.

2005-2006 ***California State Department of Mental Health***
Senior Mental Health Specialist – Program Compliance
Program lead in Fingerprinting Analysis/Criminal Background Checks and Investigations Unit. Coordinated and directed assignments and deadlines for staff. Project lead in development of 2 new database programs used to automate data from fingerprint program and facility investigations. Unit coordinator for compilation, coordination and analysis of sections monthly measures and outcomes report, contributed significantly in eliminating CBC unit backlog. Conducted incident investigations to determine regulatory compliance.

2000-2005 ***California State Parks***
Associate Parks & Recreation Specialist – Grants and Local Services
Administration of park and recreation grants under State and Federal funding to local agencies in over 19 counties statewide and Bureau of Land Management. Provided technical assistance and interpretation of regulations and policy to local agencies, evaluate project status, billing support and documentation, and field inspections to determine compliance with project agreement. Team leader in development of program procedural guides including research of state and federal regulations,

assignments coordination and participation at public hearings and coordinated assignments to meet critical deadlines. Development of program regulations and procedural guide, workshop lead.

1998-2009 ***California State Parks***
Personnel Services Specialist – Human Resources
Personnel and salary transaction functions for a roster of +400 district and HQ employees. Personnel contact with DPR employees for the purpose of responding to questions and dispensing accurate information to HQ and field timekeepers and employees. Contact with outside agencies for purpose of salary and payroll interpretation and processing. Translated bargaining unit contractual information to managers and employees and translated reference guidelines for laws and rules as set forth by DPA, SCO and SPB. Developed and initiated HQ new employee orientation and improved sign up procedures.

1997-1998 ***Department of the Youth Authority***
Public Service and Support Division
Analyzed and reconciled monthly reported from facilities and prepared monthly reimbursement claims to exceed $650K. Compiled data, analyzed and prepared intricate spreadsheets for monthly, quarterly and yearly accounting. Responsible for Mac training and support for division. Chair for United Way campaign.

1994-1997 ***Department of Fish and Game***
Office of Oil Spill Response-Scientific Division
Coordinated and prioritized assignments for division and supervised work of support staff. Coordination of interagency efforts as agency liaison during emergency response efforts during a coastline oil spill. Developed Operations Protocol manual for Incident Command Center and emergency response support team. Facilitated public surveys to determine economic value of recreation and natural resources and determine user trends.

1991-1994 ***John F. Kennedy High School***
Office of Oil Spill Response-Scientific Division
Using district graduation and special education requirements; planned, collected, evaluated and analyzed data from a variety of sources to develop a master schedule for educational programs; critical analysis of all phases of student programs to determine eligibility of curriculum prerequisites and high school graduation eligibility; translated high school graduation requirements and policy from district and inter-district transcripts to make curriculum recommendations, conducted curriculum training program to incoming students and parents, supervised team of student assistants. Program lead for targeted youth.

Education/Credentials

- Bachelor of Arts, Cum Laude, Sacramento State University in Communication Studies, concentration in Rhetorical Criticism
- California Real Estate Sales License, September 1999, license current

DECLARATION OF
Testimony of Chris Huntley

I, **Chris Huntley,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission's Siting, Transmission and Environmental Protection Division, as a senior associate in 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 **Palmdale Hybrid 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: December 16, 2010 Signed: _____

At: Agoura Hills, California

CHRISTIAN S. HUNTLEY

Senior Associate/Senior Biologist

ACADEMIC BACKGROUND

Graduate Studies, Biology, California State University Northridge
B.A., Biology, University of California at Santa Cruz, 1992

PROFESSIONAL EXPERIENCE

Mr. Huntley has eleven years of experience with Aspen supporting and managing CEQA/NEPA projects including EIR/EIS, IS/MND, EA, BE/BA, and BA. In addition, Mr. Huntley has extensive experience conducting biological assessments, managing large-scale construction and restoration projects, and supporting agency clients through the Section 7 process. With over 15 years experience as a biologist, Mr. Huntley also has proven experience working with the sensitive biological resources that occur in California. Mr. Huntley has also completed detailed vegetation mapping, sensitive species surveys, and revegetation plans for projects throughout southern California. With extensive experience in managing large scale construction projects, Mr. Huntley has unique experience in resolving conflicts and ensuring compliance with environmental regulations. Supported by a solid background in biological resources, experience in completing CEQA, NEPA, USDA Forest Service Biological Assessments, sensitive species consultation, and over a decade of construction management experience, he works closely with resource agency personnel, contractors and affected jurisdictions to ensure that projects are constructed on time and in compliance with applicable laws, ordinances, regulations and standards.

Aspen Environmental Group — 1998 to present

- **California Energy Commission Emergency Siting Team, Power Plant Development, Compliance Project Manager.** For two years, Mr. Huntley's duties included management of technical staff for the completion of CEQA equivalent environmental permitting for over nine new emergency power plants, review of applicant submittals, drafting of Memoranda of Understanding with Chief Building Officials, conducting audits of building officials, and coordinating with affected agencies to resolve concerns with potential resource impacts. Other duties included maintaining contractor construction milestones, compliance monitoring and reporting, development of mitigation measures and conflict resolution for power plant compliance issues.
- **California Energy Commission Coastal Power Plant Study, Deputy Project Manager/Biologist.** Conducted biological surveys at 21 coastal power plants as part of the CEC's coastal power plant study. Site visits characterized habitat within the footprint of the power plant, landscaping, and identified potential environmental and permitting issues associated with potential expansion of the power plants.
- **California Energy Commission Hydroelectric Power Plant Inventory Study, Deputy Project Manager/Natural Resources Analyst.** Mr. Huntley coordinated a team that collected power and environmental data on over 200 hydroelectric power plants located in California. Physical power data included electrical output, system upgrades, water storage capacity and peaking availability. Environmental information included developing a data base addressing sensitive species issues, fish

screens and ladders, monitoring parameters and a map of known hydroelectric facilities and barriers to anadromous fish passage. Mr. Huntley also obtained water use information on thermal power plants in support of the CEC's bi-annual environmental performance report.

- **Tehachapi Renewable Transmission Line Project California Public Utilities Commission/U.S. Forest Service (2007-2009), Issue Area Coordinator/Biologist.** Mr. Huntley is acting as the issue area coordinator and principal author for biological resources on this 500 kV transmission line proposed by Southern California Edison in support of wind energy projects. This transmission line is 173 miles in length and includes two separate segments that cross the Angeles National Forest. Some of the key issues on this project include potential impacts to Mojave ground squirrel, arroyo toads, California condors, spotted owl, and a host of forest sensitive plant and wildlife species. As part of the project Mr. Huntley mapped over 190 riparian related features and completed extensive surveys of the ANF. Mr. Huntley also managed the completion of comprehensive botanical surveys for the proposed right of way. Other key issues involve the coordination with State Park, Forest, and resource agency staff.
- **El Casco Sub-Transmission Line Project EIR, California Public Utilities Commission (2006-2009), Issue Area Coordinator/Biologist.** Mr. Huntley acted as the issue area coordinator for biological resources and completed the impact analysis section of the EIR for this 17-mile subtransmission line upgrade to be completed by Southern California Edison. This line is located in the Western Riverside Multiple Species Conservation Area and crosses areas supporting several federally protected species including least Bell's vireo, southwestern willow flycatcher, and Stephens' kangaroo rat. Currently, Mr. Huntley provides technical assistance to monitoring staff.
- **Antelope/Pardee Transmission Line Project EIR/EIS-BE/BA, California Public Utilities Commission/U.S. Forest Service (2005-2009), Issue Area Coordinator/Biologist.** Mr. Huntley acted as the issue area coordinator for biological resources on this 500 kV transmission line upgrade to be completed by Southern California Edison. Key issues on this project included compliance with the USFS Forest Plan and sensitive species including California condor, burrowing owl, and rare plants. Mr. Huntley reviewed and prepared the Biological Resource Section for the EIR/EIS, developed project alternatives, coordinated with USFS staff, and conducted sensitive species surveys for arroyo toad in support of this project. Currently, Mr. Huntley provides technical assistance to monitoring staff.
- **Tortoise Monitoring at Las Vegas Wash, U.S. Army Corps of Engineers (2005-2006), Project Manager.** Mr. Huntley managed the survey and report preparation for monitoring activities associated with this task. Monitoring crews conducted work within the Tropicana, Flamingo, and Blue Diamond tributaries as part of the ongoing flood control activities.
- **Devers–Palo Verde Transmission Line Project No. 2 EIR/EIS, California Public Utilities Commission/Bureau of Land Management (2005/2009), Issue Area Coordinator/Biologist.** Mr. Huntley acted as the issue area coordinator for biological resources on this 230-mile 500 kV transmission line upgrade to be completed by Southern California Edison. This project crosses key wildlife areas including the KOFA Wildlife Sanctuary, the San Bernardino National Forest, the Mojave and Sonoran Desert habitat, and sections of the Riverside Multiple Species Conservation Area.
- **Joint Red Flag '05 Exercise Environmental Assessment, U.S. Army Corps of Engineers/ Bureau of Land Management, Nellis Air Force Base Nevada (2004-2005), Project Manager/ Biologist.** Mr. Huntley managed and coordinated the EA process for the ground component of the Joint Red Flag '05 Exercise which was conducted Bureau of Land Management (BLM) lands surrounding Nellis Air Force Base in Lincoln County, Nevada. Mr. Huntley conducted extensive field surveys of the proposed anti-aircraft sites, completed the assessment for biological and visual

resources, prepared the DR/FONSI, managed sensitive species surveys, identified and flagged populations of noxious weeds, and prepared of military training guides for the soldiers in the field.

- **March Air Reserve Base Cactus and Heacock Channels Environmental Assessment and Biological Technical Report U.S. Army Corps of Engineers (2005-2009), Project Manager/Biologist.** Mr. Huntley conducted and managed the preparation of a Biological Technical Report for two channels located along the perimeter of the March Air Reserve Base in Riverside California. Mr. Huntley and a team of biologists conducted burrowing owl surveys, vegetation and vernal pool mapping, and documented existing biological conditions at the two channels. As part of this project detailed GIS maps were created to assist the Corps in preparing environmental documents for the area. Mr. Huntley managed the completion of an Environmental Assessment to evaluate impacts of construction of approximately three miles of flood control channel located at Cactus and Heacock Drainages. Currently, Mr. Huntley provides technical assistance to Corps staff for this project.
- **Patriot Integrated Air Defense Exercise Project Environmental Assessment and Environmental Baseline Survey, Nellis Air Force Base Nevada (2006-2008), Project Manager/Biologist.** Mr. Huntley managed the preparation of an EA for ongoing military activities conducted on Bureau of Land Management (BLM) lands surrounding Nellis Air Force Base in Lincoln and Nye County, Nevada. Mr. Huntley coordinated with the USAF regarding field surveys of the proposed anti-aircraft sites, the assessment of biological and cultural resources, and prepared the DR/FONSI and Right-Of-Way document for the USAF. Mr. Huntley also prepared sections and managed the completion of an Environmental Baseline Report for each of the artillery sites.
- **Lower Colorado Flood Control Project EIR/EIS, U.S. Army Corps of Engineers (2003-2004), Deputy Project Manager/Biologist.** Mr. Huntley conducted reconnaissance surveys and vegetation mapping along a 23-mile section of the Lower Colorado River in Yuma Arizona. In addition, Mr. Huntley updated the biological resource section of the current baseline conditions and is working with a team of State and federal agencies in an effort to determine the future alignment of the Lower Colorado River in this location. As part of this process Mr. Huntley developed project alternatives that met the criteria identified by the United States Boundary Water Commission and State and federal resources agencies.
- **Fort Irwin Environmental Baseline Survey Reports U.S. Army Corps of Engineers (2005), Project Manager/Biologist.** Mr. Huntley managed the preparation of two Environmental Baseline Survey reports near Fort Irwin, San Bernardino County, California to support the land acquisition of over 95 parcels by the U.S. Army for the Fort Irwin National Training Center. Mr. Huntley conducted site investigations, documented existing biological conditions and managed the preparation of the report.
- **Angeles National Forest Fuels Reduction Project, Biological Evaluation/Biological Assessment, U.S. Department of Agriculture Forest Service (2005/2009), Biologist.** Mr. Huntley reviewed existing documents and assisted staff in responding to comments from USFS staff. Mr. Huntley met with USFS staff and conducted site inspections at several plantation and natural stands. Currently, Mr. Huntley is revising BE/BA's for the ANF.
- **Level 3 Fiber Optics Network Construction Monitoring and Supplemental Environmental Review Program, CPUC, Environmental Monitor.** Mr. Huntley's duties included inspection of several southern California segments including Santa Barbara to Burbank, San Bernardino, Corona to Atwood and San Diego to the California/Arizona state line. Environmental compliance during construction addressed biological and cultural resource, air and water quality, traffic control, and public utilities. Other tasks included maintaining daily documentation, review of pre-construction mitigation measures, weekly reporting of compliance activities, and coordination with Level 3 personnel and subcontractors, and affected agencies.

- **Pacific Pipeline Project EIR/EIS for the U.S. Forest Service, Angeles National Forest, and the California Public Utilities Commission, Environmental Monitor.** Served as an Environmental Monitor and supervised mitigation monitoring for all sensitive resources for a construction segment along a 132-mile crude oil pipeline within southern California.
- **SCE Valley-Auld Power Line Project, CPUC, Environmental Monitor.** Conducted inspections of construction of this 11-mile power line upgrade for compliance with the project's Mitigated Negative Declaration mitigation measures and compliance plans. Other tasks included review of pre-construction compliance materials, maintaining inspection documentation, and coordination with SCE and its subcontractors.
- **Piru Creek Repairs Project IS/MND, California Department of Water Resources, Biologist.** Mr. Huntley completed sections of the U.S. Forest Service Biological Assessment/Biological Evaluation, and biological technical report for the Piru Creek Repairs Project. In addition, Mr. Huntley has conducted sensitive species surveys and coordinated with CDFG, USFS and RWQCB regarding permits and sensitive species issues.
- **Compliance and Mitigation Development, California Public Utilities Commission, State Lands Commission, California Department of Water Resources, Biologist.** Working with technical experts Mr. Huntley developed mitigation measures for a number of State and federal projects including the Kinder Morgan pipeline, Santa Ana pipeline and Viejo transmission line project.
- **San Antonio Creek Erosion Repairs Project BA/EA, U.S. Army Corps of Engineers, Biologist.** Mr. Huntley conducted botanical surveys and prepared detailed vegetation maps within San Antonio Creek. Mr. Huntley also prepared the Biological and Environmental Assessments for the project and developed mitigation for sensitive plant and wildlife species.
- **Santa Fe Pacific Pipeline, CPUC, Environmental Monitor.** Inspected construction of three petroleum distribution station sites for compliance with approved project mitigation measures and compliance plans.

SELECTED TECHNICAL EXPERIENCE/TRAINING AND CERTIFICATIONS

- SWPPP trained 2006
- California Energy Commission Outstanding Performance Award, 2001
- CDFG Scientific Collecting Permit for pond turtle and garter snake.
- Certified Caltrans Horizontal Directional Drilling Inspector 2001
- Desert Tortoise Handling Workshop, Ridgecrest California 2001
- CEC Expert Witness Training 2001
- Railroad Right-of-Way Safety Training 2002
- Small boat handling, licensed and certified since 1993
- Research Scuba-diving certification and training since 1989

DECLARATION OF
Beverly E. Bastian

I, Beverly E. Bastian, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission, and Environmental Office 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 Cultural Resources, for the Palmdale Hybrid Power Plant, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 1, 2010 Signed: _____

At: Sacramento, California

Beverly E. Bastian
1516 Ninth Street MS 40, Sacramento, CA 95814-5504
(916) 654-4840 email: bbastian@energy.state.ca.us

Education	Field	Degree	Year
University of California, Davis	Anthropology	B.A	1967
University of California, Davis	Anthropology	M.A	1969
Tulane University	Anthropology	P.H.C.	1975
University of Mississippi	American History	(courses only)	1989
University of California, Santa Barbara	Public (American) History and Historic Preservation	P.H.C.	1996

Experience

State of California, California Energy Commission *2005 to present*
Planner II, Siting, Transmission, and Environmental Protection Division
Environmental Office, Cultural Resources Unit
All tasks related to the production of the cultural resources sections of CEQA-equivalent (California Environmental Quality Act) documents for the environmental review of proposed 50-MW+ power plants in California, including: Evaluating data in applications; writing data requests to applicants and doing independent research to compile an inventory of and evaluate the historical/cultural significance of cultural resources subject to significant impacts from proposed projects; providing and receiving information in public hearings on applications; analyzing all pertinent data; writing Staff Assessments of impacts; identifying California Register of Historical Resources-eligible cultural resources; developing mitigation measures to reduce to insignificant any impacts to Register-eligible cultural resources; providing expert testimony on my analyses and recommendations in public hearings; and reviewing compliance with mitigation measures during the construction, operation, and decommissioning of certified power plants. Additional tasks include: providing prefiling assistance to applicants; coordinating the joint environmental review of power plant projects with cultural resources specialists in sister state agencies and in federal agencies; supervising and reviewing the work of Commission cultural resources consultants; reviewing the CEQA documents of sister state agencies; and developing internal procedures and guidelines to improve cultural resources review of applications.

State of California, Department of Parks and Recreation *2001 to 2005*
Historian II, Cultural Resources Division, Cultural Resources Support Unit
Major and complex historical and historic architectural investigations and studies dealing with the significance, integrity, and management of historic buildings, structures, and landscapes in California's state parks; participation in interdisciplinary teams and project assignments; preparation of technical reports and correspondence; inventorying and evaluating historic properties; coordinating the statewide registration of historical properties; assessing the eligibility of historic properties to the National Register of Historic Places and the California Register of Historical Resources; reviewing environmental documents and providing technical analyses of major Departmental projects to determine impacts to cultural resources under State and federal laws; identifying resource issues and constraints; establishing allowable use and development guidelines; developing approaches to protect, enhance, and perpetuate cultural resources under relevant State and federal laws, regulations, and standards; proposing and developing programs, policies, and budgets to meet Department's historic preservation missions.

Department of Social Sciences, American River College *2000 to 2002*
Instructor (part-time), American History
Creation and presentation of classroom lectures, selection of assigned texts and readings, creation and administration of quizzes and examinations, assignment and supervision of student research papers, student consultation in office hours, grading of all quizzes, tests, and papers, and assigning final student grades. These research, organizing, and teaching skills demonstrate the ability to organize information, to speak effectively to the public, and to train and direct other personnel.

Department of Sociology and Anthropology, University of Mississippi *1987 to 1989*
Archaeologist, Center for Archaeological Research
All tasks for the completion of the historical archaeological part of an archaeological survey and testing program final report related to a U. S. Army Corps of Engineers erosion control project in twelve north-central Mississippi counties, including: Coordinating the activities of a field crew and the research of historians working in archives; setting up an artifact database using survey data to generate statistical summaries for discovered historical archaeological sites; gathering historical settlement and land-use data for twelve counties; conducting a special statistical analysis and synthesis of historical data only, focusing on pre-and post-Civil War land tenure and agricultural production for plantations in two counties where soil fertility contrasted; synthesizing data from all sources, collaborating on the final cultural resources management report with archaeologists specializing in prehistory and survey and sampling methodology; presenting findings at the annual meeting of the Society for Historical Archaeology in 1989.

Gilbert Commonwealth, Inc. *1984 to 1987*
Historical Archaeologist and Project Manager, Environmental Unit
All tasks as Principal Investigator for six major historical archaeological and/or historical architectural cultural resources management projects done under contract to federal, state, and local governments, including: Writing winning proposals for these projects; negotiating and managing project budgets; gathering/supervising the gathering of historical, oral historical, and archaeological data; analyzing/supervising the analysis of gathered data; and writing/supervising the writing of reports of findings, along with the creation of maps, illustrations, and data tables for these reports; serving as the historian and historical preservationist on several multidisciplinary teams tasked with siting the routes for several major power lines in east Texas.

