Preliminary Staff Assessment
Volume 2

PALMDALE HYBRID POWER PROJECT

Application For Certification (08-AFC-9)

CALIFORNIA ENERGY COMMISSION

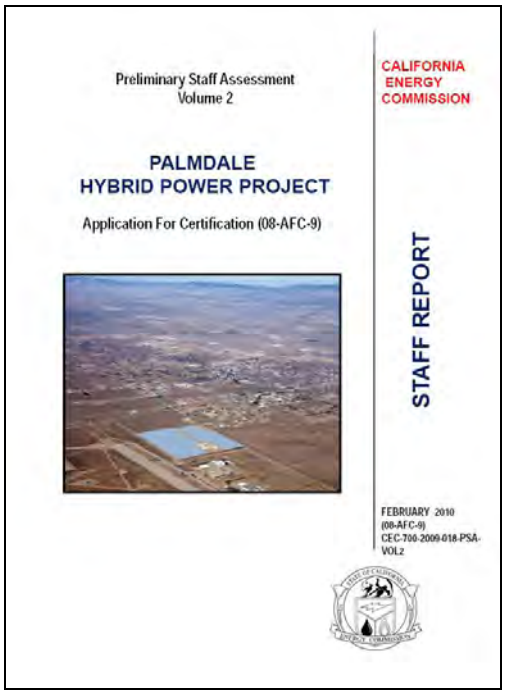
DOCKET
08-AFC-9

DATE
RECD FEB 9 2010

STAFF REPORT

FEBRUARY 2010
(08-AFC-9)
CEC-700-2010-001-PSA

PROOF OF SERVICE (REVISED 10/1/09) FILED WITH
ORIGINAL MAILED FROM SACRAMENTO ON 2/9/10
HA



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PALMDALE HYBRID POWER PROJECT
(08-AFC-9)
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EXECUTIVE SUMMARY

Felicia Miller

INTRODUCTION

This Preliminary Staff Assessment (PSA) contains the California Energy Commission staff's independent evaluation of the Palmdale Hybrid Power Project (PHPP) Application for Certification (08-AFC-9). The PSA examines engineering, environmental, public health and safety aspects of the PHPP project, based on the information provided by the applicant (City of Palmdale) and other sources available at the time the PSA was prepared. The PSA 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 agency under CEQA, and its process is functionally equivalent to the preparation of an EIR. After a 30-day public comment period on the PSA, staff will issue its testimony in the form of the Final Staff Assessment (FSA).

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

This PSA is not the decision document for these proceedings nor does it contain findings of the Energy Commission related to environmental impacts or the project's compliance with local/state/federal legal requirements. The FSA will be the next iteration of staff's analysis, and will serve as staff's testimony in evidentiary hearings to be held by the Committee of two Commissioners who are hearing this case. After evidentiary hearings, the Committee will consider the recommendations presented by staff, the applicant, all parties, government agencies, and the public prior to proposing its decision. The full Energy Commission will make the final decision, including findings, after the Committee's publication of its proposed decision.

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 East Avenue M.

Construction of the proposed PHPP would require permanent use of 333 acres at the power plant site, located immediately north and west of the combined facilities of Los Angeles/Palmdale Regional Airport and Air Force Plant 42. Air Force Plant 42 supports facilities for the production, engineering, final assembly and flight testing of high performance aircraft. 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 PHPP will be developed on a vacant and undeveloped site in an industrial area of the city of Palmdale. The site is currently zoned industrial. The site is relatively flat with the main population base of the community of Palmdale approximately 4 miles to the south. The proposed site is comprised of multiple parcels already owned by the City of Palmdale. 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 in the Big Creek/Ventura Load 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 percent. 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 Mojave Desert Air Quality Management District and be issued a Determination of Compliance from the Air District.

The applicant has proposed a 35.6-mile long transmission line consisting of two segments. 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 Southern California Edison (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.

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. The applicant provided the details of the proposed support structures as related to line safety, maintainability, and field reduction efficiency.

Natural gas would be delivered to the project through a new 8.7-mile gas line that will be designed and constructed by the Southern California Gas Company (SCGC). SCGS's natural gas system represents a resource of considerable capacity, and offers access to an adequate supply of gas to the project.

The PHPP proposes using secondary-treated water for construction and tertiary-treated water for plant operations, including cooling. Los Angeles County Waterworks would supply this water from a new, 7.4 mile tertiary water supply pipeline. Drinking water would also be supplied by the Waterworks by a new, 1 mile long pipeline connecting to an existing Waterworks potable water service pipeline.

A Zero Liquid Discharge (ZLD) system would be used to process the plant's industrial wastewater, thereby eliminating this as a source of wastewater production. Sanitary wastewater would be recycled through the Los Angeles County Sanitation District sewer system. The project proposes a new 1.0 mile pipeline which will connect with an existing sewer line just north of the project. Best Management Practices would be employed during construction and plant operations to minimize soil erosion and control storm water.

Process wastewater would be treated using a 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 of at an appropriately permitted offsite disposal facility.

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 were 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 agencies in the workshop included the applicant, CA Department of Water Resources, Southern California Edison, Los Angeles County Waterworks and Los Angeles County Farm Bureau. In addition to this workshop, extensive coordination has also occurred with numerous other local, state and federal agencies that have an interest in the project including CalTrans, Antelope Valley Air Quality Management District (AVAQMD), U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), U.S. Environmental Protection Agency (USEPA) and the Federal Aviation Administration (FAA). Staff has also considered the comments of intervenors, community groups, and individual members of the public.

ENVIRONMENTAL JUSTICE

California law defines environmental justice as "the fair treatment of people of all races, cultures and income with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" (Government Code Section 65040.12 and Public Resources Code Section 72000).

All Departments, Boards, Commissions, Conservancies and Special Programs of the Resources Agency must consider environmental justice in their decision-making process if their actions have an impact on the environment, environmental laws, or policies. Such actions that require environmental justice consideration may include:

- Adopting regulations;
- Enforcing environmental laws or regulations;
- Making discretionary decisions of taking actions that affect the environment;
- Providing funding for activities affecting the environment; and
- Interacting with the public on environmental issues

In considering environmental justice in energy facility siting cases, staff uses a demographic screening analysis to determine whether a low-income and/or minority population exists within the potentially affected area of the proposed site. The demographic screening is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (Council on Environmental Quality, December, 1997) and *Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses* (U.S. Environmental Protection Agency, April, 1998). The screening process relies on Year 2000 U.S. Census data to determine the presence of minority and below-poverty-level populations.

Environmental Justice: Guidance Under the National Environmental Policy Act, defines minority individuals as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population is identified when the minority population of the potentially affected area is (1) greater than 50 percent; or (2) or when one or more U.S. Census blocks in the potentially affected area have a minority population of greater than 50 percent.
In addition to the demographic screening analysis, staff follows the steps recommended by the U.S. EPA's guidance documents which are: outreach and involvement; and if warranted, a detailed examination of the distribution of impacts on segments of the population.

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

As a result of staff's analysis, staff determined there are no environmental justice issues for the proposed Palmdale Hybrid Power Project. Staff identified the following economic benefits from the project: capital costs; construction and operation payroll; property taxes, sales taxes; and school impact fees.

STAFF'S ASSESSMENT OF THE PROPOSED PROJECT'S IMPACTS

Each technical area section of the PSA contains a discussion of the project setting, impacts, and where appropriate, mitigation measures and proposed conditions of certification. The PSA includes staff's assessment of:

- the environmental setting of the proposal;
- impacts on public health and safety, and measures proposed to mitigate these impacts;
- environmental impacts, and measures proposed to mitigate these impacts;
- the engineering design of the proposed facility, and engineering measures proposed to ensure the project can be constructed and operated safely and reliably;
- project closure;
- project alternatives;

- compliance of the project with all applicable laws, ordinances, regulations and standards (LORS) during construction and operation;
- environmental justice for minority and low income populations;
- proposed conditions of certification; and
- recommendation on project approval or denial.

SUMMARY OF PROJECT RELATED IMPACTS

Staff believes the project, as currently proposed, including the applicant's and the staff's proposed mitigation measures and the staff's proposed conditions of certification, the PMPP project would not comply with all applicable laws, ordinances, regulations, and standards (LORS). Staff's preliminary conclusions are that significant adverse direct, indirect or cumulative impacts are not likely to occur in many of the technical areas, although eight technical areas are currently undetermined with respect to mitigation of potential impacts. For a more detailed review of potential impacts, see staff's technical analyses in the PSA. The status of each technical area is summarized in the table below.

The discussion following the table identifies the technical areas in the PSA that staff has identified as having outstanding issues that in order to resolve require either additional data, further discussion and analysis or are awaiting conditions from a permitting agency prescribing mitigation.

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	No	**Undetermined**
Biological Resources	No	**Undetermined**
Cultural Resources	No	**Undetermined**
Efficiency	Yes	Yes
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes
Hazardous Materials	Yes	Yes
Land Use	No	**Undetermined**
Noise	Yes	Yes
Public Health	Yes	Yes
Reliability	Yes	Yes
Socioeconomic Resources	Yes	Yes
Soil & Water Resources	No	**Undetermined**
Traffic & Transportation	No	**Undetermined**
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	No	**Undetermined**
Visual Resources	No	**Undetermined**
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

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)). Because staff cannot reach a conclusion about the impacts associated with eight technical areas, staff cannot conclude if any of the alternatives examined would be superior to the proposed project.

Three alternative sites were analyzed that are similar to the proposed project in size and land characteristics. All alternative sites are located within reasonable proximity to infrastructure connections (i.e., transmission lines, gas lines, and water lines). All three alternative sites are in land use areas zoned industrial, but appear to greater disadvantages than advantages when compared to the proposed project. If for any reason a transmission line to Vincent 500/230 kV substation is found to be infeasible or substantially altered, then the conclusions regarding site alternatives may change.

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 the 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 photo voltaic 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.

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 would it contribute to the development of renewable energy for the state and region as a whole.

Staff's impact analysis is undetermined for eight technical areas due to missing information and some unresolved issues. When the impact picture is clear to staff, it will be able to compare the project with the "No Project Alternative" and consider whether "No Project" is superior.

AIR QUALITY

The PHPP would be located in the Antelope Valley Air Quality Management District (AVAQMD), but because of limited availability of ozone precursor Emissions Reduction Credits (ERCs) in the Mojave Desert Air Basin, the City will rely on ERCs from the San Joaquin Valley Air Pollution Control District (SJVAPCD). The applicant, however has not identified specific credits nor has the SJVAPCD confirmed in writing that the transfers could occur. Staff needs identification of specific credits, and confirmation that the credits could be transferred, and what applicable distance or offset ratio that will be applied by the air districts. In the past, SJVAPCD has been reluctant to transfer ERCs to a competing jurisdiction as they are an important component of economic development to an air district. As a result, staff cannot determine that the significant air quality impacts would be mitigated to a less than significant.

Use of ERCs from the SJVAPC to mitigate the facility of oxides of nitrogen (NOx) and volatile organic compounds (VOC) emissions contributions to existing violation of ozone air quality standards would comply with LORS, if 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.

ERCs that originate in the SJVAPCD are subject to the governing requirements of the SJVAPCD, including Rule 2201, which 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 increase and the SJVAPCD has reviewed the permit conditions issued by the district in which the proposed offsets are obtained. The District must certify that such offsets meet the requirements of this rule and Health and Safety Code section 40709.6. Since the project site is almost 50 miles from the AVAQMD/SJVAPCD border, potential sources of SJVAB ERCs might be very limited. Staff would look for guidance from SJVAPCD on implementation of their Rule 2201 on inter-district transfers, if applicable.

BIOLOGY

Development of the power block 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 caused by the permanent loss of 416.11 acres of native and non-native plant communities which support a broad diversity of plants and wildlife and have the potential to support several special-status wildlife species.

The applicant characterized the PHPP and linear facilities as impacting the following nine plant communities: Mojave Creosote Bush Scrub, Joshua Tree Woodland, Desert Saltbrush Scrub, Rabbitbrush Scrub, Mojavean Juniper Scrub, Mojave Riparian Forest, Mojave Desert Wash Scrub, Agricultural Lane and Orchards, and Urban and Disturbed/Developed Land. Staff noted, however that several other plant communities in the project alignment include California Annual Grasslands, Big Basin Scrub, Riparian

Scrub and various coastal/Desert scrub communities. While elements of these communities can be components of other plant communities, this information was not presented in the biological data provided by the applicant.

In addition, vegetation mapping errors were also noted in areas mapped as Mojavean Juniper Woodland, as well as the transmission line alignment between Little Rock Creek and the Vincent Substation, which is in the post-burn recovery stage.

Listed plants were not identified in the project area. Only one California Native Plant Society List 4 species was observed by the applicant during botanical surveys of the project area; however, the location and abundance of this plant was not provided. Staff is concerned that while the annual rainfall in the region was adequate to detect rare plants, the timing of the surveys would have missed early blooming desert plants. Staff is also concerned that rare plant surveys were conducted by wildlife biologists rather than qualified botanists.

Construction of power block and linear facilities also has potential for impacts to listed species including desert tortoise, Mohave ground squirrel, and Swainson's hawk. Although not detected in the project area, the applicant has elected to consider the Mohave ground squirrel as being present in the project area. Tortoise was not detected in the project area, but Swainson's hawk was observed by both CDFG and staff in the project site and transmission line corridor during project surveys. Potential take of desert tortoise and Mohave ground squirrel and loss of habitat for these species would be fully mitigated with implementation of staff's proposed Conditions of Certification (COC).

The COC proposed by staff for listed species would meet the requirements of impact avoidance and minimization measures, as required by the U.S. Fish and Wildlife Service (USFWS) and the CDFG. Implementation of these conditions would reduce impacts to desert tortoise, Mohave ground squirrel, and Swainson's hawk to less-than-significant levels and would also satisfy CDFG's regulatory requirements. Staff has proposed Conditions of Certification which would likely mitigate compliance with the federal and state Endangered Species Acts (ESA), and other laws, ordinances, regulations, and standards (LORS) impacts to biological resources from the project.

Vehicle access to the transmission line alignment would require grading through State jurisdictional waters. Staff has imposed COCs to reduce potential impacts to jurisdictional features to less-than-significant levels and fulfill CDFG's Lake and Streambed Alteration Agreement.

In review of the information provided by the applicant, staff intends to resolve the issues of mischaracterized vegetation communities, permanent habitat loss, and jurisdictional habitat through the Preliminary Staff Assessment workshops in order to ensure these issues are accurately characterized in the Final Staff Assessment.