Tennessee Valley Authority (personal services contract) *1979 to 1981, 1983-1984*
Historical Archaeologist (self-employed)
All tasks as Principal Investigator for various cultural resources management projects in areas affected by TVA construction, the most significant of which were: the complete excavation of and report on seven nineteenth-century log cabin sites in Cedar Creek Reservoir in northwestern Alabama; and all historical research, the field work, and the report for the underwater remote-sensing reconnaissance and underwater videotaping of sunken Civil War cargo boats and gunboats at Johnsonville, Tennessee, in the western part of the Tennessee River.

Other Archaeological Projects *1966 to 1981*

Professional Societies
Register of Professional Archaeologists, #10683
Society for Historical Archaeology
California Council for the Promotion of History
Vernacular Architecture Forum
Society for California Archeology

DECLARATION OF
Alvin J. Greenberg, Ph.D.

I**, Alvin J. Greenberg, Ph.D.** declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the Final Staff Assessment and the Alternatives Appendix A sections on **Public Health, Hazardous Materials Management,** and **Worker Safety/Fire Protection** for the **Palmdale Hybrid Power Project Application** based on my independent analysis of the application for certification, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the 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: _____ Signed: _____

At: Sacramento, California

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
415-479-7560 fax 415-479-7563
e-mail agreenberg@risksci.com

Name & Title: **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP**
Principal Toxicologist

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader for hazardous waste site characterization, preparation of human and ecological risk assessments, air quality assessments, interaction with regulatory agencies in obtaining permits, hazardous materials handling and risk management prevention, infrastructure vulnerability assessments, conducting lead surveys and studies, with particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, and the intrusion of subsurface contaminants into indoor air. 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. In addition to providing security expertise to the State of California, Dr. Greenberg is Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 25

Education:

B.S. 1969 Chemistry, University of Illinois Urbana

Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California, San Francisco

Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of California, San Francisco

Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002
Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)
September 2000 – February 2001
Member, State Water Resources Control Board Noncompliant Underground Tanks Advisory Group
January 1999 – June 2001
Member, California Air Resources Board Advisory Committee on Diesel Emissions
January 1994 - September 1999
Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee
September 1998
Member, US EPA Workgroup on Cumulative Risk Assessment
April 1997 - September 1997
Member, Cal/EPA Private Site Manager Advisory Committee
January 1986 - July 1996
Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)
January 1988 - June 1995
Member: California Department of Toxic Substance Control Site Mitigation Program Advisory Group
January 1989 - February 1995
Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992
Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991
Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988
ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987
California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987
Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987
Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986
Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985
Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983
Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

Present Position

January 1983- present
Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, 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 Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Materials Management and Security, Hazardous Waste Site Characterization and Toxic Substances Control Policy for over 25 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 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 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 also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Since the events of 9/11, Dr. Greenberg has taken the lead for the California Energy Commission in developing a power plant vulnerability assessment methodology and model power plant security plan. He also assisted the CEC in the preparation of a “background” report on the risks and hazards of siting LNG terminals in California and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. 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.

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 oxide contaminated soil at DOD facilities.

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.

DECLARATION OF
Rick Tyler

I, **Rick Tyler** declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Siting, Transmission, and Environmental Protection Division as a Senior Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I supervised preparation of the Final Staff Assessment for Hazardous Materials Management and Worker Safety Fire Protection Sections for the Palmdale Hybrid Power Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 12/21/10 Signed: _____

At: Sacramento, California

RICK TYLER

Associate Mechanical Engineer

CALIFORNIA ENERGY COMMISSION

EDUCATION B.S., Mechanical Engineering, California State University, Sacramento. Extra course work in Statistics, Instrumentation, Technical Writing, Management; Toxicology, Risk Assessment, Environmental Chemistry, Hazardous Materials Management, Noise Measurement, and regulations regarding control of toxic substances.

Near completion of course work necessary to obtain a certificate in hazardous materials management from University of California, Davis.

EXPERIENCE

Jan. 1998-Present — California Energy Commission - Senior Mechanical Engineer
Energy Facility Siting and Environmental Protection Division

Responsible for review of Applications for Certification (applications for permitting) for large power plants including the review of handling practices associated with the use of hazardous and acutely hazardous materials, loss prevention, safety management practices, design of engineered equipment and safety systems associated with equipment involving hazardous materials use, evaluation of the potential for impacts associated with accidental releases and preparation and presentation of expert witness testimony and conditions of certification. Review of compliance submittals regarding conditions of certifications for hazardous materials handling, including Risk Management Plans Process Safety Management.

April 1985-Jan. 1998 — California Energy Commission - Health and Safety
Program Specialist; Energy Facility Siting and Environmental Protection Division.

Responsible for review of Public Health Risk Assessments, air quality, noise, industrial safety, and hazardous materials handling of Environmental Impact Reports on large power generating and waste to energy facilities, evaluation of health effects data related to toxic substances, development of recommendations regarding safe levels of exposure, effectiveness of measures to control criteria and non-criteria pollutants, emission factors, multimedia exposure models. Preparation of testimony providing Staff's position regarding public health, noise, industrial safety, hazardous materials handling, and air quality issues associated with proposed power plants. Advise Commissioners, Management, other Staff and the public regarding issues related to health risk assessment of hazardous materials handling.

Nov. 1977-
April 1985

California Air Resources Board - Engineer (last 4 years Associate level)

Responsible for testing to determine pollution emission levels at major industrial facilities; including planning, supervision of field personnel, report preparation and case development for litigation; evaluate, select and acceptance-test instruments prior to purchase; design of instrumentation systems and oversight of their repair and maintenance; conduct inspections of industrial facilities to determine compliance with applicable pollution control regulations; improved quality assurance measures; selected and programmed a computer system to automate data collection and reduction; developed regulatory procedures and the instrument system necessary to certify and audit independent testing companies; prepared regulatory proposals and other presentations to classes at professional symposia and directly to the Air Resources Board at public hearings. As state representative, coordinated efforts with federal, local, and industrial representatives.

PROFESSIONAL AFFILIATIONS/ LICENSES

Past President, Professional Engineers in California Government Fort Sutter Section;
Past Chairman, Legislative Committee for Professional Association of Air Quality Specialists. Have passed the Engineer in Training exam.

PUBLICATIONS, PROFESSIONAL PRESINTATIONS AND ACCOMPLISHMENTS

Authored staff reports published by the California Air Resources Board and presented papers regarding continuous emission monitoring at symposiums.

Authored a paper entitled "A Comprehensive Approach to Health Risk Assessment", presented at the New York Conference on Solid Waste Management and Materials Policy.

Authored a paper entitled "Risk Assessment A Tool For Decision Makers" at the Association of Environmental Professionals AEP Conference on Public Policy and Environmental Challenges.

Conducted a seminar at University of California, Los Angeles for the Doctoral programs in Environmental Science and Public Health on the subject of "Health Risk Assessment".

Authored a paper entitled "Uncertainty Analysis -An Essential Component of Health Risk Assessment and Risk Management" presented at the EPA/ORNL expert workshop on Risk Assessment for Municipal Waste Combustion: Deposition, Uncertainty, and Research Needs.

Presented a talk on off-site consequence analysis for extremely hazardous materials releases. Presented at the workshop for administering agencies conducted by the City of Los Angeles Fire Department.

Evaluated, provided analysis and testimony regarding public health and hazardous materials management issues associated with the permitting of more than 20 major power plants throughout California.

Developed Departmental policy, prepared policy documents, regulations, staff instruction, and other guidance documents and reference materials for use in evaluation of public health and hazardous materials management aspects of proposed power plants.

Project Manager on contracts totaling more than $500,000.

RES.RT

DECLARATION OF
Testimony of Negar Vahidi

I**, Negar Vahidi,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Siting, Transmission and Environmental Protection Division, as a **Senior Project Manager/Senior Land Use Technical Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use** for the **City of Palmdale Hybrid Power Plant 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: November 29, 2010 Signed: _____

At: Agoura Hills, California

NEGAR VAHIDI

Senior Associate
Group Leader: Land Use, Policy Analysis, and Socioeconomics

ACADEMIC BACKGROUND

Master of Public Administration, University of Southern California, 1993
B.A. (with Highest Honors), Political Science, University of California, Irvine, 1991

PROFESSIONAL EXPERIENCE

Ms. Vahidi has over 17 years of experience managing and preparing a variety of federal, State, and local environmental, planning, and analytical documents for large-scale energy and water infrastructure and development projects. She currently serves as a Senior Project Manager and Aspen's Group Leader for social science issues. She brings the experience of being both a public and private sector planner, specializing in the integration and completion of NEPA and CEQA documentation, land use and public policy analyses, socioeconomics and environmental justice analyses, and public involvement programs. Her diversity and experience in management and technical analyses can be shown through a sample of her projects described below.

Aspen Environmental Group — 1992 to 1998 and 2001 to present

Ms. Vahidi has participated in CEQA and NEPA analyses of major utility development projects throughout the State, providing land use, agriculture, public policy, and socioeconomics expertise as well as managing Public Participation Programs. Her specific projects are described below.

California Energy Commission (CEC)

In response to California's power shortage, Aspen has assisted the CEC in evaluating the environmental and engineering aspects of new power plant applications throughout the State under four separate contracts. Ms. Vahidi has served as expert witness and Technical Senior for land use (since 2001), and a specialist for socioeconomics and environmental justice, and alternatives analyses and special studies. Her specific projects are listed below.

- Technical Assistance in Application for Certification Review (Contract # 700-99-014; 3/6/2000 through 12/31/2003)
  - **Woodland Generation Station No. 2, Modesto, CA**. As the land use Technical Specialist, prepared the Land Use and Recreation, and Agricultural Resources Staff Assessments of this 80-megawatt nominal, natural gas-fired power generating facility and associated linear facilities (i.e., gas and water pipeline and transmission line. The Staff Assessment evaluated potential impacts on nearby residential, recreational, and agricultural land uses, including important farmlands being traversed by linear faculties.
  - **Valero Cogeneration Project, Benicia, CA**. Prepared the Socioeconomics Staff Assessment for a proposed cogeneration facility at the Valero Refinery in Benicia. Issues addressed included impacts on public services and other project-related population impacts such as school impact fees.
  - **Rio Linda/Elverta Power Project, Sacramento, CA**. Prepared the Socioeconomics Staff Assessment for a 560-megawatt natural gas power plant in the northern Sacramento County. Issues of importance included environmental justice and impacts on property values.

- **Magnolia Power Project, Burbank, CA**. As the Socioeconomics technical specialist, prepared the Staff Assessment for this nominal 250-megawatt natural gas combined-cycle fired electrical generating facility to be located at the site of the existing City of Burbank power plant. Environmental justice issues and potential impacts on local economy and employment were evaluated
- **Potrero Power Plant Project, San Francisco, CA**. Prepared the land use portion of the Alternatives Staff Assessment for this proposed nominal 540 MW natural gas-fired, combined cycle power generating facility. Analysis included review of several alternative sites for development of the power plant and the comparative merits of those alternatives with the proposed site located on the San Francisco Bay.
- **Los Esteros Critical Energy Facility, San Jose, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment of this 180-megawatt natural-gas-fired simple cycle peaking facility. Issues included potential impacts resulting from loss of agricultural land, and impacts associated with the project's non-compliance with local General Plan land use and zoning designations.
- **East Altamont Energy Center, Alameda County, CA.** Senior Technical Specialist for the Land Use Assessment for a 1,100-megawatt nominal, natural gas-fired power plant and associated linear facilities. Provided expert witness testimony on Land Use Staff Assessment. Major issues addressed in the Staff Assessment included loss of Prime Farmlands, recommendation of land preservation mitigation, and the project's non-compliance with local General Plan land use and zoning designations.
- **Tracy Peaker Project, Tracy, CA.** Senior Technical Specialist for the Land Use Staff Assessment of this 169-megawatt simple-cycle peaking facility in an unincorporated area of San Joaquin County. Provided expert witness testimony on Land Use Staff Assessment. Issues included potential impacts resulting from loss of agricultural land under Williamson Act Contract, and evaluation of cumulative development in the fast-growing surrounding area. The agriculture Condition of Certification from the Land Use Staff Assessment resulted in an Agricultural Mitigation Plan currently being implemented, and amended for continued implementation for the Tracy Combined Cycle Power Plant (see below).
- **Avenal Energy Project, Kings County, CA.** Socioeconomics Technical Specialist for this 600-megawatt combined cycle electrical generating facility, and associated linear facilities.
- **Tesla Power Project, Alameda County, CA.** Land Use Technical Senior and Alternatives Technical Specialist in charge of preparation of two Staff Assessments for this nominal 1,120-MW electrical generating power plant with commercial operation planned for third quarter of 2004. The Tesla Power Project would consist of a natural gas-fired combined cycle power generator, with 0.8 miles of double-circuit 230-kilovolt transmission line connected to the Tesla PG&E substation, 24-inch 2.8-mile natural gas pipeline, and 1.7-mile water line constructed along Midway Road.
- **Sacramento Municipal Utility District Consumes Power Plant Project, Sacramento, CA.** Socioeconomics and Alternatives Technical Specialist in charge of preparation of two Staff Assessments for this nominal 1,000-megawatt (MW) combined-cycle natural gas facility. Provided expert witness testimony on Socioeconomics Staff Assessment. The project would include the construction and operation of a natural gas power plant at the Rancho Seco Nuclear Plant, 25 miles southeast of the City of Sacramento, in Sacramento County. The project would be located on a 30-acre portion of an overall 2,480-acre site owned by SMUD.
- **Inland Empire Energy Center, Riverside County, CA.** Senior Technical Specialist for the Land Use Assessment for a 670-megawatt natural gas-fired, combined-cycle electric generating facility and associated linear facilities including, a new 18-inch, 4.7-mile pipeline for the disposal of non-reclaimable wastewater, and a new 20-inch natural gas pipeline. Provided expert witness testimony on Land Use Staff Assessment. The project would be located on approximately 46-acres near Romoland, within Riverside County. Major issues addressed in the Staff Assessment included potential loss of agricultural lands, impacts to planned school uses, and the project's potential non-compliance with local General Plan land use and zoning designations.
- **Senior Technical Lead, Land Use Resources.** The California Energy Commission (CEC) requested that the Aspen Team provide Technical Seniors for the Land Use Resources area in order to help coordinate and review Land Use Resource Assessments. As a Technical Senior, Negar Vahidi was responsible for the technical review of Land Use sections of Staff Assessments for various power plants.

- **Legislative Bill Review.** As a Land Use Technical Senior for the CEC, Ms. Vahidi conducted legislative bill review related to energy facilities siting. She conducted portions of the CEC Systems Assessment & Facilities Siting Division analysis of Senate Bill 1550 which was intended to give the Superintendent of Public Instruction/CDE approval authority over siting of power plants within one mile of existing or proposed K-12 school sites by requiring the CDE (in coordination with the State Architect, and the commission) to develop appropriate siting guidelines.

- Engineering & Environmental Technical Assistance to Support the Energy Facility Planning and Licensing Program Contract (Contract # 700-02-004; 6/30/03 through 3/30/06)

  - **Environmental Performance Report (EPR).** Ms. Vahidi managed the preparation of the Socioeconomics chapter of the EPR for the California Energy Commission, which eventually became part of the State of California's Integrated Energy Policy Report (IEPR). The Socioeconomics chapter addressed: the importance of reliable and affordable electricity supply power plant construction and operation impacts, including labor force, taxation, etc.; and trends in the energy section, including renewable power sources such as wind and solar. She also conducted the analysis of a new portion of the Land Resources Chapter, which addressed the siting and land use issues associated with renewable power. This new portion of the land use analysis compared the land use and siting constraints associated with renewable power infrastructure such as wind and solar versus other forms of power infrastructure, such as gas pipelines, transmission lines, LNG facilities, and power plants.

  - **Coastal Plant Study.** Ms. Vahidi served as the Social Sciences Task Manager for this special study being conducted as part of Aspen's contract with the California Energy Commission. The study included identification and evaluation of potential issues associated with the possible modernization, re-tooling, or expansion of California's 25 coastal power plants including: northern California power plants such as Humboldt, Potrero, Hunter's Point, Pittsburg, and Oakland; central coast power plants such as Contra Costa, Diablo Canyon Nuclear, Morro Bay, Moss Landing, Elwood, Mandalay, and Ormond Power Plants; and southern California power plants such as the Alamitos, Long Beach, Los Angeles Harbor, Haynes, Redondo Beach, Scattergood, El Segundo, Huntington Beach, Encina, Silver Gate, South Bay, and San Onofre Nuclear. As Task Manager her responsibilities included, identification of potential political, social, community, and physical land use impacts that may arise from the potential increased output of energy from plants in highly sensitive coastal communities. The intent of the study is to identify red flag items for the Energy Commission in order to streamline future licensing processes. Her task as the Social Science Task Manager also included a thorough review of applicable Local Coastal Plans, and Coastal Commission regulations associated with Coastal Development Permits and Consistency Determinations.

  - **Natural Gas Market Outlook Report (NGMOR**). Ms. Vahidi assisted the CEC's Natural Gas Unit as a technical editor in their preparation and publication of the NGMOR. She managed Aspen's efforts, including format and graphics, to edit technical sections prepared by Natural Gas Unit Staff under a condensed time frame. The Preliminary NGMOR was released for public review in June 2003.

- Peak Workload Support for the Energy Facility Siting Program and the Energy Planning Program (Contract #700-05-002; and 4/11/06 through 3/30/10); and Siting, Transmission, and Environmental Protection Peak Workload (STEP) (Contract #700-08-001; 6/30/09 through 5/31/12)

  - **Chula Vista Energy Upgrade Project, Chula Vista, CA.** Senior Technical Specialist for the Land Use Staff Assessment for MMC Energy, Inc.'s Application for Certification (AFC) to construct and operate replacements and upgrades of equipment at the Chula Vista Power Plant, located on a 3.8-acre parcel in the City of Chula Vista's Main Street Industrial Corridor and within the City's Light Industrial zoning district. Issues of concern include the impacts of the power plant on adjacent residential and open space land uses, and compliance with applicable local LORS, including recently adopted city environmental justice policies. Provided expert witness testimony on Land Use Staff Assessment.

  - **Ivanpah Solar Electric Generating System Project, San Bernardino County, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessment/BLM EIS for a 400-megawatt solar thermal electric power generating system. The project's technology would include heliostat mirror fields focusing solar energy on power tower receivers producing steam for running turbine generators. Related facilities would include administrative buildings, transmission lines, a substation, gas lines, water lines, steam lines, and well water pumps. The proposed project would be developed entirely in the Mojave Desert region of San Bernardino County, California. The document was prepared in compliance with both NEPA and CEQA

requirements. Issues of concern included taxation, property values, environmental justice, local labor force concerns, project-related worker housing.