CULTURAL RESOURCES

Staff lacks some information it needs to conclude its analysis of cultural resources on and near the project areas and its analysis of the project's potential impacts to cultural resources.

Staff has identified 5 additional previously known archaeological sites whose locations are considered close enough to project areas to make them subject to potential physical impacts. The applicant did not include them among the previously known sites; staff needs this information to make recommendations on the California Register of Historical Resources eligibility of these sites.

The applicant added a 10-foot wide, 8-foot tall, 3,050-foot-long berm intended to mitigate visual impacts along the Avenue M corridor. Staff needs additional information related to the location of the material for the berm and possible cultural survey information related to that material.

The applicant has identified the proposed gen-tie transmission line intersects the Palmdale Ditch and/or an associated bridge. Staff needs additional information on the exact location of the transmission line and access road, and the location of all the poles that would support the conductors spanning any part of feature of the ditch. Staff needs this information to complete their analysis of potential impacts and provide appropriate mitigation, if any would be required.

In addition, the applicant has proposed natural gas and reclaimed water pipelines to run parallel to the Southern Pacific/Union Pacific railroad right-of-way, which could result in impacts to the railroad berm. Staff needs the exact location of the applicant's natural gasline trench and of the pole location, relative to the railroad berm and a scaled map showing this relationship in order to complete its analysis of potential impacts and provide appropriate mitigation, if any would be required.

When staff receives the above information, they expect to conclude that no known cultural resources would be significantly impacted by the proposed project.

LAND USE

The preliminary analysis for the PHPP indicates the project site is compatible with existing on-site or nearby uses, as it is consistent with the general character of permitted uses and planned development in the area. The 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.

The proposed 230 kV transmission line would be constructed in two segments within new and existing rights-of-way (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 the route, approximately 18.2 miles would be within the city of Palmdale and the remaining 5.5 miles would be within unincorporated Los Angeles County. Segment 1 of the transmission line would require a ROW study and a new transmission line ROW in the form of a utility corridor easement for the entire route. The portion of Segment 1

within the city of Palmdale's jurisdiction would require a consistency determination of the proposed facility with applicable city LORS (general plan and zoning), prior to certification of the project. 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.

SOIL AND WATER

In the preliminary analysis for the PHPP, staff has determined that completion of their analysis is subject to outstanding stormwater management issues, final soil berm details, and construction related wastewater are resolved. In addition, an executed agreement for the tertiary treated water must be in place prior to project operation and tertiary treatment facilities and linears completed for timely start up of PHPP.

TRAFFIC AND TRANSPORTATION

The preliminary analysis for the PHPP indicates staff cannot conclude at this time that the PHPP would be in compliance with applicable federal, state and local LORS pertaining to traffic and transportation. The City of Palmdale requires the submittal and approval of a site plan that demonstrates compliance with LORS regarding parking, internal circulation and emergency access, but the applicant has not provided staff with a site plan that has been submitted and approved. Avenue M and other proposed project access routes are located within both jurisdictions, Palmdale and Lancaster, therefore City of Lancaster LORS are applicable to the proposed project and must be considered before staff can conclude the routes meet LORS compliance.

Staff identified project-induced impacts on the region’s transportation system, but cannot conclude at this time that impacts induced by the project would be reduced to less than significant. Staff needs additional information from the applicant to complete its analysis; the applicant did not address Lancaster LORS or demonstrate traffic data provided is consistent with Lancaster traffic counts, traffic data from Lancaster needs to be submitted to staff, and discrepancies resolved regarding signalized traffic intersections.

Staff cannot conclude at this time whether stack heights, vertical velocity plumes and visible water vapor plumes would have an impact on military flight paths and patterns. US Air Force Plant 42 officials expressed some concerns with the stack heights, and staff anticipates Air Force officials will provide formal comments regarding this matter. Staff will consider these comments to complete their analysis on traffic and transportation impacts.

TRANSMISSION SYSTEM ENGINEERING

The PHPP proposes a 35.6 mile 230kV transmission line connecting the project station switchyard to the Vincent Substation. The proposed segment 1 would be 23.7 miles long and located within a new utility corridor from the project to SCE’s Pearblossom substation; segment 2 would be 11.9 miles long and be located between the Pearblossom Substation and Vincent Substation.

Staff has concluded that the outlet and terminations require more definition and further study in order to determine feasibility. Although SCE performed the Tehachapi Queue Cluster Window System Impact Study (SIS) and analyzed the interconnection to the

Vincent Substation, the 11.9-mile segment between the Vincent and Pearblossom Substations was not included in the SIS. This section of line also requires reconductoring to the existing SCE Vincent-Pearblossom 230kV line and relocating this line to the new PHPP double circuit poles. There are several unresolved issues with the proposed interconnection including the existing 230kV line crossing under several 500 kV transmission lines and the assessment of the ground and line clearances, therefore, staff's impact and mitigation conclusions are undetermined.

The Vincent-Pearblossom 230kV line provides electricity to the CA Department of Water Resources Pearblossom Pumping Station. The reconductoring and relocation of this line would have direct impact to the pumping plant while the interconnection takes place, as interconnection activities would result in this line being out of service for an unspecified amount of time.

SCE is planning an upgrade and expansion of its Vincent substation, which is also part of the Tehachapi Renewable Transmission Project (TRTP). The proposed PHPP cannot be connected to the Vincent Substation until the expansion and modification is in place. A Facility Study (FS) is required to evaluate the specific interconnection location, interconnection equipment, and protection equipment at the point of interconnection at the Vincent Substation.

VISUAL RESOURCES

Staff analyzed visual resources related information for the PHPP, 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 direct or cumulative adverse visual resource impact. It would comply with applicable LORS pertaining to visual resources for viewers at Key Observation Point (KOP) 2 and 3. However, an additional simulation from KOP 1 and a new KOP 4 showing an existing view photograph with a simulation will be needed to confirm the project's LORS consistency.

The applicant noted that visible plumes would be generated by the cooling towers. Staff determined the maximum cooling tower plume length is 9,790 meters (approximately 32,000 feet) and is predicted to occur 14 hours per year. Although infrequent, the need for a plume-abated cooling tower is still being considered due to the predicted presence of plumes. Staff has identified some modeling errors that caused the applicant's plume analysis to underestimate the size and frequency of the estimated cooling tower plumes.

NOTEWORTHY PUBLIC BENEFITS

Staff concurs with the applicant regarding the following benefits associated with the PHPP project.

- 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.

CONCLUSIONS

In summary, staff has reached the following conclusions:

- Alternative project sites have been evaluated and staff concluded that none of the alternative sites were superior to the proposed project site.
- Alternative technologies have been evaluated and staff concluded that none of the alternative technologies would provide the public with an efficient, reliable source of electrical power superior to the proposed project.
- The applicant will rely on ERCs from the SJVAPD, but has not identified any specific ERCs, nor has SJVAPD confirmed in writing that the transfers could occur.
- Development of the power block and linear facilities would result in direct and indirect impacts to native vegetation and wildlife caused by the permanent loss of over 416 acres of land.
- Potential impacts to cultural resources may exist, but staff is unable to conclude their analysis without additional information.
- The project site is in conformance with local zoning requirements, however Segment 1 of the transmission line requires a right-of-way study and appropriate zoning in order for staff to complete their analysis.
- Staff has concluded that resolution of outstanding stormwater management issues, final soil berm details, construction-related wastewater issues and an executed agreement for tertiary treated water is required in order to complete their analysis.
- Staff has identified project induced impacts to the region's transportation system related to vertical velocity plumes and visible water vapor plumes which could have an impact on flight paths and patterns.
- The transmission outlet and terminations require more definition and further study in order to determine feasibility.
- Staff has determined that additional KOPs would be necessary to determine if the project is in compliance with applicable LORs. Additional information and analysis is required in order to determine whether the visible plumes generated by the cooling towers will result in a visual impact.

PROJECT DESCRIPTION

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. On October 1, 2008, the City of Palmdale provided a Data Adequacy Supplement to the AFC to satisfy the Energy Commission's informational requirements. 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 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% 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, at the intersection of Sierra Highway and East Avenue M.

Construction of the proposed PHPP would require permanent use of 333 acres at the power plant site, located immediately north and west of the combined facilities of Los Angeles/Palmdale Regional Airport and Air Force Plant 42. Air Force Plant 42 supports facilities for the production, engineering, final assembly and flight testing of high performance aircraft. 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 PHPP will be developed on a vacant and undeveloped site in an industrial area of the city of Palmdale which is currently zoned industrial. The site is relatively flat with the main population base of the community of Palmdale approximately 4 miles to the south. The proposed site is comprised of multiple parcels already owned by the City of Palmdale.

Segment 1 of the transmission line from the PHPP site to the interconnection with 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 SCE's Vincent substation. Most of segment 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.

POWER PLANT EQUIPMENT AND LINEAR FACILITIES

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.

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, 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 Mojave Desert Air Quality Management District and be

issued a Determination of Compliance from the Air District. **Project Description Figure 1** shows an overview of project site and linears, and **Project Description Figure 2** provides a simulation of the proposed project.

ELECTRIC TRANSMISSION LINE

The proposed Palmdale facility would consist of a 35.6-mile long transmission line consisting of two segments. The proposed 23.7 mile 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) water 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. The applicant provided the details of the proposed support structures as related to line safety, maintainability, and field reduction efficiency.

NATURAL GAS SUPPLY LINE

Natural gas would be delivered to the project through a new 8.7-mile gas line that will be designed and constructed by the Southern California Gas Company (SCGC). SCGS's natural gas system represents a resource of considerable capacity, and offers access an adequate supply of gas to the project.

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 from a new, 7.4 mile tertiary water supply pipeline. Drinking water would also be supplied by the Waterworks by a connection 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 offside disposal facility.

Sanitary wastewater will be disposed by connecting to the Los Angeles County Sanitation District's sewer system. The project proposes a new 1.0 mile pipeline which will connect with an existing sewer line just north of the project.

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 (Committee Conference July 2009), tentatively by the end of 2010. Construction is expected to take about 27 months for construction and 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 consist 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.

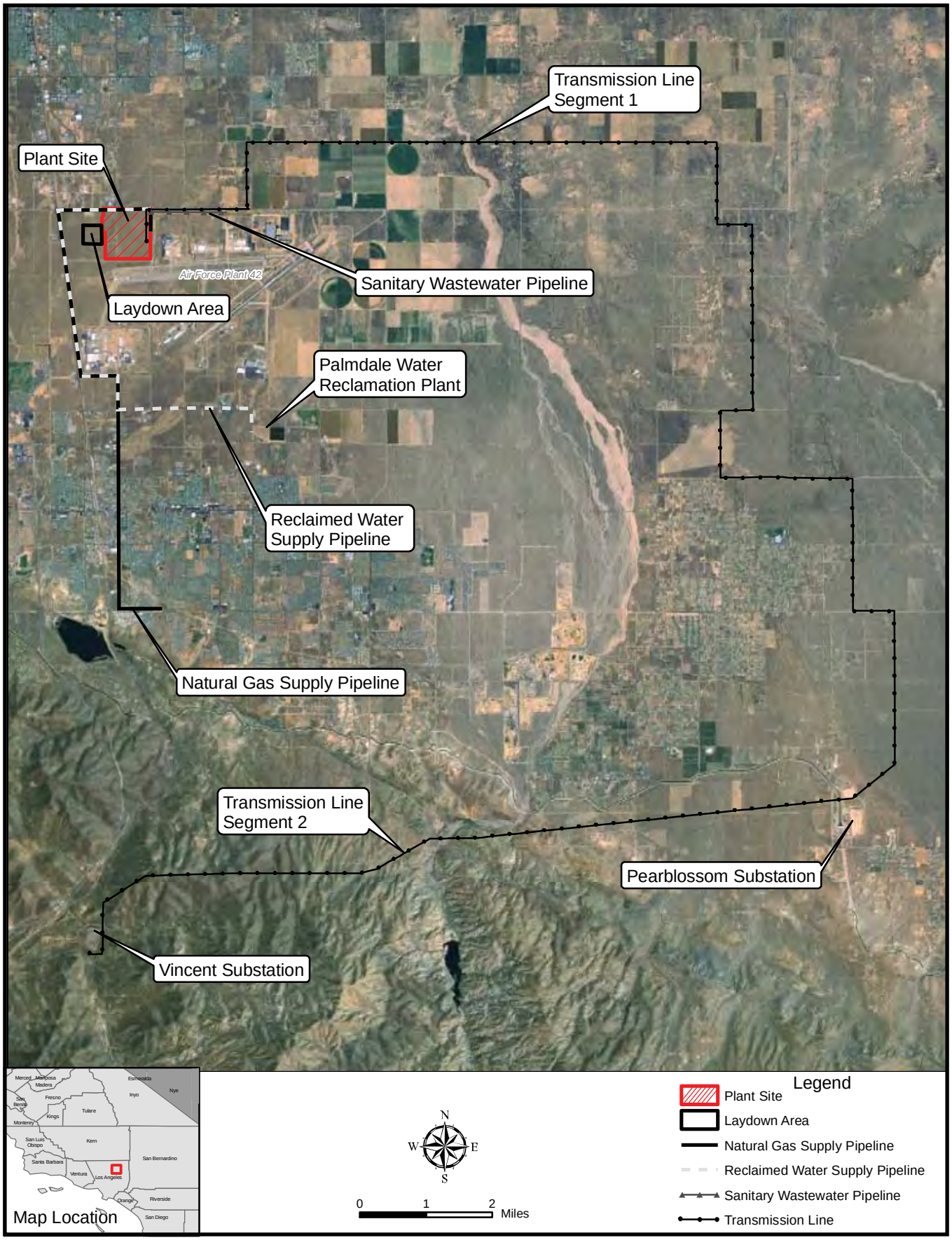
FACILITY CLOSURE

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.