- **Sentinel Energy Project, Riverside County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for CPV Sentinel's Application for Certification (AFC) to construct and operate an 850-megawatt (MW) peaking electrical generating facility near SCE's Devers Substation. The proposed project site consisted of 37 acres of land situated approximately eight miles northwest of the center of the City of Palm Springs with portions of the construction laydown area and natural gas pipeline within the Palm Springs city limits. Land use issues of concern included the project's compliance with local LORS, and parcel legality to comply with the Subdivision Map Act.
- **Carrizo Energy Solar Farm, San Luis Obispo County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for Carrizo Energy, LLC's Application for Certification (AFC) to build the Carrizo Energy Solar Farm (CESF), which would consist of approximately 195 Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air-cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The CESF site was proposed to be located in an unincorporated area of eastern San Luis Obispo County, west of Simmler and northwest of California Valley, California. The CESF included the solar farm site, a minimal offsite transmission system connection, and construction laydown area. The CESF site encompassed approximately 640 acres of fenced area in an area zoned for agricultural uses as specified in the San Luis Obispo County General Land Use Plan. Issues of concern included the impacts of the power plant on agricultural land conversion, compatibility with adjacent land uses, and compliance with applicable local LORS. The development of the agriculture mitigation to reduce impacts resulting from the loss of 645 acres of Important Farmlands required extensive coordination with the California Department of Conservation, San Luis Obispo County Agriculture Department, and the San Luis Obispo County Land Conservancy.
- **Carlsbad Energy Center Project, Carlsbad, CA.** Senior Technical Specialist and expert witness for the Land Use and Alternatives Staff Assessments for Carlsbad Energy Center, LLC's Application for Certification (AFC) to build the Carlsbad Energy Center Project (CECP), which will consist of a 558 MW gross combined-cycle generating facility configured using two units with one natural-gas-fired combustion turbine and one steam turbine per or unit. Issues of concern include major incompatibilities with local LORS, and cumulative impacts from widening of I-5. Ms. Vahidi conducted the California Coast Act Consistency Determination in lieu of the California Coastal Commission (CCC), because the CCC opted to have the CEC conduct the consistency analysis with the Coastal Act.
- **Marsh Landing Generating Station, Contra Costa County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for the Mirant Marsh Landing, LLC AFC for a 930 MW natural gas-fired power plant, which would be would be sited adjacent to the existing Contra Costa Power Plant in unincorporated Contra Costa County, near the City of Antioch. Issues of concern included impacts to nearby agricultural resources, compatibility with adjacent land uses, compliance with local LORS, and parcel legality to comply with the Subdivision Map Act.
- **Canyon Power Plant, Anaheim, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessments for a nominal 200 megawatt (MW) simple-cycle plant, using four natural gas-fired combustion turbines and associated infrastructure proposed by Southern California Public Power Authority (SCPPA). This project is a peaking power plant project located within the City of Anaheim, California. Issues of concern included impacts to local employment and housing.
- **Willow Pass Generating Station, Pittsburg, CA.** Senior Technical Specialist for the Land Use Staff Assessment for a new, approximately 550-megawatt (MW) dry-cooled, natural gas-fired electric power facility proposed by Mirant. Development of Willow Pass would entail the construction of two generating units and ancillary systems including, adjacent electric and gas transmission lines, and water and wastewater pipelines. Issues of concern include impacts to nearby agricultural resources, compatibility with adjacent land uses, compliance with local LORS, and parcel legality to comply with the Subdivision Map Act. This project is currently on hold.
- **Calico Solar One Project (a.k.a, Stirling Energy Systems Solar One), San Bernardino County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment/BLM EIS for a nominal 850-megawatt (MW) Stirling engine project, with construction planned to begin late 2010. The primary equipment for the generating facility would include the approximately 30,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support

infrastructure. Major issues of concern include the conversion of approximately 8,230 acres of open space to industrial uses, compliance with BLM's CDCA Plan, access to land-locked private parcels, compatibility with the on-site BNSF railroad right-of-way, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands. Currently, staff is working on analyzing two new reduced project alternatives, because of the significant impacts of the project as proposed.

- **Imperial Valley Solar Project (a.k.a., Stirling Energy Systems Solar Two), Imperial County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment/BLM EIS for a nominal 750-megawatt (MW) Stirling engine project, with construction planned to begin either late 2009 or early 2010. The primary equipment for the generating facility would include the approximately 30,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. Major issues of concern include conversion of 6,500 acres of public recreation land used for OHV use and camping, compliance with the BLM's CDCA plan and local LORS, parcel legality issues in compliance with the Subdivision Map Act, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands.. Ms. Vahidi coordinated extensively with Imperial County regarding the project's inconsistencies with local LORS.
- **GWF Tracy Combined Cycle Power Plant, San Joaquin County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment for GWF's proposal to modify the existing TPP (see description above), a nominal 169-megawatt (MW) simple-cycle power plant, by converting the facility into a combined-cycle power plant with a nominal 145 MW, net, of additional generating capacity. Major issues of concern included conversion of Important Farmlands, and the continued implementation of the Agricultural Mitigation Plan resulting from the agriculture Condition of Certification imposed on the Tracy Peaker Project.
- **City of Palmdale Hybrid Power Plant Project, Palmdale, CA.** Senior Technical Specialist for the Land Use Staff Assessment for the Palmdale Hybrid Power Project (PHPP) proposed by the City of Palmdale. The PHPP consists of a hybrid of natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment to be developed on an approximately 377-acre site in the northern portions of the City of Palmdale (City). Major issues of concern include compatibility impacts of the proposed project's linear facilities on adjacent land uses, and the proposed Gen-Tie's LORS inconsistency impacts in both the City of Palmdale and Los Angeles County.
- **Lodi Energy Center, Lodi, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessment for a combined-cycle nominal 225-megawatt (MW) power generating facility. Issues of concern included impacts to local workforce and employment, and taxation.
- **Abengoa Mojave Solar One Project, San Bernardino County, CA.** Senior Technical Specialist and expert witness for the Land Use Staff Assessment of a nominal 250 megawatt (MW) solar electric generating facility to be located near Harper Dry Lake in an unincorporated area of San Bernardino County. Issues of concern include the impacts associated with the conversion of 1,765 acres of Important Farmlands, and over 2,000 acres of open space lands. The analysis of agricultural land conversion impacts and associated mitigation required extensive coordination with the California Department of Conservation, San Bernardino County, and Transition Habitat Conservancy.
- **Genesis Solar Energy Project, Riverside County, CA.** Senior Technical Specialist for the Land Use Staff Assessment/BLM EIS for two independent solar electric generating facilities with a nominal net electrical output of 125 megawatts (MW) each, for a total net electrical output of 250 MW. Electrical power would be produced using steam turbine generators fed from solar steam generators. The project is located approximately 25 miles west of the city of Blythe. Major issues of concern include conversion of 4,460 acres of BLM lands to an industrial use, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands..
- **Contra Costa Generating Station, Contra Costa County, CA.** Senior Technical Specialist for the Land Use Staff Assessment for a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 624 megawatts (MW). The project would be located in the City of Oakley. Issues of concern include compatibility with adjacent land uses, and compliance with City of Oakley LORS.

- **Topaz Solar Project EIR, San Luis Obispo County, CA.** (Applicant: First Solar). Aspen is managing preparation of an EIR for this 500 MW solar photovoltaic project in the Carrizo Plain area.

A major issue of concern is the conversion of approximately 6,000 acres of open space (60 percent of which are under land preservation contracts) to an industrial use. Ms. Vahidi is the senior in charge of developing the methodology, approach, and thresholds of significance for analysis of impacts related to agricultural land conversion using the CA Department of Conservation LESA Model. One major issue of concern related to agricultural resources is impacts to lands under Williamson Act contracts. She will be guiding the analysis.

- **California Valley Solar Ranch EIR, San Luis Obispo County, CA.** (Applicant: SunPower). Aspen is managing preparation of an EIR for this 250 MW solar photovoltaic project in the Carrizo Plain area. A major issue of concern is the conversion of approximately 4,000 acres of open space to an industrial use. Ms. Vahidi is the senior in charge of developing the methodology, approach, and thresholds of significance for analysis of impacts related to agricultural land conversion using the CA Department of Conservation LESA Model. She will be guiding the analysis.
- **EIR for South San Joaquin Irrigation District's (SSJID) Plan to Provide Retail Electric Service, Sphere Plan, MSR, and Annexation, San Joaquin County, CA.** This Subsequent EIR (SEIR) evaluates environmental impacts associated with the SSJID application to provide retail electric service, and evaluates changes in the project and changes with respect to the circumstances under which the project would be undertaken that have occurred since the original 2006 Final EIR was certified. LAFCo may then certify the Final SEIR and take action to adopt the Sphere Plan and MSR, adopt the proposed SOI, approve the annexation, and approve the application to provide retail electric service. Ms. Vahidi is providing CEQA expertise to SSJID, and serves as the Senior Technical lead for the social science sections of the SEIR, including agriculture, land use, policy analysis, and socioeconomics.
- **San Onofre Nuclear Generating Station (SONGS) Steam Generator Replacement Project, San Clemente, CA.** Ms. Vahidi served as the Technical Senior in charge of developing the methodology and guiding the analysis for the Land Use and Recreation Section of this EIR. This project EIR addressed the environmental effects of SCE's proposed replacement of Steam Generator Units 2 & 3 at the SONGS Nuclear Power Plant located entirely within the boundaries of the U.S. Marine Corps Base Camp (MCBCP) Pendleton. Issues of concern included potential conflicts resulting from the transport of the large units through sensitive recreation areas such as beaches, and the San Onofre State Park.
- **Diablo Canyon Power Plant (DCPP) Steam Generator Replacement Project, San Luis Obispo County, CA.** Ms. Vahidi served as the Technical Senior in charge of developing the methodology and guiding the analysis for the Land Use and Recreation Section of this EIR. The EIR addressed impacts associated with the replacement of the eight original steam generators (OSGs) at DCPP Units 1 and 2 due to degradation from stress and corrosion cracking, and other maintenance difficulties. The Proposed Project would be located at the DCPP facility, which occupies 760 acres within PG&E's 12,000-acre owner-controlled land on the California coast in central San Luis Obispo County. Land use issues of concern include impacts to agricultural lands, recreational resources, and potential Coastal Act inconsistencies.
- **Tule Wind EIS, Third Party NEPA Review, San Diego County, CA.** Under contract to the BLM, Ms. Vahidi is serving as Aspen's Project Manager and assisting the BLM in reviewing the Draft and Final EIS/EIR for the proposed Tule Wind Project (EIS) to meet BLM and NEPA requirements. The EIS/EIR is being prepared by a consultant under contract to the CPUC, also directed by BLM, together with San Diego County, Bureau of Indian Affairs, and California State Lands Commission. The joint document evaluates the proposed Tule Wind Project and the proposed East County Substation Project (ECO), along with other related parts of both projects. The BLM is the lead agency for NEPA compliance and the CPUC is the lead agency for CEQA compliance.

Transmission Line Projects

- **TANC Transmission Project (TTP), several Northern California Counties.** Ms. Vahidi served as the Deputy Project Manager in charge of preparation of the EIR/EIS and guiding the CEQA/NEPA analysis. The Transmission Agency of Northern California (TANC) and Western Area Power Administration (Western), an agency of the U.S. Department of Energy (DOE), are the CEQA lead agency and NEPA lead agency, respectively. The TTP generally would consist of approximately 600 miles of new and upgraded 500 kilovolt (kV) and 230 kV transmission lines, substations, and related facilities generally extending from northeastern California near Ravendale in Lassen County to the California Central Valley through Sacramento and Contra Costa Counties and westward into the San Francisco Bay Area. Ms. Vahidi worked with TANC and Western to initiate the scoping process, including preparation of the NOP, preparing for scoping meetings, frameworking the EIR/EIS document, etc. She also led the preparation of the project scoping report. The project was cancelled in July 2009.
- **El Casco System Project, Riverside, CA.** Ms. Vahidi served as the Project Manager for this EIR prepared for the CPUC to evaluate SCE's application for a Permit to Construct (PTC) the El Casco System Project. The Proposed Project would be located in a rapidly growing area of northern Riverside County, which includes the Cities of Beaumont, Banning, and Calimesa. A 115 kV subtransmission line begins at Banning Substation and extends westward toward the proposed El Casco Substation site within the existing Banning to Maraschino 115 kV subtransmission line and Maraschino–El Casco 115 kV subtransmission line ROWs. Major issues of concern include impacts to existing and residential land uses, which have led to the development of a partial underground alternative and a route alternative different than the project route proposed by SCE (the Applicant). The 1,200-page Draft EIR was released for a 45-day public review and comment on December 12, 2007, and evaluates project alternatives at the same level of detail as the Proposed Project analysis. The project is currently under construction.
- **Sacramento Area Voltage Support Supplemental Environmental Impact Statement (SEIS), Western Area Power Administration.** Ms. Vahidi served as the task leader for several social science sections for the SEIS for a double-circuit 230 kV circuit between Western's O'Banion/Sutter Power Plant and Elverta Substation/Natomas Substation. New transmission lines and transmission upgrades are needed to mitigate transmission line overload, reduce the frequency of automatic generation and load curtailment during the summer peak load periods, and help maintain reliability of the interconnected system operation. Ms. Vahidi directed the preparation of the land use, aesthetics, socioeconomics, and environmental justice sections of the SEIS.
- **Sunset Substation and Transmission and Distribution Project CEQA Documentation, Banning, CA.** The City of Banning proposes to construct the Sunset Substation and supporting 33-kilovolt (kV) transmission line that would interconnect with the City's existing distribution system. The purpose of this new substation and transmission is to relieve the existing overloads that are occurring within the City's electric system and to accommodate projected growth in the City. Ms. Vahidi served as the Environmental Project Manager for the initial stages of CEQA documentation prepared for the City's Utility Department.
- **Devers–Palo Verde 500 kV Transmission Line Project EIS/EIR, southern California/western Arizona.** For this EIR/EIS prepared by U.S. Bureau of Land Management and CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator for SCE's proposed 250-mile transmission line project from the Palo Verde Nuclear power plant in Arizona to the northern Palm Springs area in California. Major issues of concern include EMF and visual impacts on property values, impacts on the area's vast recreational resources and tribal lands, and the development and evaluation of several route alternatives, including the Devers-Valley No. 2 Route Alternative, which eventually was approved by the CPUC.

- **Antelope-Pardee 500 kV Transmission Line Project (a.k.a, TRTP Segment 1) EIR/EIS, Los Angeles County, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator for SCE's proposed 25-mile transmission line project from the Antelope Substation in the City of Lancaster, through the ANF, and terminating at SCE's Pardee Substation in Santa Clarita. Major issues of concern included impacts to biological, recreational, and cultural resources within Forest lands, EMF and visual impacts on property values, impacts on residences in the urbanized southern regions of the route, and the development and evaluation of several route alternatives.
- **Antelope Transmission Project [a.k.a., TRTP], Segments 2 & 3 EIR, Los Angeles and Kern Counties, CA.** For this EIR being prepared by the CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator. The proposed Project includes both Segment 2 and Segment 3 of the Antelope Transmission Project, and involves construction of new transmission line infrastructure from the Tehachapi Wind Resource Area in southern Kern County, California, to SCE's existing Vincent Substation in Los Angeles County, California. The Tehachapi Wind Resource Area is one of the State's greatest potential sources for the generation of wind energy. A variety of wind energy projects are currently in development for this region. Major issues of concern include EMF and visual impacts on property values, impacts on residences and agricultural resources, and the development and evaluation of several substation and route alternatives.
- **Tehachapi Renewable Transmission Project (TRTP, Segments 4 through 11) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Ms. Vahidi is served as the Deputy Project Manager in the early stages (i.e., during Scoping) of the project for SCE's proposal to construct, use, and maintain a series of new and upgraded high-voltage electric transmission lines and substations to deliver electricity generated from new wind energy projects in eastern Kern County. Approximately 46 miles of the project would be located in a 200- to 400-foot right-of-way on National Forest System land (managed by the Angeles National Forest) and approximately three miles would require expanded right-of-way within the Angeles National Forest. The proposed transmission system upgrades of TRTP are separated into eight distinct segments: Segments 4 through 11. Segments 1 (Antelope-Pardee) and Segments 2 and 3 (Antelope Transmission Project) were evaluated in separate CEQA and NEPA documents as described above.
- **Jefferson-Martin 230 kV Transmission Line Project EIR, San Francisco Bay Area, CA.** Ms. Vahidi served as the Issue Area Coordinator for the Social Science issues of the EIR, and was responsible for preparation of the socioeconomics, recreation, and public utilities sections of the EIR prepared on behalf of the California Public Utilities Commission (CPUC) to evaluate a proposed 27-mile transmission line in San Mateo County. Major issues of concern included EMF and visual impacts on property values, impacts on the area's vas recreational resources, and evaluation of several route alternatives.
- **Miguel-Mission 230 kV #2 Project EIR, San Diego, CA.** Ms. Vahidi conducted the land use, recreation, socioeconomics, and environmental justice analyses for this EIR for a proposed 230 kV circuit within an existing transmission line ROW between Miguel and Mission substations in San Diego County. The proposed project included installing a new 230 kV circuit on existing towers along the 35-mile ROW, as well as relocate 69 kV and 138 kV circuits on approximately 80 steel pole structures. In addition, the Miguel Substation and Mission Substation would be modified to accommodate the new 230 kV transmission circuit.
- **Viejo System Project, Orange County, CA.** Ms. Vahidi served as the Deputy Project Manager for the project's CEQA documentation, including and Initial Study, prepared on behalf of the CPUC to evaluate Southern California Edison's (SCE) Application for a Permit to Construct the Viejo System Project, which was in SCE's forecasted demand of electricity and goal of providing reliable electric service in southern Orange County. The Viejo System Project would serve Lake Forest, Mission Viejo, and the surrounding areas. Components of the project included, construction of the new 220/66/12 kilovolt (kV) Viejo Substation, installation of a new 66 kV subtransmission line within an

existing SCE right-of-way, replacement of 19 double-circuit tubular steel poles with 13 H-frames structures, and minor modification to other transmission lines. Major issues of concern include visual impacts of transmission towers, EMF effects, and project impacts on property values.

- **Cabrillo Port Liquefied Natural Gas (LNG) Deepwater Port, Ventura County, CA.** Under contract to the City of Oxnard, Aspen was tasked to review the Draft EIS/EIR for this the proposed construction and operation of an offshore floating storage and regasification unit (FSRU) that would be moored in Federal waters offshore of Ventura County. As proposed, liquefied natural gas (LNG) from the Pacific basin would be delivered by an LNG Carrier to and offloaded onto, the FSRU; re-gasified; and delivered onshore via two new 21.1-mile (33.8-kilometer), 24-inch (0.6-meter) diameter natural gas pipelines laid on the ocean floor. These pipelines would come onshore at Ormond Beach near Oxnard, California to connect through proposed new onshore pipelines to the existing Southern California Gas Company intrastate pipeline system to distribute natural gas throughout the Southern California region. Ms. Vahidi reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Aesthetics, Land Use, Recreation, Socioeconomics, and Environmental Justice.

- **Long Beach LNG Import Project, Long Beach, CA.** Under contract to the City of Long Beach, Aspen was tasked to review the Draft EIS/EIR for the proposed construction and operation of this onshore LNG facility to be located at the Port of Long Beach. Ms. Vahidi reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Aesthetics, Land Use, Recreation, Socioeconomics, Environmental Justice, and Port Master Plan Amendment.

- **Post-Suspension Activities of the Nine Federal Undeveloped Units and Lease OCS-P 0409, Offshore Southern California**. Aspen assisted the U.S. Department of the Interior, Minerals Management Service (MMS) to prepare an Environmental Information Document (EID) evaluating the potential environmental effects associated with six separate suspensions for undeveloped oil and gas leases Pacific Outer Continental Shelf (OCS) located offshore Southern California. These undeveloped leases lie between 3 and 12 miles offshore Santa Barbara, Ventura and southern San Luis Obispo Counties and are grouped into nine units, with one individual lease that is not unitized. As the Senior Aspen social scientist, Ms. Vahidi guided the analysis of community characteristics and tourism resources, recreation, visual resources, social and economic environment, and military operations.

- **Otay River Watershed Management Plan (ORWMP) and Special Area Management Plan (SAMP) in San Diego County, CA.** Ms. Vahidi served as a Technical Senior for social science and land use issues. The ORWMP focused on developing strategies to protect and enhance beneficial uses within this watershed and thereby comply with the San Diego Region's NPDES permit, and the SAMP intended to achieve a balance between reasonable economic development and aquatic resource preservation, enhancement, and restoration in this 145-square-mile (93,000 acres) area through the issuance of Corps and CDFG programmatic permits.

- **Littlerock Reservoir Sediment Removal Project EIS/EIR, Palmdale, CA.** Ms. Vahidi is the Project Manager for this joint EIS/EIR evaluating the impacts of sediment removal alternatives for the Littlerock Reservoir and Dam on USFS Angeles National Forest (NEPA Lead Agency) lands in Los Angeles County. The Palmdale Water District (District) [CEQA Lead Agency] proposes to remove approximately 540,000 cubic yards of sediment from the reservoir (behind the dam) and haul it to off-site commercial gravel pits located 6 miles north of the dam site in the community of Littlerock. The project involves impacts to the arroyo toad, extensive coordination with USFWS for a Section 7 consultation, incorporation of new Forest Service Plan updates and requirements into the analysis, preparation of the Forest Service required BE/BA, and analysis of compliance with federal air quality conformity requirements. Under Ms. Vahidi's direction, Aspen developed six different project alternatives for sediment removal, involving detailed hydraulics analysis and preparation of a hydraulics technical report. The most feasible of these alternatives (grade control structure) was

chosen by the PWD as their proposed project to be evaluated in the EIS/EIR. In addition, the PWD is currently considering an additional alternative (use of a slurry line for sediment removal) presented by Aspen. Aspen is currently working on the Administrative Draft EIR/EIS and assisting the PWD with portions of their Proposition 50 grant application to the DWR.

- **Santa Ana Valley Pipeline Repairs Project, San Bernardino and Riverside Counties, CA.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation and permitting efforts related to the repair of 12 sites along the pipeline portion of the East Branch of the California Aqueduct. The repair of the 12 sites was crucial because, eight of the Priority 1 sites included areas of the pipeline that were under high stress and subject to rupture. Issues of concern included, potential impacts to special status species, sensitive receptors, and traffic. As the DWR's CEQA consultant, Ms. Vahidi determined that the proposed SAPL Repairs Project would qualify for a CEQA Categorical Exemption, and recommended the preparation of a Technical Memorandum to justify this exemption. The Technical Memorandum and supporting documentation, including a Biological Constraints Report, and analyses of proposed project potential construction-related air quality, noise, and traffic impacts, were prepared and presented to DWR as one packet to support both a Class 1 and Class 2 CEQA Exemption. Subsequent to preparation of this packet, DWR filed a Notice of Exemption on June 13, 2003 for their repair activities.
- **Piru Creek Erosion Repairs and Bridge Seismic Retrofit Project, Northern Los Angeles County, CA.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation for this project. An IS/MND was prepared to evaluate the impacts of the project, which proposed to maintain four access routes to DWR's facilities along the West Branch of the California Aqueduct downstream of the Pyramid Dam. Repair and improvement activities would occur on Osito Canyon (an intermittent tributary to Piru Creek) at Osito Adit, adjacent to Old Highway 99 at North Adit (or access tunnel), alongside an eroded section of Old Highway 99 along Piru Creek, and at Pyramid Dam Bridge. Repair activities would serve to improve conditions of access routes, as well as strengthening and reinforcing them against seismic or flood events. Project-related construction could result in potentially significant impacts to biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, and transportation and traffic.
- **Pyramid Lake Repairs and Improvements Project, northern Los Angeles County.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation, ADA (Americans with Disabilities Act) compliance, and permitting efforts for this project. DWR and the Department of Boating and Waterways (DBW) are planning repairs and improvements at various recreational sites at Pyramid Lake, which is located on the border between Los Padres National Forest and Angeles National Forest; recreation is managed by Angeles National Forest. The lake is also part of Federal Energy Regulatory Commission Project 2426. Aspen worked with DWR and DBW to determine ADA compliance components at each site. CEQA documentation in support of a Class 1 and 2 Categorical Exemption was prepared to evaluate the potential impacts of the repairs and improvements, and provide CEQA clearance for filing of required permit applications, including but not necessarily limited to 404, 401, and 1602 permits. In addition to the CEQA documentation and preparation of permit applications, Aspen coordinated DWR and DBW's efforts with the USFS, and the permitting agencies (i.e., CDFG, RWQCB, and USACE). Through coordination with the USAC, Aspen prepared the NEPA EA for Corps 404 permit process, and reviewed and coordinated revisions to the 1602 with CDFG.
- **Mulholland Pumping Station and Lower Hollywood Reservoir Outlet Chlorination Station Project, Los Angeles, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Project Manager for preparation of CEQA documentation for this project. LADWP proposed to replace the existing historic pumping/chlorination station building as well as the existing lavatory and unoccupied Water Quality Laboratory buildings with a new single structure pumping/chlorination station within the

LADWP's Hollywood Reservoir Complex located in the Hollywood Hills section of the City Los Angeles. These improvements were required due to the age and deterioration of the facility and the potential risk of seismic damage to existing structures. An Initial Study was prepared in support of a City of Los Angeles General Exemption.

- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles and Burbank, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Task Leader for land use issues and is in charge of development and analysis of project alternatives for the CEQA document for this project. The RSC is a major transmission pipeline in the LADWP water distribution system. The existing RSC pipeline's purpose is to transport large amounts of water from the Los Angeles Reservoir Complex and local ground water wells to reservoirs and distribution facilities located in the central areas within of the City of Los Angeles. The LADWP proposed a new larger RSC pipeline to replace and realign the Upper and Lower Reaches of the existing RSC pipeline, which would involve the construction of approximately 69,600 linear feet (about 13.2 miles) of 42-, 48-, 60-, 66-, 72-, 84-, and 96-inch diameter welded steel underground pipeline.
- **Valley Generating Station Site Survey & Documentation Report, Los Angeles, CA.** Ms. Vahidi managed the preparation of a comprehensive report (over 150 pages) documenting all of the structures and facilities located at the Valley Generating Station (VGS). The report includes exhibits that illustrate locations of each structure at the VGS, a detailed appendix of color photos of each structure, and a written description of each structure. The report also provides a general discussion of the history and background of the VGS and its development to provide a context for the structures on site.
- **Taylor Yard Water Recycling Project (TYWRP), Los Angeles and Glendale, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Project Manager for preparation of CEQA documentation for this project. LADWP proposed to construct the TYWRP in order to provide recycled water produced by the Los Angeles–Glendale Water Reclamation Plant (LAGWRP) to the Taylor Yard. An important part of the City of Los Angeles' expanding emphasis on water conservation is the concept that water is a resource that can be used more than once. Because all uses of water do not require the same quality of supply, the City has been developing programs to use recycled water for suitable landscaping and industrial uses. The project is located in the southernmost part of the City of Glendale and northeastern part of the City of Los Angeles. The IS/MND was adopted in the Summer of 2007.
- **MARS EIR/EIS, Monterey, CA.** Ms. Vahidi served as the technical specialist in charge of preparing the Environmental Justice analysis for this EIR/EIS, which would evaluate the effects associated with the installation and operation of the proposed Monterey Accelerated Research System (MARS) Cabled Observatory Project (Project) proposed by Monterey Bay Aquarium Research Institute (MBARI)[NEPA Lead Agency]. The goal of the Project was to install and operate, in State and Federal waters, an advanced cabled observatory in Monterey Bay that would provide a continuous monitoring presence in the Monterey Bay National Marine Sanctuary (MBNMS) as well as serve as the test bed for a state-of-the-art regional ocean observatory, currently one component of the National Science Foundation (NSF) Ocean Observatories Initiative (OOI). The Project would provide real-time communication and continuous power to suites of scientific instruments enabling monitoring of biologically sensitive benthic sites and allowing scientific experiments to be performed. The environmental justice analysis evaluated the potential for any disproportionate project impacts to both land-based populations and fisheries workers. The CEQA Lead Agency was CSLC.
- **Kinder Morgan Concord-Sacramento Pipeline EIR**. Ms. Vahidi prepared the environmental justice and utilities and service systems sections of an EIR evaluating a proposed 70-mile petroleum products pipeline for the California State Lands Commission. Analysis included consideration of potential impacts of pipeline accidents in Contra Costa, Solano, and Yolo Counties.

- **Shore Marine Terminal Lease Consideration Project EIR, Contra Costa County, CA.** Served as Aspen's Project Manager (under contract to Chambers Group, Inc.) in charge of conducting the preparation of the Land Use, Recreation, Air Quality, and Noise sections of this EIR evaluating Shore Terminal, LLC's application to the California State Lands Commission (CLSC) to exercise the first of two 10-year lease renewal options, with no change in current operations. Shore Terminals operations comprise the marine terminal and on-land storage facilities in an industrial part of the city of Martinez. The marine terminal is on public land leased from the CSLC with the upland storage facilities located on private land.
- **Looking Glass Networks Fiber Optic Cable Project IS/MND, northern and southern California.** As part of Aspen's ongoing contract with the CPUC for review of Telecommunications projects, this document encompassed the evaluation of project impacts and network upgrades in the San Francisco Bay Area and the Los Angeles Basin Area. Ms. Vahidi served as the Deputy Project Manager and Study Area Manager for the Los Angeles Basin for this comprehensive CEQA document reviewing the potential impacts of hundreds of miles of newly proposed fiber optic lines throughout northern and southern California, including Los Angeles and Orange Counties. Issues of concern focused on potential construction impacts of linear alignments in highly urbanized rights-of-way, and resultant land use, traffic and utilities conflicts.
- **U.S. Army Corps of Engineers, Los Angeles District.** Ms. Vahidi is responsible for managing Delivery Orders and conducting the analyses of the social science issue areas for 16 projects throughout southern California and Arizona as part of two environmental services contracts. Delivery orders have included:
  - **Northeast Phoenix Drainage Area Alternatives Analysis Report, Phoenix and Scottsdale, AZ.** As the project manager guided the preparation of an alternatives analysis report that evaluated the potential environmental impacts associated with channel and detention basin alternatives to control flooding problems resulting from fast rate of development in the northeast Phoenix area.
  - **Imperial Beach Shore Protection EIS/EIR, Imperial Beach, CA.** Responsible for preparing the affected environment and environmental consequences sections for the land use, recreation, aesthetics, and socioeconomics issue areas. This EIS will analyze the impacts of shore protection measures along a 4.7-mile stretch of beach in southwest San Diego County.
  - **U.S. Food and Drug Administration Laboratory EIS/EIR, Irvine, CA.** Prepared the land use and recreation; socioeconomics, public services, and utilities; and visual resources/aesthetics analyses for this proposed "mega-laboratory" on the University of California Irvine Campus. Also developed the cumulative projects scenario for analyses of cumulative impacts. As the Public Participation Coordinator for the EIS/EIR review process, prepared the NOP, set up the scoping meeting and public hearing, prepared meeting handouts, and developed the project mailing list.
  - **San Antonio Dam EIS, Los Angeles and San Bernardino Counties, CA.** Responsible for preparing the cultural resources, land use and recreation, and aesthetics sections for the analysis of impacts resulting from the re-operation of San Antonio Dam to increase flood protection.
  - **Rio Salado Environmental Restoration EIS, Phoenix and Tempe, AZ.** Conducted the land use and recreation, and aesthetics analyses for this environmental restoration project in the Salt River and Indian Bend Wash located in the Cities of Phoenix and Tempe. Incidental to the primary objective of the Proposed Action (environmental restoration) is the creation of passive recreational opportunities associated with the restored habitat areas, such as trails for walking and biking, and areas for observing wildlife and learning about the natural history of the river.
  - **Airspace Restrictions EA, Ft. Irwin, CA.** Conducted the land use, recreation, aesthetics, and socioeconomics analyses of impacts for the conversion of unrestricted airspace to restricted airspace above Ft. Irwin in the Mojave Desert.
  - **National Guard Armory Building EA, Los Angeles, CA.** Conducted the land use, aesthetics, and socioeconomics analyses and prepared the cumulative impacts and policy consistency sections.

- **Supplemental EA for the Seven Oaks Dam Woolly Star Land Exchange, San Bernardino County, CA.** Prepared the land use and recreation analyses and policy consistency section.
- **Lower Santa Ana River Operations and Maintenance EA, Orange County, CA.** Responsible for conducting the land use, recreation, aesthetics, socioeconomics, and cultural resources analyses.
- **EA for Area Lighting, Fencing, and Roadways at the International Border, San Diego, CA.** Conducted the land use, aesthetics, and socioeconomics analyses and prepared the policy consistency section.
- **Border Patrol Checkpoint Station EA, San Clemente, CA.** Analyzed the aesthetic impacts of the installation of a concrete center divider and a Pre-inspected Automated Lane adjacent to and parallel to Interstate 5.
- **Upper Newport Bay Environmental Restoration Project, Newport Beach, CA.** Prepared physical setting, socioeconomics, land and water uses, and cultural resources sections for the Baseline Conditions Report and the Environmental Planning Report.
- **Whitewater/Thousand Palms Flood Control Project, Thousand Palms, CA.** Prepared the land use and recreation, aesthetics, and socioeconomics affected environment sections for the project's Baseline Conditions Report that was incorporated into the project EIS.
- **San Antonio Creek Bridges Project, Vandenberg Air Force Base, CA.** Prepared the physical setting, land use, socioeconomics, utilities, and aesthetics sections for analyses of bridge alternative impacts for missile transport on Vandenberg Air Force Base.
- **Ft. Irwin Expansion Mitigation Plan, Mojave Desert, CA.** Responsible for developing Ft. Irwin's Public Access Policy based on mitigation measures from the Army's Land Acquisition EIS for the National Training Center. Policy includes provisions for access by research and scientific uses.

- **Los Angeles Unified School District (LAUSD), Los Angeles County, CA.** Between 2002 and 2008, Ms. Vahidi served as the Program/Contract Manager for Aspen's Environmental Master Services Agreement with the LAUSD (nation's second largest school district) to prepare CEQA documents (EIRs, IS/MNDs, Categorical Exemptions) in review of the LAUSD's four-phased new school construction program intended to meet existing and projected overcrowded conditions (200,000 seat shortfall) within the LAUSD (i.e., City of Los Angeles and all or parts of 28 surrounding jurisdictions cover 700 square miles of land). As the Program Manager, she was responsible for client interface and providing CEQA expertise to the LAUSD on day-to-day basis, QA/QC activities for all Aspen documents submitted, budget tracking and allocation, staff assignments, and the general day-to-day management of this contract. Aspen was awarded 54 work authorizations, of which 48 were CEQA document assignments for new school projects, school expansions and additions. In addition to her duties as the contract manager, Ms. Vahidi managed the preparation of several CEQA documents under this contract, including:
  - **East Valley Middle School No. 2 EIR.** This middle school was proposed to be located at the previous Van Nuys Drive-In site. The EIR focused on impacts associated with air quality, hazards and hazardous materials, noise, land use and planning, and traffic and transportation. Major issues of concern included traffic and noise generated by school operation activities. The EIR included LAUSD design standards and measures employed to minimize environmental impacts.
  - **Canoga Park New Elementary School IS/MND.** This elementary school would be developed on a parcel of land owned by the non-profit organization, New Economics For Women (NEW). This "Turn-Key" project consisted of a Charter Elementary School to be developed by NEW and sold to the LAUSD for operation. It was later decided that NEW would lease the school back and run it as a charter school. Issues of concern included, pedestrian safety, traffic, air quality, noise, and land use.
  - **Mt. Washington Elementary School Multi-Purpose Room Addition Project IS/MND.** This project proposed the development of a multi-purpose room facility, including a library, auditorium, and theater, to the existing Mt. Washington Elementary School campus located in Los Angeles. The surrounding residential community had concerns regarding the proposed project's impacts on aesthetics, traffic, air quality, and noise. Of particular concern, were impacts generated due to the after-hours use of the multi-purpose room facility by civic and community groups.

- **New School Construction Program EIR.** Serves as a Study Area Manager (Valley Districts), and Issue Area Coordinator (IAC) (i.e., technical lead and reviewer) for social science issues, including land use, socioeconomics, public services, population and housing, and utilities and service systems. As the IAC, she has formulated the scope of work and methodology for analysis of issues and mitigation options. In addition to her managerial duties, Ms. Vahidi is preparing the Land Use section of the EIR, and directing the preparation of the Project's Scoping Report.
- **Belmont Senior High School 20-Classroom Modular Building Addition Project.** Under Aspen's on-going master services agreement with the LAUSD, served as the project manager for CEQA documentation and permitting efforts related to the addition of modular classrooms to the existing Belmont Senior High School campus. Issues of concern included, potential impacts to sensitive receptors adjacent to the school from construction-related air quality, noise, and traffic, and operation-related noise generated by the new classrooms. As the LAUSD's CEQA consultant, Ms. Vahidi directed the preparation of technical documentation in support of a Class 32 In-Fill CEQA Categorical Exemption. This technical documentation included analyses of potential project-related air quality, noise, and traffic impacts, which were then submitted to LAUSD as one packet. Subsequent to preparation of this packet, LAUSD filed a CEQA Notice of Exemption for the classroom addition project.
- **Narbonne High School Stadium Lighting Project MND Addendum.** Served as the project manager for this project proposed to add a new stadium, lighting, and associated sport facilities needed to address existing needs at Narbonne High School. Issues of concern include lighting impacts to the surrounding neighborhood, and available parking stock.

- **SCE Calnev Power Line and Substation Project IS/MND.** Aspen was contracted to thoroughly review and analyze Southern California Edison Company's Application for a Permit to Construct and Proponent's Environmental Assessment (PEA) for the Calnev Power Line and Substation Project in the City of Colton. Ms. Vahidi served as the Deputy Project Manager for preparation of the IS/MND. Tasks include: a site visit, and evaluation of the project's compliance with the Commission's General Order 131D, Rule 17.1, and associated information submittal requirements; and preparation of a letter report identifying data deficiencies of the Application and PEA. Upon formal CPUC acceptance of the Application and PEA, Aspen prepared a CEQA Initial Study Checklist by identifying baseline data, project characteristics, and determining impact significance for each issue area. Each issue area's impact determination was supported by a paragraph or more of analysis describing the rationale for the impact identified, or for the lack of a significant impact. Upon completion of the Initial Study, the Mandatory Findings of Significance were prepared and Aspen determine that a Mitigated Negative Declaration should be prepared per CEQA Guidelines.
- **SCE Six Flags Substation and Power Line Project IS/MND.** Ms. Vahidi served as Deputy Project Manager for preparation of the IS/MND. Reviewed and provided comments on the permit application by SCE to construct a substation and power line to provide electrical service to Six Flags Amusement Park in Valencia, CA. Subsequent to the application completeness review, she prepared the project's Initial Study Checklist and Mitigated Negative Declaration for the California Public Utilities Commission (CPUC). Identified possible deficiencies and provided recommendations.
- **Industrywide Survey for the South Coast Air Quality Management District.** Ms. Vahidi coordinated Aspen's work for an Air Toxics Survey of harmful emissions by auto body and paint shops, performed in compliance with AB2588. She was responsible for development of an industrywide emission inventory for these facilities; she also performed information management, facility verifications, survey mail-outs, emissions calculations, analysis of calculated results, and preparation of the final report.
- **Technical Support to NEPA Lawsuit, Angeles National Forest, CA.** Ms. Vahidi prepared a detailed project chronology and a list of all applicable federal, State, and local laws and regulations in support of the USDA Office of General Counsel and National Forest's response to the City of Los Angeles' 1996 lawsuit on the adequacy of the Pacific Pipeline EIS.
- **Yellowstone Pipeline EIS, Lolo National Forest, Montana.** Environmental Justice and Public Services Issue Area Specialist. Responsible for conducting the analysis of project impacts on minority and

low-income populations to comply with Presidential Executive Order 12898 on Environmental Justice using Census data to determine population density, minority population percentages and unemployment rates to determine the potential for disproportionate project impacts on affected communities. Also responsible for conducting analysis of project impacts such as population inmigration and pipeline accidents on public services in western Montana. During the EIS scoping process, she served as the project public participation coordinator and was responsible for preparation of the project newsletter, setup of the first round of scoping meetings, and determination of project information centers.