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, FEBRUARY 2010

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, FEBRUARY 2010

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

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Steve Radis

SUMMARY OF CONCLUSIONS

Staff cannot determine that the significant air quality impacts would be mitigated to less than significant, and therefore cannot recommend the project be certified by the Commission as is. While staff believes that with the adoption of the attached conditions of certification the proposed Palmdale Hybrid Power Project (PHPP) could comply with all applicable laws, ordinances, regulations, and standards (LORS), staff does not believe the potential significant air quality-related impacts have been fully mitigated. Currently, no specific emission reductions credits have been identified and not all appropriate air agencies have approved the proposed inter-district emission reduction transfers. Pending identification of specific emission reductions and successful resolution of the inter-district emission reduction transfer, staff would find that:

- The project would comply with applicable Antelope Valley Air Quality Management District Rules and Regulations, including New Source Review requirements (AVAQMD 2009b).
- 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 not 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 the existing violations of the state 24-hour PM10 air quality standard. However, staff has determined that emission reductions from paving of local roads (AQ-SC9) under current regulations could mitigate the project's PM10 and PM10 precursor emissions impacts to a level that is less than significant, if the rules are not challenged.
- The project 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. However, staff has determined that emission reductions from paving of local roads (AQ-SC9) under current regulations would mitigate the project's PM2.5 impacts to a level that is less than significant if the rules are not challenged.

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 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. The proposed PHPP is a hybrid project, and 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.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Air Quality Table 1 summarizes the applicable 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. Staff has incorporated the District conditions in this Preliminary Staff Assessment.

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 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 each PSD criteria pollutant (NO2, CO, PM10, and SO2). 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 the 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	ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling – Generally prohibits idling longer than five minutes for diesel-fueled commercial motor vehicles.

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

Applicable LORS	Description
CCR §2485)	
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 through the PDOC 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 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 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 - Weight 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

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

Applicable LORS	Description
	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 the BACT levels discussed previously. 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 NO2, 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 ATC 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), will 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 by the appropriate date. 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. 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 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 normally treated the same as an attainment area for regulatory purposes. An area could be attainment for one air contaminant while non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same air contaminant.

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.

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. **Air Quality Table 5** summarizes the area's attainment status for various applicable state and federal standards.

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	—	0.18 ppm (339 μg/m^3)
Sulfur Dioxide (SO_2)	Annual	0.030 ppm (80 μg/m^3)	—
	24 Hour	0.14 ppm (365 μg/m^3)	0.04 ppm (105 μg/m^3)
	3 Hour	0.5 ppm (1300 μg/m^3)	—
	1 Hour	—	0.25 ppm (655 μg/m^3)
Particulate Matter (PM10)	Annual	—	20 μg/m^3
	24 Hour	150 μg/m^3	50 μg/m^3
Fine Particulate Matter (PM2.5)	Annual	15 μg/m^3	12 μg/m^3
	24 Hour	35 μg/m^3	—
Sulfates (SO_4)	24 Hour	—	25 μg/m^3
Lead	30 Day Average	—	1.5 μg/m^3
	Calendar Quarter	1.5 μg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 μg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 μg/m^3)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.

Source: ARB 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.

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*	Unclassified
	1 Hour	*Attainment*	N/A
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*	Unclassifiable/Attainment
	24 Hour	*N/A*	Attainment

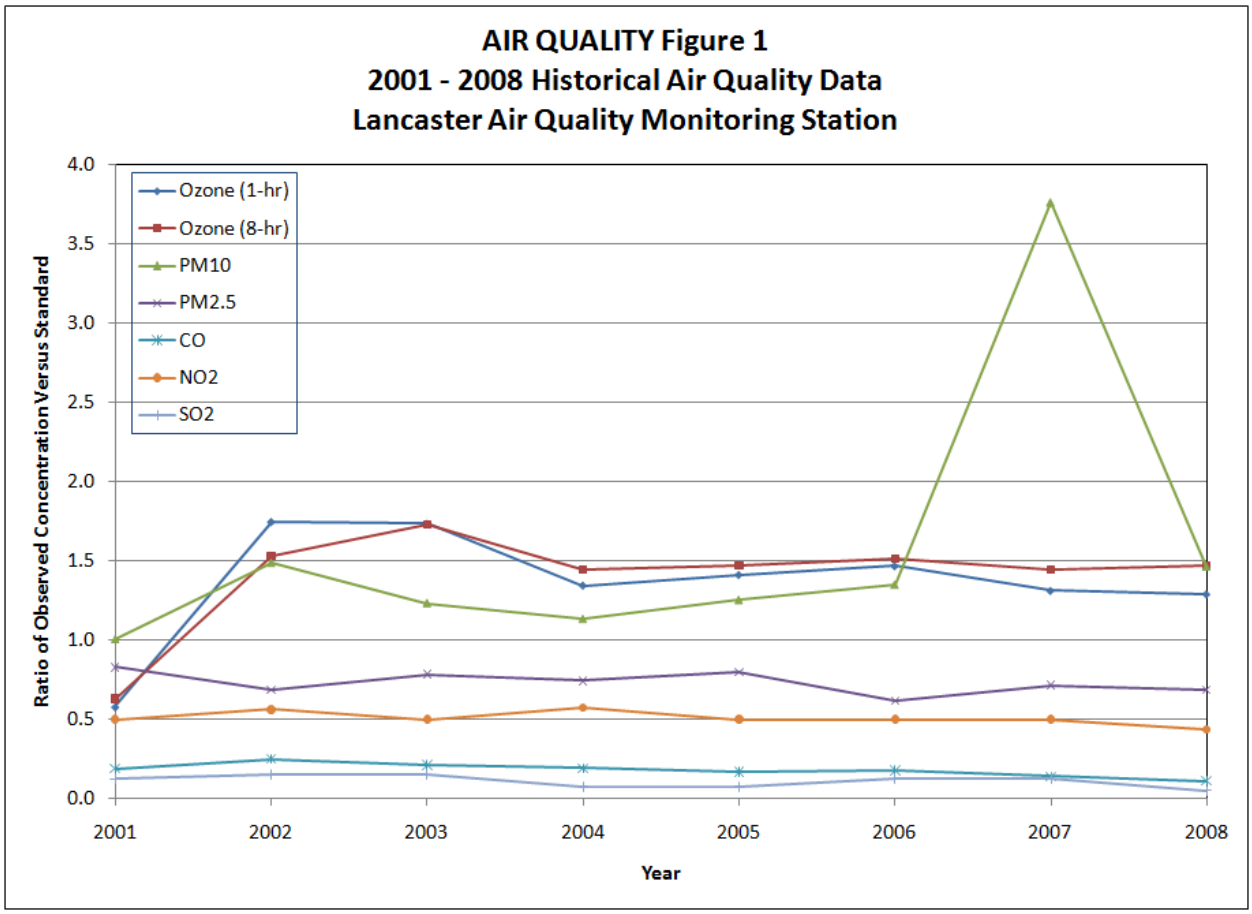
Notes: N/A= no standard applies or not applicable

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** shows that the maximum 1-hour ozone concentrations are between 0.6 to 1.7 times the standard, 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, hovering between 0.6 to 1.7 times the new California 8-hour ozone standard since 2001.

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.

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

Pollutant	Averaging Period	Units	2004	2005	2006	2007	2008	Limiting AAQS
Ozone	1 hour	ppm	0.121	0.127	0.132	0.118	0.116	0.09
Ozone	8 hours	ppm	0.101	0.103	0.106	1.31	1.29	0.07
PM10 [a]	24 hours	μg/m^3	56	53	63	188	73	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	35
PM2.5 [a, b]	Annual	μg/m^3	8.9	8.9	7.4	8	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	9
NO_2	1 hour	ppm	0.103	0.074	0.066	0.064	0.062	0.18
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	0.006	0.25
SO_2	24 hours	ppm	0.00	0.00	0.01	0.01	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.