- **Santa Fe Pacific Pipeline Project EIR.** Ms. Vahidi was responsible for development and screening of alternatives for a 13-mile petroleum products pipeline from Carson to Norwalk, CA. Prepared analyses of project impacts on socioeconomics, public services, utilities, and aesthetics.
- **Pacific Pipeline Project Mitigation Monitoring, Compliance, and Reporting Program (MMCRP).** Ms. Vahidi served as the expert technical reviewer for the socioeconomics and environmental justice issues. As the MMCRP Agency Liaison, was responsible for developing protocol for efficient interagency communication procedures in coordination of mitigation activities with the CPUC, USFS, Responsible Agencies, and the project proponent. Also responsible for the development and management of the MMCRP Community Outreach and Public Access Program.
- **Pacific Pipeline Project EIR.** For the California Public Utilities Commission's (CPUC) EIR on the originally proposed route of this proposed pipeline (from Santa Barbara County to Los Angeles), Ms. Vahidi developed and coordinated a public participation program to comply with CEQA's mandate for information disclosure and public involvement in decision-making. The Final EIR was certified in September 1993.
- **Pacific Pipeline Project EIS and Subsequent EIR.** Ms. Vahidi prepared the socioeconomics and public services analysis, the Environmental Justice analysis in compliance with Presidential Executive Order 12898, as well as portions of the Land Use and Public Recreation analyses, including a comprehensive comparative analysis of project alternatives on this EIS/Subsequent EIR for the U.S. Forest Service (Angeles National Forest) and the CPUC. Ms. Vahidi managed the subsequent GIS mapping of socioeconomic data relative to pipeline corridor alternatives and other industrial facilities. She also prepared the cumulative projects list (covering a five county area for the Proposed Project and its alternatives) used for the cumulative scenario analyses of the various issue areas in the EIS/SEIR. As the Public Participation Program Coordinator for the project, she developed, implemented, and managed the public involvement efforts for the NEPA and CEQA environmental review processes. This included: setup and logistics for 20 separate scoping meetings, informational workshops, and public hearings along the project route; preparation of all meeting handouts; preparation of project newsletters and public notices; placement of project documents on Internet; and maintenance of the a project telephone information hotline. She also reviewed over 2,000 public comments (written and verbal) received on the Draft EIS/SEIR, for subsequent distribution to the project team.
- **Alturas Transmission Line Project EIR/EIS.** Ms. Vahidi conducted the analysis of potential impacts on minority populations and low-income populations in compliance with Presidential Executive Order 12898 on Environmental Justice using Census data to determine population density, minority population percentages and unemployment rates, and the potential impacts of the transmission line on affected communities. She also prepared the cumulative projects list and map used for analyses of cumulative impacts. She managed development of meeting handouts; scheduling and logistics for four scoping meetings; developed and maintained project mailing list; reviewed public scoping comments and prepared the Scoping Report; coordinated four sets of informational workshops and public hearings for the Draft EIR/EIS; supervised the distribution of comments on the Draft EIR/EIS to the project team; and coordinated the distribution of the Draft and Final EIR/EIS to affected public agencies, organizations, and citizens.

EIP Associates 1998 to 2001

- **Program EIR for the Divestiture of PG&E's Hydroelectric Generation Assets.** For the CPUC's EIR evaluating the Pacific Gas & Electric Company's (PG&E) proposal to divest their hydroelectric facilities in California, served as the land use technical analyst for two watershed areas, and the Task Manager for the Socioeconomics and Transportation sections of the EIR covering five watershed areas. PG&E owns and operates the largest private hydroelectric power system in the nation. Situated in the Sierra Nevada, Southern Cascade, and Coastal mountain ranges of California, this system is strung along 16 different river basins and annually generates approximately five percent of the power consumed each year in California. The proposed sale of assets also includes approximately 140,000 acres of land proposed for sale with the hydroelectric system. The EIR analyzes the range of operational changes that could occur under new ownership, including complex integrated models that analyze power generation and water management. The land use section of the EIR examines the implications of the change in ownership of lands and the potential for impacts due to development or potential changes in use. Contributed significantly to the extensive GIS analysis, which was conducted to determine the development suitability and potential intensity of development that might occur on the lands if sold. These results served as one of the primary bases for analysis of impacts associated with the sale of the hydroelectric assets.
- **Section 108 Loan Guarantee EA/FONSI for the Waterfront Development Project.** Served as the Manager and Principal Preparer for this EA/FONSI for the City of Huntington Beach Economic Development Department. Prepared NEPA documentation evaluating the impacts resulting from the use of HUD Section 108 Loan guarantee funds for the Waterfront Resort Expansion Project in accordance with The HUD NEPA Guidelines and Format 1 (Environmental Assessments at the Community Level). Tasks included: (1) Evaluation of activities that would be categorically excluded from NEPA based on an assessment of the NEPA Implementing Guidelines for HUD Projects; (2) Evaluation of proposed actions compliance with all applicable federal statutes, regulations, and policies; and (3) Preparation of an Environmental Assessment/Mitigated Finding of No Significant Impact (EA/FONSI) for proposed actions that are not categorically excluded. Proposed actions to be evaluated consisted mainly of infrastructure improvement projects, rehabilitation and/or development of affordable housing, provision of relocation assistance, facilitation of development and/or redevelopment plans, property acquisition, provision of open space, etc.
- **MTA Mid Cities/Westside Transit Corridor Study EIS/EIR.** Served as the EIS/EIR Deputy Project Manager (DPM) for this 3-phase (including prepared the Major Investment Study (MIS), the Environmental Impact Statement (EIS), and an evaluation of the urban design implications of transit interventions on selected routes) study intended to address current and long range traffic congestion in the central and westside areas of the Los Angeles, Basin. Three east/west corridors and a range of transit alternatives ranging including Rapid Bus, light rail, and heavy rail are being evaluated. In addition to her duties as DPM for this comprehensive joint EIS/EIR, Ms. Vahidi prepared the Environmental Justice Analysis (per Executive Order 12898), the Section 4(f) Parklands discussion, and the land use and socioeconomics sections of the EIS/EIR.
- **Wes Thompson Ranch Development Project EIR.** Served as the EIR Project Manager for this hillside residential development in the City of Santa Clarita. Issues of concern included seismic and air quality impacts associated with the excavation of 2 million cubic yards of soil, the project's non-compliance with the City's hillside ordinance for innovative design, and traffic generated by project-related population growth in the area. Four different site configuration alternatives were developed as part of the EIR analysis. Other issues of concern included sensitive biological resources, the potential for hydrological impacts due to disturbance of the hillside, and cultural resources.
- **City of Santa Monica Environmental Assessments.** As one of the City's qualified CEQA consultants managed several environmental assessment documents for housing, commercial, institutional, and mixed-use developments in compliance with CEQA, including:

- **Berkeley Manor Condominium EIR and Technical Reports**. This one-issue EIR originally was a CEQA Categorical Exemption per direction of the City. During preparation of the Categorical Exemption documentation, it was determined that project-generated traffic would have potentially significant impacts. As a result, a traffic technical report was prepared as the background document for and EIR. In addition, shade and shadow impacts were evaluated in a technical report to ensure that shading impacts from the proposed structure on surrounding uses would not be significant. A simple Excel model was developed for calculation of shade and shadow angles.
- **Seaview Court Condominiums IS/MND.** This comprehensive Initial Study/Mitigated Negative Declaration included six technical reports including traffic, cultural resources, parking survey, shade and shadow analysis, and a geotechnical assessment to evaluate the level of severity of this development in the waterfront area of Santa Monica. Major issues of concern were; parking and project-generated traffic on adjacent narrow residential streets; visual obstruction and shading impacts of the proposed structure; liquefaction and seismic impacts to adjacent properties as result of the project's excavation for a subterranean parking garage; and the potential impacts of the project to impact the integrity of a historic district and the historic Seaview Walkway to the beachfront.
- **Four-Story Hotel IS/MND.** A comprehensive Initial Study/Mitigated Negative Declaration was prepared for this four-story hotel adjacent to St. John's Hospital in Santa Monica. Major issues of concern included project-generated traffic on surrounding multi-family residential uses and emergency access to the hospital.
- **Santa Monica College Parking Structure B Replacement EIR.** This focused EIR addressed issues related to traffic and neighborhood land use impacts associated with the addition of a 3-story parking structure in the center of the SMC campus. Major issues of concern included the potential for project-generated traffic to cause congestion at the school's main entrance on Pico Boulevard, and the potential for overflow traffic to impact the Sunset Community of single-family homes adjacent to the school.
- **North Main Street Mixed-Use Development Project EIR.** This EIR included evaluation of impacts resulting from the development of a mixed-use development in Santa Monica's "Commercial Corridor" on Main Street, with ground-floor residences and boutique commercial uses. Major issues of concern included traffic and parking impacts to Main Street and surrounding residential land uses, shade and shadow impacts, and neighborhood impacts.

- **Specific Plans and Redevelopment Projects.** As the senior technical lead for land use, prepared the project description, alternatives screening and development, cumulative scenario, and land use analysis for:
  - **Cabrillo Plaza Specific Plan EIR in Santa Barbara.** This project consisted of a mixed-use commercial development on Santa Barbara's waterfront on Cabrillo Boulevard. On-site uses included an aquarium, specialty retail, restaurants, and office space.
  - **Culver City Redevelopment Plan and Merger EIR.** This programmatic EIR evaluated the impacts of the City's redevelopment of its redevelopment zones. A major land use survey and calculation of acreage of redevelopment lands was conducted as part of the EIR.
  - **Dana Point Headlands Specific Plan EIR.** This EIR evaluated the development of coastal bluff in the City with hotel, single- and multi-family residential, and commercial uses. Major issues of concern included ground disturbance as a result of excavation, impacts to terrestrial and wildlife biology, recreation impacts to beachgoers, and project-generated population inducement.
  - **Blocks 104/105 Redevelopment Project EIR in Huntington Beach (Project Manager).** This EIR evaluated the development of a supermarket, retail shops, and office space in the City's Waterfront Redevelopment Zone. Issues of concern evaluated included traffic, land use, and impacts to on-site historic structures.

HONORS AND AWARDS

- 2006 American Planning Association, Los Angeles Section Environmental Award for the Los Angeles Unified School District New School Construction Program, Program EIR
- 2004 Association of Environmental Professionals Statewide Best EIR Award for the Jefferson-Martin 230 kV Transmission Project EIR.
- 2001 Outstanding Performance Award from the State of California Energy Commission.

- 1992-93 recipient of the USC Merit ("Ides of March") Scholarship from the Southern California Association of Public Administrators (SCAPA).
- University of California, Irvine, School of Social Sciences. Graduated with Highest Honors in Political Science.

PROFESSIONAL ASSOCIATIONS

- American Planning Association (APA), Los Angeles Section Executive Board Member 1999-2001
- Association of Environmental Professionals (AEP)

DECLARATION OF
Testimony of Susanne Huerta

I**, Susanne Huerta,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Siting, Transmission and Environmental Protection Division, as a **Land Use Technical Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use** for the **City of Palmdale Hybrid Power Plant 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: November 29, 2010 Signed:_____

At: Agoura Hills, California

SUSANNE R. HUERTA

Associate
Land Use, Agriculture, Public Policy

ACADEMIC BACKGROUND

Master of Urban Planning, New York University, 2007
B.A., Geography, University of California, Los Angeles, 2004

PROFESSIONAL EXPERIENCE

Ms. Huerta is an Environmental Planner with five years of experience in environmental consulting, city planning, economic development, and GIS analysis. She has worked with Aspen Environmental Group since earning her Master's degree in 2007. While attending graduate school, Ms. Huerta interned for a city planning firm in New Jersey. Her city planning background includes experience in the preparation of master plans, the evaluation of site plans and subdivisions, and conducting land use surveys. At Aspen Environmental Group, Ms. Huerta conducts research and prepares environmental analyses in accordance with CEQA, NEPA, and various other environmental laws and regulations. She is currently conducting the technical analysis for land use and agricultural resources for several renewable energy projects, including solar and wind energy generating facilities, and transmission line projects. In addition, Ms. Huerta is regularly involved with document coordination and production, public involvement, and client interaction. Her project-specific efforts are provided below.

Aspen Environmental Group — 2007 to present

California Energy Commission (CEC)

In response to California's power shortage, Aspen has assisted the CEC in evaluating the environmental and engineering aspects of new power plant applications throughout the State under four separate contracts. Ms. Huerta has served as a Staff Professional for Land Use Staff Assessments since 2008.

- Peak Workload Support for the Energy Facility Siting Program and the Energy Planning Program (Contract #700-05-002; and 4/11/06 through 3/30/10); and Siting, Transmission, and Environmental Protection Peak Workload (STEP) (Contract #700-08-001; 6/30/09 through 5/31/12)
  - **Carrizo Energy Solar Farm, San Luis Obispo County, CA.** Staff Technical Analyst for the Land Use Staff Assessment for Carrizo Energy, LLC's Application for Certification (AFC) to build the Carrizo Energy Solar Farm (CESF), which would consist of approximately 195 Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air-cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The proposed CESF included the solar farm site, a minimal offsite transmission system connection, and construction laydown area. The CESF site would encompass approximately 640 acres of fenced area in an area zoned for agricultural uses as specified in the San Luis Obispo County General Land Use Plan. Issues of concern include the impacts of the power plant on adjacent land uses, compliance with applicable local LORS, and the conversion of agricultural land. The development of the agriculture mitigation to reduce impacts resulting from the loss of 645 acres of Important Farmlands required extensive coordination with the California Department of Conservation, San Luis Obispo County Agriculture Department, and the San Luis Obispo County Land Conservancy.

- **Willow Pass Generating Station, Pittsburg, CA.** Staff Technical Analyst for the Land Use Staff Assessment for a new, approximately 550-megawatt (MW) dry-cooled, natural gas-fired electric power facility proposed by Mirant. Development of Willow Pass would entail the construction of two generating units and ancillary systems including, adjacent electric and gas transmission lines, and water and wastewater pipelines. Issues of concern include impacts to nearby agricultural resources, compatibility with adjacent land uses, compliance with local LORS, and parcel legality to comply with the Subdivision Map Act. This project is currently on hold.
- **Calico Solar Project, (a.k.a., Stirling Energy Systems Solar One), San Bernardino County, CA.** Staff Professional for the Land Use Staff Assessment/BLM EIS for a nominal 850-megawatt (MW) Stirling engine project, with construction planned to begin late 2010. The primary equipment for the generating facility would include the approximately 30,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. Major issues of concern include the conversion of approximately 8,230 acres of open space to industrial uses and compliance with BLM's CDCA Plan, access to land-locked private parcels, compatibility with the on-site BNSF railroad right-of-way, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands. Currently, staff is working on analyzing two new reduced project alternatives, because of the significant impacts of the project as proposed.
- **Imperial Valley Solar Project, (a.k.a, Stirling Energy Systems Solar Two), Imperial County, CA.** Staff Professional for the Land Use Staff Assessment/BLM EIS for a nominal 750-megawatt (MW) Stirling engine project, with construction planned to begin either late 2009 or early 2010. The primary equipment for the generating facility would include the approximately 30,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure. Major issues of concern include conversion of 6,500 acres of public recreation land used for OHV use and camping, and compliance with the BLM's CDCA plan, and local LORS, parcel legality issues in compliance with the Subdivision Map Act, and significant cumulative land use impacts resulting from the conversion of 1,000,000 acres of southern California desert lands. Ms. Huerta was involved in staff's extensive coordination efforts with Imperial County regarding the project's inconsistencies with local LORS.
- **City of Palmdale Hybrid Power Plant Project, Palmdale, CA.** Staff Professional for the Land Use Staff Assessment for the Palmdale Hybrid Power Project (PHPP) proposed by the City of Palmdale. The PHPP consists of a hybrid of natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment to be developed on an approximately 377-acre site in the northern portions of the City of Palmdale (City). Major issues of concern include compatibility impacts of the proposed project's linear facilities on adjacent land uses, and the proposed Gen-Tie's LORS inconsistency impacts in both the City of Palmdale and Los Angeles County.
- **Abengoa Mojave Solar One Project, San Bernardino County, CA.** Staff Professional for the Land Use Staff Assessment of a nominal 250 megawatt (MW) solar electric generating facility to be located near Harper Dry Lake in an unincorporated area of San Bernardino County. Issues of concern include the impacts associated with the conversión of 1,765 acres of Important Farmlands, and over 2,000 acres of open space lands. The analysis of agricultural land conversion impacts and associated mitigation required extensive coordination with the California Department of Conservation, San Bernardino County, and Transition Habitat Conservancy.
- **Oakley Generating Station, Contra Costa County, CA.** Staff Professional for the Land Use Staff Assessment for a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 624 megawatts (MW). The project would be located in the City of Oakley. Issues of concern include compatibility with adjacent land uses, and compliance with City of Oakley LORS.

- **Topaz Solar Farm Project Environmental Impact Report (EIR), San Luis Obispo County, CA, Project Assistant/Technical Specialist (2009-Present).** Ms. Huerta prepared the Project Description, the alternatives analysis, and the technical analysis for the agriculture resources for this 550 MW solar photovoltaic power plant on the Carrizo Plain of eastern San Luis Obispo County. The project includes solar arrays that would cover approximately 4,200 acres, as well as an electric substation and switching station. A major issue of concern is the conversion of agricultural land, including approximately 1,200 acres of land under Williamson Act contracts. Ms. Huerta has conducted

extensive coordination with the San Luis Obispo County Agriculture Department to develop the approach and analysis for land conversion.

- **California Valley Solar Ranch Project EIR, San Luis Obispo County, CA, Technical Specialist (2009-Present).** Ms. Huerta prepared the technical analysis for the agricultural resources for this 250 MW solar photovoltaic power plant on the Carrizo Plain of eastern San Luis Obispo County. The project includes solar arrays that would cover nearly 2,000 acres, as well as an electric substation, a 2.5-mile transmission line, and expansion of a surface aggregate mine. Conversion of Important Farmlands, and disturbance to nearby agricultural production activities are major concerns.
- **Tule Wind EIS, Third Party NEPA Review, San Diego County, CA, Technical Specialist (2010).** Under contract to the BLM, Ms. Huerta assisted the BLM in reviewing the land use and agricultural analyses of the Draft and Final EIS/EIR for the proposed Tule Wind Project (EIS) to meet BLM and NEPA requirements. The EIS/EIR is being prepared by a consultant under contract to the CPUC, also directed by BLM, together with San Diego County, Bureau of Indian Affairs, and California State Lands Commission. The joint document evaluates the proposed Tule Wind Project and the proposed East County Substation Project (ECO), along with other related parts of both projects. The BLM is the lead agency for NEPA compliance and the CPUC is the lead agency for CEQA compliance.
- **Ocotillo Express Wind Project, Imperial County, CA, Technical Specialist (2010- Present).** Ms. Huerta is currently preparing the technical analysis for lands (including agriculture and grazing), realty, and recreation resources. The project is proposed to be a 550-MW wind generation facility on approximately 15,000 acres in Imperial County.
- **Alcoa Dike Project Supplemental Environmental Assessment EA/EIR, US Army Corps of Engineers, Technical Specialist (2009-Present).** Ms. Huerta is a preparing the land use and visual analysis for the Supplemental EA/EIR Addendum under the NEPA/CEQA for the United States Army Corps of Engineers. A Supplemental EA/EIR Addendum is being performed to address design changes to the approved Alcoa Dike located in the Prado Basin, Riverside County.
- **Auxiliary Dike Project Supplemental Environmental Assessment (EA)/EIR, US Army Corps of Engineers, Technical Specialist (2009).** Ms. Huerta prepared the land use and visual analysis for the Supplemental EA/EIR Addendum under the NEPA/CEQA for the United States Army Corps of Engineers. A Supplemental EA/EIR Addendum is being performed to address design changes to the approved Auxiliary Dike located in the Prado Basin, Riverside County.
- **Pacific Wind Project EIR, Kern County, CA, Technical Specialist (2009-2010).** Ms. Huerta prepared the technical analysis for land use and public services. The project is proposed to be located on approximately 8,300 acres of land with up to 250 wind turbines to produce up to 250 MW of wind energy.
- **Baldwin Hills Community Standards District (CSD), City of Culver City, Technical Specialist (2009).** Technical Specialist for the review of a County of Los Angeles environmental document and preparation of an oil and gas drilling ordinance for the City of Culver City in Los Angeles County. Ms. Huerta reviewed the technical comments on the Baldwin Hills Community Standards District EIR prepared by the County of Los Angeles for the Inglewood Oil Field. The technical review included the evaluation of the County's proposed CSD (drilling ordinance), which the County revised based on public comments. The City used the review comments as part of their formal comments submitted on the County's EIR and CSD.
- **California River Parkways Trailhead Project Initial Study/Mitigated Negative Declaration (IS/MND), Ventura County Watershed Protection District, Technical Specialist, (2009).** The project would provide a new point of entry to the Ventura County-maintained Ojai Valley Trail and the Ventura River Trail, building on an existing trails network, and would include a new parking lot and crosswalk. Ms. Huerta performed the analyses for land use, agricultural and mineral resources, public services, and recreation resources.