Carbon Monoxide

The area 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. 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 2000 through 2006, with highs close to four times the state 24-hour PM10 standard. 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.

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 any new 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) 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 the 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) 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 three 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	193.6	339	57%
	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 Victorville monitoring station is located approximately 43 miles east southeast of the project site. This monitoring station provides more conservative air quality data due to the influence of SO2 emission sources near Victorville.

The background concentrations for PM10 are at or above the most restrictive existing ambient air quality standards, while the background concentrations for the other pollutants are all below the most restrictive existing ambient air quality standards. The pollutant modeling analysis was limited to the pollutants listed above in **Air Quality Table 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 of 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 will cause some unavoidable but minor localized short-term impacts.

The Project will 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, of approximately 35.6 miles.

Construction of the combined-cycle power plant and the solar array will require approximately 27 months and 24 months, respectively. Construction of the reclaimed water supply line will require approximately nine months, construction of the natural gas pipeline will require approximately 15 months, construction of the sanitary wastewater line will require approximately five months, and construction of the potable water supply line will require approximately two months. Transmission line construction will occur over a 26-month period. Construction of Project elements will 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
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	12.3	2.4	<0.05	32	7.9	2.3
Natural Gas Pipeline	14.4	2.7	<0.05	36.9	4.3	1.5
Sanitary Wastewater Line	9.1	2.8	<0.05	18.0	6.5	1.9
Potable Water Pipeline	16.8	5.1	<0.05	32.2	13.0	3.6
Transmission Line Segment 1	1.8	0.6	<0.05	3.8	0.9	0.3
Transmission Line Segment 2	0.7	0.2	<0.05	1.5	0.3	0.1

SOURCES: AFC SECTION 5.2.4.1 (PHPP 2008), 5/1/09 DATA RESPONSE (PHPP 2009) AND AVAQMD REVISED PDOC (AVAQMD 2009B).

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. 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 new impacts from the NOx and CO emissions during the commissioning period. 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**.

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 REVISED PDOC (AVAQMD 2009B).

OPERATIONAL PHASE

The project will 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 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 251 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 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 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) during off-line periods.

Power plant cooling will be provided by a 10-cell, mechanical draft 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 5000 ppm of total dissolved solids (TDS).

A small amount of emergency electrical power will be provided on site by a (2000 kW) 2683 horsepower (hp) diesel-fired internal combustion engine and shaft generator. Emergency fire suppression water pressure will 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 hour 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
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 are used in emissions impacts and cumulative emissions analyses scenarios.

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

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 the 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 the among the lowest permitted 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] 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 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.

[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.

Air Quality Table 11
Maximum Project Construction Impacts

Pollutant	Averaging Period	Concentrations (µg/m³)					Percent of Limiting Standard
		AERMOD Result	Ambient Background[2]	Total[3]	CAAQS	NAAQS	
NO_2[1]	1-hr	296.5	---	296.5	339	--	60%
	Annual	7.9	28.2	36.1	57	100	93%
CO	1-hr	3,349.8	4,010.0	7,030.0	23,000	40,000	51%
	8-hr	548.4	1,859.0	2,388.0	10,000	10,000	17%
PM10	24-hr	37.0	100.2	123.0	50	150	19%
	Annual	3.6	26.8	28.6	20	--	200%
PM2.5	24-hr	6.6	31.2	26.6	--	35	134%
	Annual	1.0	10.7	9.9	12	15	89%
SO_2	1-hr	2.5	35.6	36.6	665	--	89%
	3-hr	1.0	24.9	24.6	--	1,300	5%
	24-hr	0.2	16.6	15.9	105	365	2%
	Annual	0.01	5.9	5.2	--	80	16%

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

On the Victorville II siting case, 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 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 significance.

PM10/PM2.5

In addition to the proposed construction NOx mitigation, the City has proposed the following mitigation 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

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.

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 and cooling tower, including steady state operation, commissioning, and start-up and shut down events in **Air Quality Tables 12 through 14**. Concentrations of CO and were found to be below the CAAQS, and concentrations of 1-hour 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, the impacts were shown to exceed the standard. However, this analysis is conservative since it is unlikely that the combustion turbines would both be operating at the same time, at peak emissions levels and at the time of day when background level is at its peak.. 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

Staff's position for operating emissions CEQA impact determination is that all nonattainment pollutants and their precursors need to be mitigated through emission reductions at a minimum ratio of 1:1, with larger ratios required for inter-pollutant, inter-basin and distant ERC sources. The MDAB in the area of the project site is classified as nonattainment for the state ozone and PM10 standards and federal ozone standard. Without proper emission reduction mitigation, this project could contribute to existing violations of the state and federal ambient air quality standards.

Air Quality Table 12
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	203.1	---	203.1	339	--	60%
	Annual	1.0	28.2	29.2	57	100	51%
CO	1-hour	330.0	3,680.0	4,010.0	23,000	40,000	17%
	8-hour	19.2	1,840.0	1,859.0	10,000	10,000	19%
PM10	24-hour	14.2	86.0	100.2	50	150	200%
	Annual	1.8	25.0	26.8	20	--	134%
PM2.5	24-hour	14.2	17.0	31.2	--	35	89%
	Annual	1.8	8.9	10.7	12	15	89%
SO_2	1-hour	1.5	34.1	35.6	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	0.7	5.2	5.9	--	80	7%

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.

Air Quality Table 13
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	331.67	139.2	470.9	339	--	139%
CO	1-hour	856.01	3,680.0	4,010.0	23,000	40,000	20%
	8-hour	650.42	1,840.0	1,859.0	10,000	10,000	25%

Source: PHPP 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	1,840.0	2,327.9	10,000	10,000	23%

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.

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 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 MDAB, 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 251 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 emit VOCs, 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 and 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 of roads in the Palmdale area for PM10/PM2.5 and its precursors. Details of the mitigation plan are following:

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

Due to the limited availability of ozone precursor ERCs in the Mojave Desert Air Basin, 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 the contribution 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 will 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 complies 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) require AVAQMD and SJVAPCD board approval. 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.

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.

ERCs that originate in the SJVAPCD are subject to the governing requirements of the SJVAPCD. Therefore, since the SJVAPCD ERCs are adjusted to reflect Reasonably Available Control Technology (RACT) when they are banked, no additional surplus adjustments would be required. The SJVAPCD ERCs should also be subject to the other rules regarding the use of ERCs that are obtained in the SJVAPCD. Therefore,

the SJVAPCD limitations on the distance between the ERC and new emission source should also be observed. 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 might be very limited. Staff would look for guidance from SJVAPCD on implementation of their Rule 2201 on inter-district transfers, if applicable.

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 that are 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). However, the applicant has not identified specific credits nor has the SJVAPCD confirmed in writing that the transfers could occur. Staff needs identification of specific credits, and confirmation that the credits could be transferred, and the applicable distance or offset ratio which will be applied by the air districts. Lastly, past practices do not ensure that SJVAPCD would currently be willing to transfer emissions reduction credits to a competing jurisdiction as they are an important component of economic development to an air district. Pending resolution of these issues, Staff would recommend the adoption of Condition of Certification **AQ-SC18** to ensure timely purchase of the NOx and VOC emission reduction credits.

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 may 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 location 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 now contends that a new PM10 road paving rule is not required, and that existing district Rule 1305(B)(3) explicitly addresses emission reductions from mobile,

area and indirect sources. Under this scenario, 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:

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 would approve this approach to generating PM10 ERCs under the existing rules, and whether or not this would occur within the Energy Commission's required time frame.