- **TANC Transmission Project, Transmission Agency of Northern California, Staff Professional (2009).** Public scoping for 600 miles of proposed 230-kV and 500-kV transmission lines and associated infrastructure extending from eastern Lassen County south through the Sacramento Valley, and branching west to the Bay Area and east to Tuolumne County: Ms. Huerta assisted in the acquisition and processing of 6,600 scoping comments and information requests; responded via phone, email, and postal mail to public and agency inquiries throughout the twice extended, five-month scoping period; quantitatively evaluated scoping data; and authored sections of the scoping report. The project was cancelled in July 2009.
- **Alta-Oak Creek Mojave Project EIR, Kern County, CA, Technical Specialist (2008-2009).** Ms. Huerta prepared the technical analysis for land use, public services, population, and housing resources. The project is proposed to be located on approximately 11,000 acres of land with up to 350 wind turbines to produce up to 800 MW of wind energy. This would be the first project of the Alta Wind Energy Center which is designed to produce 1,500 MW of wind power in the Tehachapi Wind Resource Area of Kern County**.**
- **Santa Maria River Levee Repair Project, US Army Corps of Engineers, Technical Specialist (2008).** An Environmental Assessment (EA) is being performed for the corrective action to repair the design deficiency of the Santa Maria River Levee in order to avoid the potentially catastrophic consequences of a levee breach that would affect the population of the city of Santa Maria. Ms. Huerta prepared the technical analysis of potential land use and socioeconomic impacts for the EA under NEPA, including NEPA-required environmental justice issues.
- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles and Burbank, CA, Technical Reviewer (2008).** Under Aspen's environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Huerta assisted in preparation of the potential impacts to recreational resources for this EIR. The RSC is a major transmission pipeline in the LADWP water distribution system. The existing RSC pipeline's purpose is to transport large amounts of water from the Los Angeles Reservoir Complex and local ground water wells to reservoirs and distribution facilities located in the central areas within of the City of Los Angeles. The LADWP proposed a new larger RSC pipeline to replace and realign the Upper and Lower Reaches of the existing RSC pipeline.
- **Tehachapi Renewable Transmission Project (TRTP Segments 4 through 11) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, CA, Technical Specialist (2007-Present).** In preparation of a joint EIR/EIS for the CPUC and USDA Forest Service (Angeles National Forest), Ms. Huerta conducted research and analysis for impacts related to public services and utilities, and prepared the Cumulative Impact Scenario. In addition, she prepared the EIR/EIS Summary; and assisted in preparation of the Project Description, Alternative Screening Report, Scoping Report, and the public comment period of the Draft EIR/EIS.

PREVIOUS EXPERIENCE

Burgis Associates, Inc. — May 2006 to May 2007

Ms. Huerta worked as a consultant for city planning departments and private developers throughout northern New Jersey. Her primary projects were to draft a master plan reexamination report and an open space and recreation element of a master plan. Within these projects she evaluated existing socioeconomic conditions and land uses, and conducted an inventory of recreational facilities and open space. She also used ArcGIS to illustrate zoning recommendations and update land use and zoning maps. Other routine projects included the evaluation of site plan, subdivision and variance applications for compliance with local, State and federal regulations.

Brooklyn Economic Development Corporation **September to December 2005**

Ms. Huerta conducted research and field surveys for community revitalization projects. She also participated in collaborative meetings with other community organizations.

ADDITIONAL TRAINING AND COURSES

- Successful CEQA Compliance (February 2009)
- CEQA Basics Workshop Series (November 2008)
- Advanced courses in ArcGIS
- Graduate courses in Environmental Impact Assessment and Environmental Policy

PROFESSIONAL AFFILIATIONS

- American Planning Association

DECLARATION OF
Erin Bright

I**, Erin Bright,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Siting, Transmission and Environmental Protection Division as a **Mechanical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Facility Design** and **Noise and Vibration** for the **Palmdale Hybrid Power Project** (8-AFC-09) based on my independent analysis of the Application, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 17, 2010 Signed: _____

At: Sacramento, California

Erin Bright
Mechanical Engineer

Experience Summary

Two years of experience in the electric power generation field, including analysis of noise pollution, construction/licensing of electric generating power plants, and engineering and policy analysis of thermal power plant regulatory issues. One year of experience in the alternative energy field, including analysis of alternative fuel production and use.

Education

- University of California, Davis--Bachelor of Science, Mechanical Engineering and Materials Science
- University of California, Davis Extension Program--Renewable Energy Systems

Professional Experience

2007 to Present-- Mechanical Engineer, Energy Facilities Siting Division - California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

2006 to 2007--Energy Analyst, Fuels & Transportation Division - California Energy Commission

Performed analysis of use potential and environmental effects of emerging non-petroleum fuels, including compressed natural gas, biomass, hydrogen and electricity, in heavy and light duty transportation vehicles. Contributor to Energy Commission's alternative fuels plan.

DECLARATION OF
SHAHAB KHOSHMASHRAB

I**, SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Noise and Vibration** for the **Palmdale Hybrid 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: _____ Signed: _____

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 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 participated in the preparation of the staff testimony on **Power Plant Efficiency** for the **Palmdale Hybrid 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: _____ Signed: _____

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 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 participated in the preparation of the staff testimony on **Power Plant Reliability** for the **Palmdale Hybrid 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: _____ Signed: _____

At: Sacramento, California

Shahab Khoshmashrab
Mechanical Engineer

Experience Summary

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-2004--Mechanical Engineer, Systems Assessment and Facilities Siting– California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

1998-2001--Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

1995-1998--Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

DECLARATION OF
Kristin Ford, Planner I

I, Kristin Ford, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting, Transmission & Environmental Protection Division as a Planner I.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff supplemental testimony on Socioeconomics for the Palmdale Hybrid Power Plant 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: 11/19/10 Signed: _____

At: Sacramento, California

Kristin S. Ford

Experience

Environmental Planner November 2009 to Present
California Energy Commission, Sacramento, California

- Conduct CEQA-equivalent environmental review for proposed and existing power plants.
- Write analysis for Socioeconomics, Traffic, Visual Resources and Land Use sections for staff assessments.
- Provide expert witness testimony on Socioeconomics, Traffic, Visual Resources and Land Use issues at Energy Commission hearings.

Assistant Planner June 2006 to July 2009
City of Sacramento, Environmental Planning Services, Sacramento, California

- Evaluated, prepared and supervised the preparation of a variety of environmental documents under the California Environmental Quality Act (CEQA); analyzed data and made recommendations on complex planning matters involving issues related to land use, traffic, utilities, aesthetics, noise, energy, historic preservation, air quality and biological resources.
- Prepared, researched and reviewed Mitigation Monitoring Plans per CEQA, the California State & Federal Endangered Species Acts (CESA & FESA), the Clean Water Act (CWA), the Migratory Bird Treaty Act (MBTA) and the Natomas Basin Habitat Conservation Plan.
- Conducted biological resources site assessments for proposed development projects. Determined the need for preparation and/or review of specific studies, such as Wetland Delineations, Nesting Raptor Surveys, and Arborist Reports, to identify resources and provide mitigation measures.
- Coordinated the release of the City of Sacramento's 2030 General Plan Draft/Final Environmental Impact Report between various City departments, the Planning Commission, City Council and the consultant team.

Environmental Coordinator August 2005 to June 2006
Nella Oil Company, Auburn, California

- Coordinated company-wide environmental regulatory compliance activities, including:
  - site investigations;
  - underground fuel-storage tank environmental compliance recommendations and subsequent tank upgrades; and
  - hazardous waste removal.
- Maintained and managed Air Quality Management District and Environmental Health Department permits for 60+ gas stations.

Student Assistant March 2005 to August 2005
California Energy Commission, Sacramento, California

- Conducted research and provided technical writing support to Biology and Water Departments for the annual Energy Policy Report impact analyses.
- Maintained and managed compliance files on power plant facilities.

Student Assistant June 2004 to March 2005
Central Valley Regional Water Quality Control Board, Sacramento, California

- Supported National Pollutant Discharge Elimination System (NPDES) staff by:
  - maintaining waste water treatment plant discharge self-monitoring reports and case files; and
  - analyzed (Amador, Sutter, Placer and Yolo county) wastewater treatment plant monthly monitoring reports for possible permit violations.

Education

2005 Bachelor of Arts, Environmental Studies, *California State University, Sacramento*
2001 Associate of Arts, Liberal Studies, *Allan Hancock College, Santa Maria, California*

DECLARATION OF
Christopher B. Dennis, P.G.

I, **Christopher B. 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 **Soil and Water Resources** for the Palmdale Hybrid 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: December 16, 2010 Signed:_____

At: Sacramento, California

CHRISTOPHER B. DENNIS, P.G., J.D.

EXPERIENCE SUMMARY

Mr. Dennis is a licensed Professional Geologist with the State of California. His professional experience includes over 17 years of innovative technical and management experience. He has worked with a wide variety of CEQA and environmental management issues including soil, water, and waste compliance, investigation, and remediation. He has recently worked with siting and compliance of natural gas-fired and solar power plants. He has been a portfolio manager for several major oil companies and the East Bay Municipal Utility District's trench spoils program. He actively managed Unocal CERT, ExxonMobil, and ChevronTexaco pipeline, service station, bulk fueling, and terminal sites. He is knowledgeable of California's regulatory structure and laws, and is proficient in CEQA analysis, risk assessment, site assessment, remediation, environmental due diligence, and database/GIS development and management.

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
Licensed Professional Geologist, State of California #7184
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., Senior Geologist
2000 to 2001 Alisto Engineering, Inc, Senior Geologist
1998 to 2000 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

Siting, Transmission, and Environmental Protection Division. Focusing on siting and compliance for simple-cycle, combined cycle, solar, and hybrid power plants. Developed a broad knowledge of CEQA impact analysis and mitigation involving water resources, water quality, soil resources, and waste management. Developed preliminary and final staff assessments involving issues of basin water management, overdraft, water quality, water conservation, water transfers, flood potential, and wind and water soil erosion. Deeply involved in issues surrounding the recently proposed large-scale solar power projects including project grading designs, flood management, water use, biological resource impacts, interagency cooperation, and laws, ordinances, regulations, and standards compliance. Also participating in the Quarterly Fuels and Energy Reporting (QFER) program and Environmental Policy Report. Oversaw the development of a QFER database for the collection and management of water use and wastewater discharge by all power plants 20 MW and greater in California.

2004 to 2007 Science Applications International Corporation, Sacramento, CA

Chevron, Northern California (various sites). Managed several former pipeline right-of-way and pump stations sites within the Central California region. Developed and implemented new written field quality assurance/quality control procedures for the entire portfolio of sites. Developed and implemented an analytical laboratory evaluation plan. Managed the groundwater monitoring and sampling program for the portfolio. Initiated low-flow sampling and the use of pre-packed filter screens in boreholes to reduce turbidity in groundwater samples and attain low risk-assessment level detection limits. Initiated a crude oil remediation study for the portfolio that is proving to be a pivotal tool for closure of the pipeline sites. Submitted the first soil vapor survey workplan to the RWQCB for the portfolio and was given approval of that workplan without comment. 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 for-end planning and coordination. Developed and managed all sites budgets and billing.

2004 to 2004 Bay Consulting Services, LLC, Rocklin, CA

Chevron, Northern California (various sites). Completed several closure requests with Tier I/II risk analysis. Started and operated this experimental company for two months.

2001 to 2004 Cambria Environmental Technology, San Ramon and Rocklin, CA

Chevron, Northern California (various sites). Responsible for a large portfolio (40 - 60+ active sites) of ChevronTexaco service station, bulk fueling, and terminal sites in Northern California, some of which were located in the sensitive Lake Tahoe area. 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. Helped develop and received State Underground Storage Tank (UST) Fund pre-approved for ~100 low-risk ChevronTexaco sites as part of a management transfer initiative. Through good regulatory communication, solid analysis, and hard work, closed over 30 sites in two years (half of one portfolio). Site closures were risk-based using both natural attenuation and active remediation approaches. Worked with Caltrans on a freeway (CA I-80) expansion project that required excavation and dewatering beneath a former Chevron site. Through a series of constructive meetings, built into the Caltrans request for bid, specifications for handling petroleum impacted excavated soils and water. The expansion project has proceeded as expected and planned. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

East Bay Municipal Utility District, Northern California (various sites). 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 on trench spoils sampling/analyses for soil disposal. Developed a small group of professionals to manage this portfolio. As part of this project, managed several EPA SW-846 statistical soil analysis projects at District landfill sites with volumes up to ~180,000 cubic yards of landfilled soil. Created and surveyed statistical grids on the landfills and characterized the soil for removal to Class III or Class II landfills. Conducted site investigations and quarterly groundwater monitoring projects. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

2000 - 2001 Alisto Engineering, Lafayette, CA

Caltrans, Northern California (various sites). Conducted statistical analyses of the soil from the shoulders of several Caltrans highways in Southern California. Performed the statistical

analyses to determine lead hazard levels for use soil management planning in proposed construction corridors. The statistical analyses were performed on sample populations ranging from approximately 80 to 300. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

Industrial Facilities, Northern California (various sites). Conducted site investigations at several industrial sites in Northern California. Developed storm water pollution prevention plans (SWPPPs) for development projects in downtown San Jose and a Caltrans project along CA I-680. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

1998 - 2000 TRC, Concord, CA

ExxonMobil, Northern California (various sites). Responsible for a mid-size portfolio (15 - 20+ active sites) of ExxonMobil service station and bulk fueling sites in Northern California. Through good regulatory communication, solid analysis, and hard work, closed over 30 sites. Site closures were risk-based using both natural attenuation and active remediation approaches. For one bulk plant on the sensitive Napa River, secured a public recession of a RWQCB cleanup and abatement order and site closure for Mobil after two years of negotiations, technical presentations, and meetings. Conducted high vacuum, dual-phase extraction at several ExxonMobil sites. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

Quick Stop Markets, Northern California (various sites). Developed and managed a small portfolio of Quick Stop Market sites in Northern California. Saved the client thousands of dollars in lease fees by closing a site through solid regulatory negotiation and communication, and aggressive site assessment and remediation. The site was located a few blocks upgradient from Lake Merritt in Oakland. Conducted high vacuum, dual-phase extraction at several Quick Stop sites. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

Miscellaneous Sites, Northern California. Team member of the Level 3 Communications environmental impact report (EIR) submittals, preparing geologic hazard evaluations. Conducted site investigations at several industrial sites in Northern California. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

1993 - 1995 Project Manager, GeoResearch, Long Beach, CA

Unocal CERT, Southern California (various sites). Project manager of a portfolio of active Unocal CERT sites. Frequently utilized mobile laboratories to assist in the placement of soil borings, vapor extraction, and groundwater wells. Conducted risk assessments, site assessments, tanks pulls, station demolitions, aquifer and vapor extraction tests, and remediation system designs and installations.

1990 - 1993 Staff Geologist, AeroVironment, Monrovia, CA

Project manager and project geologist for industrial sites and government projects. Team leader for documenting homestead well locations and archaeological and biological concerns at over 400 former homestead sites at Edwards AFB using GPS technology. Conducted groundwater sampling according to AFCEE protocols, and soil-vapor and geophysical surveys at Vandenberg AFB. Member of the design team of a mobile soil-vapor laboratory. Lead designer of an insitu soil-vapor sample collection system. Managed two teams for monitoring landfill vapor emissions and subsurface migration at active county operated landfills, and wrote the standard operating procedures, conducted field training, and prepared quarterly AQMD reports.

DECLARATION OF
James Adams

I, James Adams declare as follows:

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.

2. I prepared staff testimony related to Traffic and Transportation and Visual Resources for the Final Staff Assessment for the Palmdale Hybrid Power Project (08-AFC-9) 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.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 11/29/10 Signed: James Adams

At: Sacramento, California

James S. Adams
Environmental Protection Office
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5504
PH (916) 653-0702, FAX (916) 654-3882
Jadams@energy.state.ca.us

5/1999
Present **Environmental Planner**
Review applications for certification to acquire permits from the California Energy Commission to build electric generating power plants. Specific technical fields include socioeconomics and traffic and transportation.

11/1997
Present **Energy and Resource Consultant**
Provide clients with technical expertise on various issues related to natural resource use and development. Current activities include managing an Intervention by the Redwood Alliance before the California Public Utilities Commission regarding the decommissioning of the Humboldt Bay Power Plant's nuclear reactor.

9/1994--
10/1997 **Senior Analyst - Safe Energy Communication Council (SECC)**
Responsible for developing and/or implementing campaigns on various energy issues involving the promotion of energy efficiency and renewable energy and advocating less reliance on nuclear power. Managed educational outreach efforts to newspaper editorial writers throughout the U.S. to encourage coverage of energy issues. Participated in meetings and negotiations with key Clinton administration officials, members of Congress and staff, national coalitions, and grassroots organizations on important energy issues (e.g. U.S. Department of Energy Budget for Fiscal Years 1996-1998). Successfully raised $140,000 from private foundations to support SECC activities.

6/1978--
12/1992 **Principal Consultant - Redwood Alliance**
Provided consulting services to the Alliance; a renewable energy/political advocacy organization. Major responsibilities included managing and/or participating in several interventions/appearances before the California Public Utilities Commission, California Energy Commission, California Legislature, U.S. Congress and the U.S. Nuclear Regulatory Commission. Issues included electric utility planning options, greater reliance on energy efficiency and renewable energy, nuclear power economic analyses, decommissioning cost estimates, and nuclear waste management and disposal.

2/1983--
8/1986 **Natural Resource Specialist**
Assisted private consulting, firms, non-profit corporations and government agencies in various projects related to the enhancement and protection of national forests in Northern California and Southern Oregon. This included contracts with the U.S. Forest Service, Fish and Wildlife Service, National Park Service, the California Coastal Conservancy, and private landowners.

6/1978--
present Consultant/Journalist/Paralegal/Lobbyist
Throughout the period of work outlined above, I have written a considerable amount of news articles and reports connected to ongoing-projects and issues of personal interest. The leg, al/administrative interventions have required extensive paralegal work to support attorneys, and technical expertise to identify and assist consultants. In addition, many of the projects required consulting services and lobbying, at the local, state and federal level whenever necessary, as well as working with the print and television media as appropriate.

From 1978 through 1984 1 served on the Board of Directors for two locals non-profit agencies devoted to sustainable community development, Redwood Community Development Council and Redwood Community Action Agency (RCAA). I also was hired on staff at RCAA as a natural resource specialist which is explained more fully above. I am proficient with computers, printers, fax machines and related equipment.

EDUCATION

M.A. Social Science. Political science and natural resources emphasis. California State University at Humboldt. Graduated December 1988.

B.A. Political Science. Political and economic aspects of natural resource development, with a particular emphasis in forest ecology and appropriate technology. California State University at Humboldt. Graduated June 1978.

Academic Honors. Member of PI GAMMU MU Honor Society since 1986.

MILITARY SERVICE

7/1969--
9/1975 U.S. Navy. Air Traffic Controller.
Honorable Discharge.

DECLARATION OF

Dr.Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting, 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 Palmdale Hybrid 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:_____ Signed:_____

At: Sacramento, California

RESUME

DR. OBED ODOEMELAM

EDUCATION:

1979-1981 University of California, Davis, California. Ph.D., Ecotoxicology

1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.

1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989
The Present: California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

DECLARATION OF
Suzanne L. Phinney, D.Env.

I, Suzanne L. Phinney, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Senior Associate.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared staff testimony on **Waste Management** and **Alternatives Appendix A** for the **Palmdale Hybrid Power Plant Final Staff Assessment** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony and errata is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and errata and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 12/16/2010 Signed: Suzanne Phinney

At: Sacramento, California

SUZANNE L. PHINNEY

Senior Associate, Energy and Infrastructure

ACADEMIC BACKGROUND

Doctorate, Environmental Science & Engineering (D.Env.), University of California, Los Angeles, 1981
M.S., Marine Biology, Dalhousie University, Halifax, Nova Scotia, Canada, 1975
B.A., Biological Sciences, University of California, Berkeley, 1973

PROFESSIONAL EXPERIENCE

Dr. Phinney has 30 years of experience in the environmental and energy field, providing technical and policy support in energy analysis, environmental assessment, environmental remediation, air and water quality assessments, risk assessment, regulatory compliance, permitting, and project/program management. Her particular emphasis is energy and infrastructure with projects addressing climate change, alternative energy generation technologies, liquefied natural gas, petroleum infrastructure, advanced transportation vehicles and fuels, land use and energy, and power plant siting. Prior to employment at Aspen, Dr. Phinney worked for 16 years with Aerojet, where she oversaw all environmental and safety issues.

Aspen Environmental Group — 2001 to present

Dr. Phinney manages energy and infrastructure projects for Aspen and provides environmental support on major projects. She has provided energy and environmental expertise to the following clients:

California Energy Commission (CEC). Dr. Phinney has supported CEC staff since 2001. She has prepared analyses for several power plants throughout the State, and has authored or contributed to over a dozen special studies. She is currently Deputy Program Manager for planning studies conducted by the Aspen team. Her major efforts for the CEC include the following.

- **Power Plant Siting, CEC, Project Management/Technical Support (2001 – Present).** Dr. Phinney prepared the alternatives analysis for the following power plants under review by the Energy Commission:
  - **Palomar Energy Project –** 500 MW combined-cycle natural gas facility in Escondido, San Diego County
  - **Russell City Energy Center –** 600 MW combined-cycle natural gas facility in Hayward, Alameda County
  - **Eastshore Energy Center -** 115.5 MW simple-cycle natural gas facility in Hayward, Alameda County
  - **Carrizo Energy Solar Farm –** 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
  - **CPV Sentinel Energy Project –** 850 MW natural gas plant in the Coachella Valley, Riverside County
  - **Marsh Landing Generating Station-** 930 MW natural gas plant within the existing Contra Costa Power Plant in Antioch, Contra Costa County
  - **Orange Grove Project –** 96 MW natural-gas peaking facility near Pala, San Diego County
  - **Willow Pass Generating Station –** 550 MW natural gas plant within the existing Pittsburg Power Plant in Pittsburg, Contra Costa County

- **Almond 2 Peaking Power Plant Project** – 174 MW natural-gas peaking facility near Ceres, Stanislaus County
- **Abengoa Mojave Solar Project** – 250 MW solar thermal (parabolic trough) plant near Harper Dry Lake, San Bernardino County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County

Dr. Phinney prepared the waste management assessments of power plant licensing applications:

- **Eastshore Energy Center –** 115.5 MW natural gas simple-cycle plant in Hayward, Alameda County
- **Carrizo Energy Solar Farm –** 177 MW solar thermal (Compact Linear Fresnel Reflector) plant in the Carrizo Plain, San Luis Obispo County
- **Palmdale Hybrid Power Project –** 570 MW natural gas-solar thermal (parabolic trough) hybrid plant in Palmdale, Los Angeles County
- **SES Solar Two Siting Case –** 750 MW solar thermal (Stirling dish) plant on 6,500 acres of mostly BLM land in Imperial County
- **Hanford Energy Park Peaker Plant –** 120 MW simple-cycle, natural gas facility in Hanford, Kings County
- **Ridgecrest Solar Power Project** – 250 MW solar thermal (parabolic trough) plant on 3,920 acres of BLM land near Ridgecrest, Kern County
- **Blythe Solar Power Project** – 1,000 MW solar thermal (parabolic trough) plant on 9,400 acres of BLM land near Blythe, Riverside County
- **Palen Solar Power Project** – 500 MW solar thermal (parabolic trough) plant on 5,200 acres of BLM land in the Chuckwalla Valley, Riverside County

Dr. Phinney also coordinated the study of cooling water alternatives for the Tesla and Tracy natural gas, combined-cycle power plants.

- **Environmental Performance Report, CEC, Project Manager/Technical Support (2001, 2003, 2005)**.Dr. Phinney was Project Manager for Aspen's technical contributions, graphics and production efforts for the 2001 Environmental Performance Report (EPR) which detailed the current and historical air, water and biological impacts from in-state generation facilities. She provided support to the water resources discussion in the 2003 EPR and managed the analysis of out-of-state generation facilities for the 2005 EPR.
- **Advanced Electric Generation Technologies, CEC, Project Manager (2001 - 2002).** Dr. Phinney served as Project Manager for a report defining the technical development, developmental capacity, commercial status, costs and deployment constraints of selected alternative electric generation technologies. Technologies included geothermal, fuel cell, solar thermal, solar photovoltaic, wind and hydro. The focus was on development and application of the technology in California. Two page fact sheets on each technology and a matrix comparing all technologies was developed. Finally, an updated discussion of renewable technologies was developed for insertion into the alternatives section of Staff Assessments for power plant applications.
- **Liquefied Natural Gas Support, CEC, Technical Author (2002 – 2007**). Dr. Phinney has been instrumental in the preparation of numerous safety and policy reports on liquefied natural gas (LNG). She authored the Commission document: *International and National Efforts to Address the Safety and Security of Importing Liquefied Natural Gas: A Compendium*. This report reviewed national and international LNG regulations, standards and guidelines, reviewed risk assessment techniques, and identified, compiled and reviewed LNG safety/risk studies. Dr. Phinney helped organize LNG Access Workshops held in June 2005 and prepared a 40 page summary of presentations made at the workshops. She developed over 30 fact sheets on LNG subject areas for distribution to the public. Dr. Phinney compiled state and local comments on a proposed LNG terminal at the Port of Long Beach;

these were presented in the *Safety Advisory Report on the Proposed Sound Energy Solutions Natural Gas Terminal at the Port of Long Beach, California,* which was delivered to the Federal Energy Regulatory Commission within the mandated 30-day period imposed by the 2005 federal Energy Bill. She provided technical review for the report *The Outlook for Global Trade in Liquefied Natural Projections to the year 2020.*

- **Natural Gas Market Assessment Support, CEC, Technical Author/Editorial Support (2005 –** 2007). Dr. Phinne**y c**ontributed to natural gas supply and demand analyses for the Commission document, *Natural Gas Assessment Update*. She provided technical and editorial support to the 2005 and 2007 Integrated Energy Policy Report (IEPR) documents, *Preliminary (and subsequently the Revised report) Reference Case in Support of the 2005 Natural Gas Market Assessment* and *2007 Natural Gas Market Assessment.* She edited the Commission document *Natural Gas Quality: Power Turbine Performance During Heat Content Surges.*
- **Petroleum Infrastructure Environmental Performance Report, CEC, Project Manager (2005)**. Dr. Phinney served as Project Manager for the 2005 IEPR document *Petroleum Infrastructure Environmental Performance Report.* In addition to managing preparation of the report and workshop presentations, she prepared responses to comments and provided policy recommendations.
- **Hydropower and Global Climate Change, CEC, Technical Author (2005)**. Dr. Phinney coauthored the document *Potential Changes in Hydropower Production from Global Climate Change in California and the Western United States*. This report investigated the effects of climate change on hydropower production in the West and compared impacts and policy actions in California, the Pacific Northwest, and the Southwest.
- **Advanced Energy Pathways, CEC, Project Manager (2006 – 2008).** Dr. Phinney provided project management support for a 3-year study evaluating the effects of advanced transportation technologies and fuels (out to 2050) on California's natural gas and electricity systems. This report involved the development of baseline and alternative energy demand and supply scenarios, in-depth technical analysis of advanced transportation technologies and fuels, and the development of an energy-rich model.
- **Land Use and Energy, CEC, Project Manager/Technical Author (2006 – 2008).** Dr. Phinney authored a CEC report on the linkages between land use and energy, which ultimately became one of the two chapters presented in the 2006 IEPR Update. The report highlighted how energy can be better integrated in land use planning, and how efforts such as smart growth can help the state meet its energy and greenhouse gas emission reduction goals. She organized a full-day workshop involving over a dozen speakers representing state agencies, local governments, research entities, environmental groups, utilities, and non-profits. Dr. Phinney was one of the authors of the 2007 land use and energy follow-up report which further defined the role of land use in meeting California's energy and climate change goals. She helped synthesize the report into a chapter for the 2007 IEPR. Dr. Phinney helped edit the Land Use Subgroup of the Climate Action Team report prepared for submission to the California Air Resources Board AB 32 Scoping Plan.
- **AB 1632 Nuclear Power Plant Assessment, CEC, Technical Author (2007 – 2008).** Dr. Phinney was a key member of a team evaluating nuclear power issues in the state in response to AB 1632 legislation. She managed and prepared report sections regarding the impacts to local communities and the environmental issues and costs associated with alternatives, including renewables, to the state's two nuclear facilities. These sections were incorporated in the report *An Assessment of California's Nuclear Power Plants.*
- **Environmental Screening Tool for Out-of-State Renewable Energy Facilities, CEC, Project Manager (2009).** Dr. Phinney prepared an environmental screening tool/analysis allowing CEC to determine quickly whether out-of-state renewable facilities requesting RPS certification met California laws, ordinances, regulations and standards.

- **Energy Aware Facility Planning and Siting Guide, CEC, Project Manager (2009-2010).** Dr. Phinney is updating a 1997 version of the Energy Aware Guide to help local governments plan for and permit electricity generation facilities and transmission lines that will be needed in the upcoming years. The Guide informs planners, decision makers and the public about what, how, and why electricity infrastructure may be developed.

California Public Utilities Commission. Dr. Phinney has managed several environmental assessments for the CPUC and has been heavily involved in editorial support of many other CPUC documents prepared by Aspen.

- **Looking Glass Network Initial Study/Mitigated Negative Declaration, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the preparation of Initial Study/Mitigated Negative Declarations (IS/MND) for this telecommunication project that involved construction in the San Francisco Bay Area and the Los Angeles Basin to allow fiber optic connections in numerous locations.
- **Williams Communications Sentry Marysville Project IS/MND, CPUC, Project Manager (2002 – 2003).** Dr. Phinney served as Project Manager for the installation of fiber optic connection to a Beale Air Force Base in Yuba County.
- **Kirby Hills II Natural Gas Storage Facility IS/MND, CPUC, Project Manager (2007).** Dr. Phinney managed an IS/MND for expansions at a natural gas storage facility in Solano County.
- **Multiple EIR Documents, CPUC, Technical Editor (2004 - 2008).** Dr. Phinney provided editorial and QA/QC review for the Diablo Canyon Steam Generator Replacement EIR, the Miguel Mission 230 kV Transmission Line EIR and the Sunrise Powerlink EIR/EIS.

California Institute of Technology/University of California. Dr. Phinney provided project management support to the following project.

- **Combined Array for Research in Millimeter-wave Astronomy EIS/EIR**, **U.S. Forest Service and the University of California (2001 – 2002).** Dr. Phinney was the Project Manager for this EIS/EIR for a radio telescope antenna array to be placed at a high altitude site in the Inyo National Forest. The evaluation of alternatives was especially contentious, and Aspen's field analyses of several potential sites were pivotal in the ultimate selection of one of these alternative sites.

Western Area Power Administration. Dr. Phinney provided editorial and QA/QC support to the following projects.

- **North Area ROW Maintenance Project Environmental Assessment, Western, Technical Editor/QA/QC (2006-2008).** Dr. Phinney provided technical editing and QA/QC support for all documents relating to the development of 800 miles of transmission lines in Northern California.
- **Sacramento Area Voltage Support Supplemental EIS/EA, Technical Editor/QA/QC (2006 – 2008).** Dr. Phinney provided technical editing and QA/QC support for all environmental documentation and permitting for new construction and reconstruction of transmission lines in the greater Sacramento area.

Vermont Yankee Nuclear Power Plant Report, Vermont Department of Public Service, Project Manager (December 2008 to January 2009). Dr. Phinney was the Project Manager and provided technical support for the environmental analysis of the continued operation of the Vermont Yankee Nuclear Power Station in Vernon, Vermont. The report assessed the environmental impacts to land, water and air resources (including climate change), soil and seismicity, on-site and off-site storage and disposal of high-level and low-level nuclear waste.

GenCorp 1999 to 2000

- As Vice President, Environmental and Regulatory Affairs, Dr. Phinney held primary responsibility for coordinating the company's aerospace and automotive environmental activities with various federal, State, and local regulatory agencies. Her specific responsibilities included: working with external groups and entities to develop responsible environmental legislation, regulations, and standards and the implementation of sound public policy; developing stakeholder base and strategy to ensure that company objectives were achieved; facilitating company and regulatory agency discussions to achieve more comprehensive and quicker remediation of sites; and spearheading a stakeholder group to develop and fund scientific studies on selected chemicals of concern.

Aerojet General Corporation 1984 to 1999

As Vice President, Environmental Health and Safety, Dr. Phinney ensured that programs were in place to meet all regulatory requirements and company initiatives. Her responsibilities included: providing strategic direction and management of all superfund-related investigation and remediation activities; developing environmental management plans; communicating environmental requirements, concerns, and successes to both internal and external audiences, including the board of directors, investment banking, and the analyst community; and participating as a member of the leadership council in defining company-wide business objectives and targets.

- Dr. Phinney created the first corporate EHS department, defining and staffing key functional areas. She managed a $20,000,000 annual budget and oversaw a staff of up to 30 professionals. Select accomplishments include: the development of remediation technologies that resulted in the cleanup of over 50 billion gallons of contaminated groundwater; development of the world's first groundwater treatment facility for perchlorate; significant reductions in emissions and hazardous waste generation; representation on numerous legislative and regulatory task forces and leadership positions on external business and community EHS committees and councils; and extensive public outreach efforts.

PREVIOUS EXPERIENCE, 1976 TO 1984

Jacobs Engineering Group. Dr. Phinney conducted toxicological, ecological, and air and water quality assessments.

Department of Environmental Science and Engineering at the University of California, Los Angeles. Dr. Phinney analyzed legal, economic, public health, and administrative barriers to waste water reuse. She also conducted an analysis of ecological and institutional factors in coastal siting of power plants.

Southwest Los Angeles Junior College. Dr. Phinney taught lecture and laboratory courses in general science.

TRAINING

- Certificate, Executive Program, University of California, Davis, 1989
- Expert Witness Training, California Energy Commission, 2001

HONORS AND AWARDS

- Who's Who of American Women, 18th Edition
- YWCA Outstanding Woman of the Year (Sciences) Award, 1992
- Woman of Achievement Award, Downtown Capitol Business and Professional Women, 1993
- Individual Award for Outstanding Contribution in Air Quality, 1995
- Sacramento Safety Center Incorporated, Eagle Award for Safety, 1998
- Regional Award for Outstanding Contribution in Air Quality, 2003

ACTIVITIES AND ASSOCIATIONS

- Editorial Board, The Environmental Professional, 1987-1989
- City of Sacramento Toxic Substances Commission, 1986-1988
- Sacramento Environmental Commission, 1988-1991
- Board of Directors, League of Women Voters of Sacramento, 1989-1999; President 1996-1997; Co-President 1997-1998; 2003-2005; Energy Study Committee 2005; Moderator/Facilitator of Debates and Forums (e.g., climate change, the SACOG's MTP, and flood control)
- Toxics Consultant, League of Women Voters of Sacramento, 1988-1989
- Member, Advisory Committee on AB 3777 (Risk Management Prevention Programs)
- Board of Directors, American Lung Association of Sacramento-Emigrant Trails, 1992-2000; President 1998-1999;
- Board of Directors, Sacramento Metropolitan Chamber of Commerce, 1992-1997; Vice President, Public Policy, 1996-1997
- Board of Directors, Air and Waste Management Association, 1991-1994
- Steering Committee Chair, Cleaner Air Partnership, 1993-1996, 2000-2001; Executive Committee 1993 to present
- Co-chair, TCE Issues Group, 1994-2000
- Sacramento Water Forum, 1995-2000
- Rate Advisory Committee, Sacramento Municipal Utility District, 1999-2001

SELECTED PUBLICATIONS/PRESENTATIONS

Phinney, S.L., Panel Moderator, Climate Change Initiatives for California, AEP Annual Conference, Shell Beach, California, 2007.

Phinney, S.L., Panel Moderator, Is there a Need for LNG in California, AEP Annual Conference, Shell beach, California, 2007.

Phinney, S.L., "LNG Safety Analysis in California – Federal, State and Local Processes" Presented at California Foundation on the Environment and the Economy, 2005.

Phinney, S.L., "Energy Basics" Presented at League of Women Voters of California Annual Convention, 2005.

Phinney, S.L., Presentation to U.S. Department of Justice, Office of the U.S. Attorney, on Women and Equality, 2004.

Phinney, S.L., "Trends in Industrial Waste Generation and Management" Presented at National Ground Water Association Conference, Las Vegas, Nevada, 1996.

Phinney, S.L., "Effective Management of an RI/FS to Reduce Financial Exposure," Manufacturers Alliance Environmental Management Council, Washington, D.C., 1995.

Phinney, S.L., "Knowing Your Compliance Challenge," 7th Annual California Statewide Community Awareness and Emergency Response (CAER) Conference, Sacramento, California, 1995.

Phinney, S.L., "Industry's Role in Broadening the Use of Alternative Fuels in America," Clean Cities Ceremony, Sacramento, California, 1994.

Phinney, S.L., "Aerospace Industry Perspective on Defense Conversion," AAAS Annual Meeting, San Francisco, California, 1994.

Phinney, S.L., "Aerojet's Waste Reduction Successes," Business for the Environment Conference, Sacramento, California, 1993.

Phinney, S.L., "Company Worker Trip Reduction Programs Under the Clean Air Act Amendments." MAPI Hazardous Materials Management Council, Washington, D.C., 1993.

Phinney, S.L., Testimony Before House Government Operations Subcommittee, 1993.

Phinney, S.L., Moderator, The Clean Air Act, A Public Forum, Sacramento, California, 1993.

Phinney, S.L., Plenary Session Chairperson and Speaker, "Business and the Environment: Must You Sacrifice One for the Other?" National Association of Environmental Professionals Conference, Seattle, Washington, 1992.

Phinney, S.L., "Facing the Challenge: The New California EPA." HazMat Northern California Conference, San Jose, California, 1992.

Phinney, S.L., "Understanding the Client Perspective." Environmental Business Conference, Pasadena, California, 1991.

Phinney, S.L., Panelist – Women of Science: Secrets of Success. Workshop, AAAS Annual Meeting, Washington, D.C., 1991.

Phinney, S.L., Keynote Address, ADPA International Symposium on Compatibility and Processing, San Diego, California, 1991.

Phinney, S.L., Keynote Address, Women in Science and Technology Conference, Jackson, Mississippi, 1991.

Phinney, S.L., Guest Speaker, Sacramento County Bar Association, Environmental Law Section, Sacramento, California, 1991.

Phinney, S.L., "Managing CERCLA Compliance from the Corporate Perspective." Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Phinney, S.L., and C.A. Fegan, "Identifying a Feasible, Effective Treatment Method for an Unusual Chemical of Concern." Proceedings, American Defense Preparedness Association 16th Environmental Symposium, New Orleans, Louisiana, 1988.

Phinney, S.L., "A Proactive Superfund Cleanup by Industry." Proceedings of the 4th Annual Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Thompson, C.H., S.L. Phinney and F.R. McLaren, "Aerojet: A Regional Site Program – Problem Definition." Proceedings of the Hazardous Waste and Environmental Emergencies Conference, Cincinnati, Ohio, 1985.

Kahane S.W., S.L. Phinney and A. Wright, "The Tightening Environmental Regulatory Climate for Hazardous Waste Management – Current Mandates and Future Directions for Industrial Compliance." Proceedings of the 1984 AlChE Summer National Meeting, Philadelphia, Pennsylvania, 1984.

Bachrach, A., D.M. Morycz, S.L. Phinney and S.W. Kahane, "Regulation and Offshore Oil and Gas Facilities." In: Emerging Energy/Environmental Trends and the Engineer. Eds. R.D. Nuefeld and R.W. Goodwins, 1983.

Lindberg, R.G., S.L. Phinney, J. Daniels and J. Hastings (eds)., "Environmental Assessment of the U.S. Department of Energy's Solar Thermal Technology Program." Prepared for the U.S. Department of Energy, June 1982.