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 134 tons of PM10/PM2.5 and their precursors (125 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 MDAQMD Rule 1406. 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 are 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**.

While staff believes that the project complies with current applicable LORS, since the rule underlying the PHPP's use of PM10/PM2.5 emission reduction credits is being legally challenged[2], staff cannot determine if PM credits generated via road paving will

[2] The California Court of Appeals for the Fourth Appellate District recently ruled in favor of environmentalists and other groups in the case California Unions For Reliable Energy v. Mojave Desert

mitigate project PM impacts. Staff will address any changes to the rule and PM10/2.5 mitigation proposals to determine their effect on the project, impact mitigation and LORS compliance. If revisions to the rule limit the availability of the emission reductions, the applicant should consider alternative emission reductions from other sources.

Staff also recommends the adoption of Condition of Certification **AQ-SC20**, which was 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 facility.

PM2.5 and their precursors:

Similar to PM10 and their precursors, the City proposes to mitigate the project PM2.5 impacts with the emission reductions from paving of roads. Therefore, staff has incorporated the mitigation requirement for 134 tons of PM2.5 per year into Condition of Certification **AQ-SC19**.

Similar to mitigation for ozone precursors, the City proposes the use of PM10/PM2.5 emission reduction credits that are generated by the implementation of the MDAQMD's Rule 1406 (see discussion above) that is being legally challenged. Thus, staff believes that the project would only be in compliance with applicable LORS with the understanding that these emission reduction credits ultimately generated under the rule will be valid and for the quantities specified. If the revisions to the rule limit the availability of the emission reductions, the applicant should consider alternative 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.

Air Quality Management District. The lawsuit, filed by the Center for Biological Diversity (CBD) and labor union groups, challenged the MDAQMD Rule 1406 on the claim that the district should have conducted a CEQA analysis of its impacts. Since the AVAQMD is currently classified as attainment for federal PM10 and PM2.5 standards, additional rulemaking and CEQA analysis is not required. This PSA satisfies CEQA review requirements for the proposed road paving PM10/2.5 offsets.

This analysis is concerned with criteria air pollutants, which are usually (though not always) cumulative by nature. Rarely will a project 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 back ground air quality and whether mitigations are adequate. 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 the federal 8-hour ozone air quality standards. 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." Therefore, it is unlikely that the project, fully mitigated, and the emissions from the Lockheed Martin Aeronautics and Northrop Grumman facilities would cause violations of the ozone standards.

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. However, the ARB classified the area as unclassified/attainment for the annual state PM2.5 air quality 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 the project and the Lockheed Martin Aeronautics and Northrop Grumman facilities on the existing air quality would be insignificant.

Localized Cumulative Impacts

Since the PHPP air quality impacts 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.
- 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

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

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 15**. 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 15
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	195.2	139.2	334.4	339	--	99%
	Annual	6.6	28.2	34.8	57	100	61%
CO	1-hour	251.8	3,680	3,932	23,000	40,000	17%
	8-hour	40.6	1,840	1,881	10,000	10,000	19%
PM10	24-hour	13.3	86.0	99.3	50	150	199%
	Annual	1.5	25.0	26.6	20	--	133%
PM2.5	24-hour	13.35	17.0	30.3	--	35	87%
	Annual	1.55	8.9	10.4	12	15	87%
SO_2	1-hour	1.6	34.1	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.
Source: PHPP 2009.

As shown in **Air Quality Table 15**, 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. 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. Staff has incorporated the District conditions in this Preliminary Staff Assessment. Compliance with all District rules and regulations was demonstrated to the District's satisfaction in the PDOC. The District's PDOC conditions are presented in the Conditions of Certification 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 applicant has stipulated to emission levels that ensure that the project's net emission increase of pollutants would be below PSD permit trigger levels. The District's PDOC permit conditions have been designed to ensure that the project will 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.

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 PDOC 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, 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. Staff has incorporated the District conditions in this Preliminary Staff Assessment. Compliance with all District rules and regulations was demonstrated to the District's satisfaction in the PDOC. The District's PDOC 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 will install the required 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 fugitives, 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.

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 SO2 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 CO2 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, CO2, 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, CO2, 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% O2 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.
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. Thus, neither unit is subject to the requirements of this rule.

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 is not applicable to the proposed 100 MMBtu per hour boiler, 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, compliance with NSR cannot be determined at this time.

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 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. This 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 implements the federal PSD program. Because the Project is an unlisted stationary source (as defined by the rule) that emits or has the potential to emit 40 tpy or more of CO, it is required to obtain a PSD permit. A key element of the application is to verify that the emissions do not cause an increase in ambient emission concentration above those allowed in the rule. AVAQMD is not currently delegated to administer the PSD program. A PSD application will be submitted to EPA Region IX in a timely manner. The owner or operator of a major stationary source or major modification shall, after construction of the stationary source or modification, conduct such ambient monitoring as the District determines is necessary to determine the effect emissions from the stationary source or modification may have, or are having, on air quality in any area. The Project Owner will perform monitoring as requested.

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 facilities, such as the PHPP, are needed to meet California's mandated renewable energy goals.

CONCLUSIONS

Staff cannot determine that the significant air quality impacts would be mitigated to less than significant, and therefore cannot recommend the project as proposed be certified by the Commission at this time. . While staff believes that with the adoption of the attached conditions of certification the proposed Palmdale Hybrid Power Project (PHPP) could comply with all applicable laws, ordinances, regulations, and standards (LORS), staff does not believe the potential significant air quality-related impacts have been fully mitigated. Currently, no specific emission reductions credits have been identified and not all appropriate air agencies have approved the proposed inter-district emission reduction transfers. Pending identification of specific emission reductions and successful resolution of the inter-district emission reduction transfer, staff would find that:

1) The project would comply with applicable District Rules and Regulations, including New Source Review requirements (AVAQMD 2009b).
2) 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 not significant.
3) 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 MDAB and SJVAB (AQ-SC8) could mitigate the project's ozone impact to a level that is less than significant.
4) The project PM10 emissions and PM10 precursor emissions of SOx would contribute to the existing violations of the state 24-hour PM10 air quality standard. However, staff has determined that emission reductions from paving of local roads (AQ-SC9) under current regulations would mitigate the project's PM10 and PM10 precursor emissions impacts to a level that is less than significant.
5) The project 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. However, staff has determined that emission reductions from paving of local roads (AQ-SC9) under current regulations would mitigate the project's PM2.5 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, and this may enable the ARB to implement trading markets (see AIR QUALITY APPENDIX AIR-1). The project may be subject to additional reporting requirements and GHG reduction or trading 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, Subchapter 10, Article 2, sections 95100 et. seq.) and/or future GHG regulations formulated by the ARB, such as GHG emissions cap and trade markets.

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-SC-1 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-SC-2 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-SC-3 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 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 prior to taking initial deliveries.

B. All unpaved construction roads and unpaved operational site roads, as they are being constructed, shall be stabilized with a non-toxic soil stabilizer or soil weighting agent, 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. 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 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 District 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-SC-4 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 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 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 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-SC-5 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 that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. This good faith effort shall be documented with signed written correspondence by the appropriate construction contractors along with documented correspondence with at least two construction equipment rental firms. In the event that a Tier 3 engine is not available for any off-road equipment larger than 100 hp, that equipment shall be equipped with a Tier 2 engine, or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 2 levels unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is "not practical" for the following, as well as other, reasons.