Kahane, S.W., S.L. Phinney, J.A. Hill and R.C. Sklarew, "Key Considerations in Assessing the Air Impacts of Projected Outer Continental Shelf Oil and Gas Development," presented at the 74th Annual Air Pollution Control Association Meeting, Philadelphia, Pennsylvania, 1981

Phinney, S.L., "The U.S. Environmental Protection Agency's Pesticide Registration Program: A Case Study – Chloramben." Doctoral Dissertation, Environmental Science and Engineering Program, University of California, Los Angeles, California, 1981.

Phinney, S.L., (contributing author) et al. "Institutional Barriers to Wastewater Reuse in Southern California." Environmental Science and Engineering Report Prepared for the Office of Water Research and Technology, U.S. Department of the Interior, 1979.

Phinney, S.L., "Area-Restricted Feeding in American Plaice." Masters Thesis. Dalhousie University, Halifax, Nova Scotia, Canada, 1975.

DECLARATION OF

Testimony of Dal Hunter, Ph.D., C.E.G.

I, **Dal Hunter, Ph.D., C.E.G.,** declare as follows:

1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as 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** for the **Palmdale Hybrid 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: November 19, 2010 Signed: _____

At: Black Eagle Consulting, Inc.
Reno, Nevada

REGISTERED GEOLOGIST
ROBERT DALTON HUNTER
No. 1411
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

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Robert D. Hunter, Ph.D., C.E.G.
Engineering Geologist
Vice President

Education

- Ph.D. – Geology – 1989 – University of Nevada, Reno
- M.S. – Geology – 1976 – University of California - Riverside
- B.S. – Earth Science – 1972 – California State University, Fullerton

Registrations

- Professional Geological Engineer – Nevada
- Registered Geologist – California
- Certified Engineering Geologist – California

Experience

1997 to Present: Black Eagle Consulting, Inc.; Vice President. Dr. Hunter is in charge of all phases of geochemical, geological, and geotechnical projects and is responsible for conducting, coordinating, and supervising geotechnical investigations for public and private sector clients. He is very familiar with design specifications and state and federal requirements.

Dr. Hunter has also provided geological, geotechnical, and paleontological review and written and oral testimony for California Energy Commission (CEC) power plant projects including:

- El Segundo Power Redevelopment Project (Coastal, including testimony and compliance monitoring)
- Magnolia Power Project (including compliance monitoring
- Ocotillo Energy Project (Wind Turbines)
- Vernon-Malburg Generating Station
- Inland Empire Energy Center (including testimony and compliance monitoring)
- Palomar Energy Project
- Henrietta Peaker Project
- East Altamont Energy Center
- Avenal Energy Center
- Teayawa Energy Center monitoring
- Walnut Energy Center (including compliance monitoring
- Riverside Energy Resource Center
- Salton Sea Unit 6 (Geothermal Turbines)
- National Modoc Power Plant
- Pastoria Energy Center
- Sun Valley Energy Project
- El Centro Unit 3 Repower Project
- AES Highgrove Project
- South Bay Replacement Project
- Vernon Power Plant

- Humboldt Bay Repowering Project
- Victorville Power Project
- Carlsbad Energy Center
- San Gabriel Generating Station
- Orange Grove
- Chula Vista Energy Upgrade
- Carrizo (Solar)
- Kings River
- Canyon Power Plant
- Otay Mesa Generating Project (compliance monitoring)
- Montainview Power Plant Project (compliance monitoring)
- Consumes Power Plant (compliance monitoring)
- Sunrise Power Project (compliance monitoring)
- Niland Power Project (compliance monitoring)
- Panoche Power Plant (compliance monitoring)

Attended Expert Witness Training Sponsored by CEC.

1978 to 1997: SEA, Incorporated; Geotechnical Manager, Engineering Geologist. Dr. Hunter was in charge of all phases of geotechnical projects for SEA, including project coordination and supervision, field exploration, geotechnical analysis, slope stability analysis, soil mechanics, engineering geochemistry, mineral and aggregate evaluations, and report preparation. Numerous investigations were undertaken on military, commercial, industrial, airport, residential, and roadway projects. He worked on many geothermal power plants, providing expertise in foundations design, slope stability, seismic assessment, geothermal hazard evaluation, expansive clay, and settlement problems. Project types included high-rise structures, airports, warehouses, shopping centers, apartments, subdivisions, storage tanks, roadways, mineral and aggregate evaluations, slope stability analyses, and fault studies.

1977 to 1978: Fugro (Ertec) Incorporated Consulting Engineers and Geologists; Staff Engineering Geologist; Long Beach, California.

Affiliations

- Association of Engineering Geologists

Publications

- Hunter, 1988, *Lime Induced Heave in Sulfate Bearing Clay Soils*, Journal of Geotechnical Engineering, ASCE, Vol. 14, No. 2, pp. 150-167.

- Hunter, 1989, *Applications of Stable Isotope Geochemistry in Engineering Geology*: Proceedings of the 25th Annual Symposium on Engineering Geology and Geotechnical Engineering.

- Hunter, 1993, *Evaluation of Potential Settlement Problems Related to Salt Dissolution in Foundation Soils*: Proceedings of the 29th Annual Symposium on Engineering Geology and Geotechnical Engineering.

DECLARATION OF
LAIPING NG

I, Laiping Ng declare as follows:

1. I am presently employed by the California Energy Commission in Strategic Transmission Planning Office of the Siting, Transmission & Environmental Protection Division as an Associate 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 Palmdale Hybrid 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: _____ Signed: _____

At: Sacramento, California

Laiping Ng
Associate Electrical Engineer

Education:

Master of Science: Electrical Engineering - Power
California State University, Sacramento. December 1997.

Bachelor of Science: Electrical Engineering - Power
California State University, Sacramento. May 1991.

Power Certificate – EPRI, May 1991

Experience:

April 1999 – Present:

- Review and evaluate electrical transmission system sections of the application to ensure that the transmission engineering aspects of the power plant, switchyards, substations, and the related facilities comply with applicable laws, ordinances, regulations, and standards (LORS).

- Prepare written analysis, which address the issues of the adequacy of proposed projects to meet applicable LORS.

- Perform load flow studies and fault analysis.

- Coordinate with CAISO, WSCC and other regulatory agencies and coordinate with utilities companies in the review and evaluation of the power plant siting process.

May 1991 – April 1999:

- Prepared engineering bid specifications for recommended lighting and HVAC projects. Evaluated contractor bids and recommended contractors to customers. Reviewed RFPs and RFQs. Evaluated, selected, and managed engineering consultants. Administrated and coordinated contracts.

- Designed electrical systems for indoor and outdoor lighting and lighting controls. Assisted in design cooling systems and controls for school buildings and office buildings. Reviewed and checked electrical lighting designs and drawings. Analyzed designs and made recommendations for effective actions.

- Performed facility energy audits and field surveys on schools, offices, hospitals and county jail facilities to identify energy efficiency improvements and cost estimate with respect to lighting and HVAC systems. Inspected lighting and HVAC system equipment installation.

- Worked with regulatory agencies to conduct day-to-day basis works such as participated in Nonresidential Energy Efficiency Standards development teams. Prepared and updated Standards concentrating on interior building illumination and indoor and outdoor flood lighting.

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 the **Transmission System Engineering** and **Alternatives** for the **Palmdale Hybrid Power Project** (08-AFC-9) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: Sacramento, California

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
Hedy Koczwara

I, **Hedy Koczwara** declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities **Siting OFFICE** of the Systems Assessments and Facilities Siting Division as a **Staff Professional**.

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 **Alternatives** for the Palmdale Hybrid Power Plant (08-AFC-09) 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: November 22, 2009 Signed: _____

At: San Francisco, California

HEDY KOCZWARA
Associate Environmental Scientist

ACADEMIC BACKGROUND
M.S., Earth Systems, Stanford University, 2001
B.S., Earth Systems, Stanford University, 2000

PROFESSIONAL EXPERIENCE

Ms. Koczwara is an environmental scientist with management and technical experience preparing Environmental Impact Reports and Statements in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Her project experience includes both linear and site-specific projects such as transmission lines, pipelines, power plants, and infrastructure development and improvement projects. She prepares technical analyses, coordinates with specialty subcontractors, and she provides management support in client interaction, public involvement, and supervises overall document coordination. She has performed the alternatives analysis for several power plant siting cases and controversial transmission line projects, which ultimately incorporated alternatives developed during the screening process into the approved project design.

Aspen Environmental Group — 2002 to present

- **California Energy Commission (CEC).** Under Aspen's CEC contract, Ms. Koczwara is an author and technical specialist in the environmental review of power plant applications. She researches and writes planning and siting reports, such as alternative analyses, in compliance with CEQA and NEPA. Each alternative site evaluation involves identifying potential locations that would meet most of the objectives stated by the applicant, but that could have less impact on the environment. Analyses have included the following proposed power plants and reports:
  - **Sentinel Power Plant (2007-ongoing).** Project manager, researcher, and writer of the Socioeconomic analysis for this proposed 850 MW power plant in unincorporated Riverside County near Desert Hot Springs.
  - **CEC Power Plant Siting Alternatives Analyses.** Ms. Koczwara has researched, updated, and written the alternatives analyses for the following 11 power plant siting projects: Palmdale Hybrid Power Plant; South Bay Replacement Project (SBRP); Avenal Energy Power Plant Project; San Francisco Electricity Reliability Project (SFERP); Blythe Energy Project, Phase Two; East Altamont Energy Center; El Segundo Power Redevelopment Project; El Segundo Cooling Options Report; Roseville Energy Facility Power Plant Project; SMUD Cosumnes Power Plant Project; and SMUD Cosumnes Cooling Options Report.
  - **Colusa Generating Station (CGS) Project (2007)**. Project manager, researcher, and writer of the Transmission System Engineering Assessment, which is attached as an appendix to the Staff Assessment and analyzes the indirect impacts of future reconductoring of the 8.75-mile Shasta-Flanagan-Keswick 230 kV transmission line and associated substation upgrades. The reconductoring project would be required as a result of the CGS project for the plant to operate at full capacity. The Final Staff Assessment was released on November 30, 2007.
  - **Chevron Richmond Power Plant Replacement Project (2007-2008).** Project manager, researcher, and writer of the Socioeconomic analysis for Chevron's proposed addition of 60 MW net generation to its existing Refinery electrical generation located within Chevron's Richmond Refinery in the City of Richmond in Contra Costa County. The Applicant withdrew its SPPE application in September 2008.

- **Blythe Energy Project Transmission Line Modifications (2004-2006).** Researched and wrote the alternatives analysis and coordinated on the level and scope of the alternatives analysis between the CEC (CEQA lead agency) and the two NEPA lead agencies, the Western Area Power Administration and U.S. Bureau of Land Management, was required for this joint Staff Assessment/Environmental Assessment. More than 23 alternatives were considered, and five transmission alternatives, plus the No Project Alternative/Action, were carried through for full evaluation.
- **WESTCARB Carbon Sequestration Demonstration Projects (2005-present).** Ms. Koczwara researched and wrote one CEQA Initial Study and three USDOE environmental documents for multi-site, multi-state pilot studies and preliminary investigations of methods for sequestering CO2 at terrestrial sites and in geologic formations for the Public Interest Energy Research (PIER) group at the CEC.
- **Comparative Study of Transmission Alternatives Background Report (2004).** Researched and wrote portions of the draft report, which presents background information related to transmission alternatives and the transmission planning process. The information in the report is being used to assess potential approaches to evaluation of non-transmission alternatives to transmission projects. Ms. Koczwara also attended the public workshop where the report was disseminated. The workshop was a forum for discussion regarding transmission alternatives methodology. Following the workshop, Ms. Koczwara prepared a summary of the workshop and comments received as an appendix to the final white paper report.
- **Hydroelectric Energy/Environment Report (2003).** Collected and logged data on over 200 hydroelectric power plants from FERC licenses. The final draft of the report was published in October 2003.
- **Coastal Study (2003).** Researched and wrote the alternative cooling technologies section for a statewide evaluation of California's 25 coastal power plants. The report was used to facilitate licensing of repower and replacement projects by providing better pre-filing guidance to developers, and minimizing data adequacy and other issues that could delay licensing.

- **Sunrise Powerlink Project EIS/EIR, California Public Utilities Commission (CPUC) and Bureau of Land Management (BLM).** Under contract to the CPUC, and under a Memorandum of Understanding with the Bureau of Land Management (BLM), Ms. Koczwara has provided management support, attended public meetings, and has written numerous EIR/EIS sections for a highly controversial 150-mile transmission line from Imperial County to coastal San Diego County. The 500 kV line would pass through Anza-Borrego Desert State Park, and a 230 kV line would continue through rural San Diego County with both overhead and underground segments. Ms. Koczwara researched and analyzed route segment alternatives for a comprehensive Alternatives Screening Report that screened over 100 alternatives, 27 of which were carried forward for full evaluation. Ms. Koczwara also wrote the Socioeconomics, Services, and Utilities section and the setting and impacts for Connected Actions, Future Transmission Expansion, Cumulative Impacts, among others. She managed the writing of the Environmental Justice analysis and was responsible for compiling and writing the Comparison of Alternatives, which identified the overall Environmentally Superior Alternative out of 27 route segments, options, transmission and system alternatives and non-wire alternatives. She also wrote the BLM Record of Decision and is assisting with implementation of the Mitigation Monitoring Compliance and Reporting Program.
- **CPUC When-Needed Environmental Services, CPUC.** Project Manager, Public Involvement Specialist, and/or technical writer for Socioeconomics, Public Utilities and Environmental Justice for Aspen's on-call contract for provision of CEQA services to the CPUC's Energy Division. Currently Project Manager for PG&E's Seventh Standard 115/21 kV Substation Project in Bakersfield.
- **Riverway Substation Project MND, CPUC (2007)**. As Deputy PM, Ms. Koczwara wrote the Project Description, website content, and assisted with all-around management support for this

substation project in Visalia. SCE proposed to built a 1.7-acre 66/12 kV low-profile substation and approximately 1,200 feet of underground 66 kV subtransmission lines.

- **Devers-Palo Verde No. 2 Transmission Line Project EIR/EIS, CPUC and BLM**. Ms. Koczwara served on the project management team and in this role she managed preparation of the 100-page Alternatives Screening Report, which evaluated and screened over 30 alternatives. She also prepared the Introduction, Alternatives, and part of the Executive Summary sections for the EIR/EIS. The EIR/EIS evaluated a proposed 280-mile 500 kV and 230 kV transmission line between the Palo Verde generating hub in Arizona and SCE's system in Riverside County.

- **Jefferson-Martin 230 kV Transmission Line Project EIR, CPUC**. Ms. Koczwara served as the assistant to the Project Manager on this major and controversial 27-mile transmission line through scenic San Mateo County in the Hwy 280 corridor, urban Colma and Daly City, and across San Bruno Mtn. This high profile project is an essential component of San Francisco's energy supply, and involved coordination with numerous local and regional jurisdictions, as well as the development of 38 alternatives including the No Project Alternative into a 200-page Alternatives Screening Report.

- **South San Joaquin Irrigation District's (SSJID) Acquisition of the Pacific Gas and Electric Company System, San Joaquin County.** On behalf of San Joaquin County, Aspen prepared an application and an EIR on SSJID's proposal to acquire specific electric distribution assets currently owned and operated by PG&E within southeastern San Joaquin County. Responsible for writing the Socioeconomics, Visual, Cultural Resources, Land Use, Public Services/Utilities, Agricultural Resources, and Recreation sections for the application and prepared the same sections for the EIR. The EIR was certified in June 2006.

- **Kirby Hills Natural Gas Storage Facility IS/MND, CPUC**. As Deputy Project Manager, Ms. Koczwara was responsible for the research and writing of the Aesthetics, Agricultural Resources, Population and Housing, Public Services, and Utilities and Service Systems sections of the IS/MND for the proposed use of a depleted gas reservoir in Solano County, for the temporary storage of natural gas by Lodi Gas. The project consists of the drilling of 10 injection/withdrawal wells, and the construction of 7 miles of pipeline and ancillary facilities. A CPCN was granted in March 2006.

PREVIOUS EXPERIENCE

Ms. Koczwara was a Facilities Coordinator at *Publicis and Hal Riney* from November 2001 to May 2002. She managed the daily office operations of a 14-department, 300-person advertising company and organized the scheduling, setup, and operation of client meetings and company events. She also has worked as a laboratory and fieldwork researcher at Stanford University (Palo Alto, California) and James Cook University (Townsville, Australia) from 1999 to 2001. Her work focused primarily on biological, ecological, and marine geochemical analyses.

TRAINING AND PROFESSIONAL ORGANIZATIONS

- 2006 Environmental Award for Los Angeles Unified School District's New School Construction Program EIR (certified in June 2004), American Planning Association (APA), Los Angeles Section
- 2004 AEP Outstanding Environmental Analysis Document, Jefferson-Martin Final EIR
- 2009 AEP Outstanding Environmental Analysis Document Merit Award, Sunrise Powerlink Project EIR/EIS
- *UC Davis Extension Courses Attended*: Planning in California: An Overview and Update; GIS for Resource Managers and Professionals; National Environmental Policy Act Overview and Refresher, Making Effective Use of Mitigated Negative Declarations, and California Environmental Quality Act Two-Day Workshop.

DECLARATION OF
Chris Davis

I, Chris Davis, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Compliance Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **General Conditions Including Compliance Monitoring and Closure Plan** for the **Palmdale Hybrid Power Project** (08-AFC-9) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 5, 2010

Signed: _____

At: Sacramento, California

Chris Davis

California Energy Commission
1516 Ninth St., MS-2000
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Professional Experience

January 2008 to present

California Energy Commission
Planner III Compliance Project Manager – Oversee power plant construction. Process amendments to Energy Commission project certifications. Direct technical staff in tasks related to compliance issues regarding power plant project design, construction, operation, and associated environmental issues. Work with power plant operators, public agencies, community groups, engineering, legal and technical staff to identify and resolve issues.

2007-2008

California Energy Commission
Energy Specialist I – Education and outreach for the New Solar Homes Partnership (NSHP) and the Building Standards Office. Developed fact sheets on proposed changes to the 2008 building standards and a tutorial on how to use the PV Calculator to figure photovoltaic system power production and expected incentives. Wrote case study, articles and Web pages explaining various aspects of the NSHP program. Certified by CalCERTS (California Energy Rating and Testing Services) as a Home Energy Rating System (HERS) rater for photovoltaic systems. Organized, developed materials and staffed Energy Commission booth/tables for conferences put on by California Building Energy Consultants (CABEC), California Building Officials (CALBO) and International Air Conditioning Institute (IHACI).

2005-2007

State Water Quality Control Board
Information Officer I - Liaison between State Water Board, as well as Central Valley Regional Water Board, and media. Issues included waste (NPDES) permits, groundwater contamination and treatment, once-through cooling, emerging contaminants, contaminated beaches, stormwater containment, and areas of special biological significance. Organized, produced and served as master of ceremonies for presentations of grant awards to repair watersheds, practice sustainable forestry and construct water treatment facilities.

2005-2008

California Energy Commission
Information Officer I – Joined the Energy Commission media office during California's power crisis. Liaison between Energy

Commission and media in the area of power plant licensing. Wrote news releases about projects as they reached milestones in the approval and construction process, including a number of releases for Governor's office about new facilities beginning operations. Initiated and developed Power Plant Fact Sheet, in cooperation with Siting Office manager.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
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APPLICATION FOR CERTIFICATION
For the *PALMDALE HYBRID POWER PROJECT*

Docket No. 08-AFC-9

PROOF OF SERVICE
(Revised 10/6/2010)

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DECLARATION OF SERVICE

I, Chris Marxen, declare that on, December 22, 2010, I served and filed copies of the attached (08-AFC-9) Palmdale – Final Staff Assessment. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [http://www.energy.ca.gov/sitingcases/palmdale/index.html]. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

For service to all other parties:

X____ sent electronically to all email addresses on the Proof of Service list;

_____ by personal delivery;

X____ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses NOT marked "email preferred."

AND

For filing with the Energy Commission:

X___ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);

OR

____depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-9
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Original Signature in Dockets
Chris Marxen