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

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

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

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

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

F. Construction equipment will employ electric motors when feasible.

Verification*:* The AQCMM shall include in the 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-SC-6 Except for minor activities such as cement pours, construction activities shall be limited to the hours between one hour after sunrise and one hour before sunset.

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

AQ-SC-7 The project owner, when obtaining dedicated vehicles for mirror washing activities and other facility maintenance activities, shall only obtain new model

year vehicles that meet California on-road vehicle emission standards for the model year when obtained.

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

Verification: At least 60 days prior to the start 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-SC-8 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 as ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation.

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

Verification: At least 60 days prior to start of commercial operation, the project owner shall submit to the 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. At least 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-SC-9 Each HTF tank shall be connected to a volatile organic compound (VOC) vapor control system.

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-SC-10 HTF expansion vessel shall be gas tight and vent to vapor control system with a 99% control efficiency.

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-SC-11 The project owner shall establish an inspection and maintenance program to determine, repair, and long 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. All accessible valves, fittings, pressure relief devices (PRDs), hatches, pumps, compressors, etc. shall be inspected quarterly using a leak detection device such as a Foxboro OVA 108 calibrated for methane.

C. VOC leaks greater than 100-ppmv shall be tagged (with date and concentration) and repaired within seven calendar days of detection. D. VOC leaks greater than 10,000-ppmv shall be tagged and repaired within 24-hours of detection.

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

E. The project owner shall maintain record of the amount of HTF replaced on a monthly basis for a period of five years.

F. 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).

G. 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-SC-12 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-SC-13 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-SC-14 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-SC-15 Each 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-SC-16 Project owner shall provide District with total volume require for solar power plant and annual volume of HTF used 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-SC-17 The project owner shall provide the CPM copies of all 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-SC-18 The project owner shall provide valid evidence 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). For ERC sources greater than 15 miles from the western portion of the AVAQMD, an offset ratio of 1.5 to one shall be utilized, resulting in an ERC liability of 172.5 and 60 for NOx and VOC, respectively.

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.

AQ-SC-19 The project owner shall pave, with asphalt concrete that meets the current county road standards, unpaved local roads to provide emission reductions of 134 tons per year of PM2.5, prior to start construction of the project. Calculations of PM2.5 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, and PM2.5 portion shall be calculated as being equal to 10% of the total PM10 road dust emission reduction credits.

Verification: At least one year prior to start construction, the project owner shall submit to the CPM, the District and ARB, for approval, 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-SC-20 The project owner shall provide 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.

Verification: At least 60 days prior to start construction, the project owner shall submit to the CPM a copy of the plant lay out, which identifies all locations of the speed limit signs.

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: At least 90 days prior to construction of the project, the project owner shall provide the District, the ARB and the CEC CPM copies of the federal PSD and Acid Rain permits.

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 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 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 120 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 CEC staff 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 and the selective catalytic reduction system with valid District permit C00nnnn installed and fully functional, i.e., enables the combustion turbines to meet the emission limits listed in condition 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 120 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 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 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-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 120 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.

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 or CEC staff.

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.

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

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]

AQSC-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.

AQSC-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.

AQSC-3. This equipment shall be operated concurrently with the combustion turbine generator with valid District permit B00nnnn.

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.

AQSC-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.

AQSC-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 reports available to the District, ARB, EPA or CEC staff.

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 or CEC staff.

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 or CEC staff.

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 or CEC staff.

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 or CEC staff.

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 or CEC staff.

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 or CEC staff.

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 or CEC staff.

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 or CEC staff.

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 120 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 CEC staff 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 or CEC staff.

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 120 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 CEC staff 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 or CEC staff.

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 or CEC staff.

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 120 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 CEC staff 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 or CEC staff.

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 120 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 CEC staff 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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ARB 2001. Ozone Transport: 2001 Review, April 2001.

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AIR QUALITY APPENDIX AIR-1

Greenhouse Gas Emissions

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 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 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[4] 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 inter-connected 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 generation from the PHPP would come from renewable solar generation.

[4] 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, CO_2 and GHG are used interchangeably in this section.

- PHPP would displace some less efficient local generation in the dispatch order of gas-fired facilities that are required to provide electricity reliability in the Big Creek/Ventura Local Regulatory Authority (LRA).
- 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 new Emissions 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 would help a load-serving entity (LSE) meet resource adequacy (RA) requirements.

The ability and magnitude to which PHPP would fulfill these roles are uncertain given that the project would have an annual availability of 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. 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, and the project would serve a role in optimizing the system by providing reliability to a major local reliability area, the Big Creek/Ventura LRA. 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 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 create 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 (Title 20, California Code of Regulations, section 2900 et seq.) that applies to utility purchases of base load power from power plants. The utility that enters into a contract with PHPP would 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.

Staff notes that mandatory reporting of the GHG emissions provides the necessary information for the California Air Resources Board to develop greenhouse gas regulations and/or trading markets required by the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code

sections 38500 et seq.). The project may be subject to additional reporting requirements and GHG reductions or trading requirements as these regulations are more fully developed and implemented.

INTRODUCTION

GHG emissions are not criteria pollutants, but are discussed in the context of cumulative impacts. The State has demonstrated a clear willingness to address global climate change though research, adaptation[5], 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 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.

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

[5] 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).

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).

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

Applicable Law	Description
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)

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[6] emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such reductions to be achieved by 2020.[7] 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. ARB staff is developing regulatory language to implement its plan and holds ongoing public workshops on key elements of the recommended GHG reduction measures, including market mechanisms (ARB 2006). The regulations must be effective by January 1, 2011 and mandatory compliance

[6] Global climate change is the result of greenhouse gases, or air emissions with global warming potentials, affecting the global energy balance, and thereby, climate of the planet. The term greenhouse gases (GHG) and global climate change (GCC) gases are used interchangeably.
[7] Governor Schwarzenegger has also issued Executive Order S-3-05 establishing a goal of 80% below 1990 levels by 2050.

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.

SB 1368,[8] 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[9] (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.[10] 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

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[8] Public Utilities Code § 8340 et seq.
[9] The Emission Performance Standard only applies to carbon dioxide and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.
[10] See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

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 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. The system to deliver the 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[11] 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 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.

[11] See page CEC 2009b, page 95.

The Energy Commission staff-sponsored 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 in response to the OII. 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).

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.

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 will also be a small amount of GHG emissions from the diesel fuel consumed in the emergency fire pump engine, and sulfur hexafluoride emissions from electrical component equipment.

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

Greenhouse Gas Table 3 shows what the proposed project, as permitted, could potentially emit in greenhouse gases on an annual basis. All emissions are converted to CO_2-equivalent and totaled. Electricity generation GHG emissions are generally dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG are typically small and also are more likely to be easily controlled or reused/recycled, 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. The new PHPP combined cycle plant would be more efficient than the existing power plants in the Big Creek/Ventura LSA, which has facilities with GHG performance ranging from 0.374 to 0.761 MTCO2/MWh. The proposed PHPP project, with input from a solar field for much of the year, would emit at 0.371 MTCO2/MWh, which would easily meet the SB 1368 Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh. However, if the use or efficiency of the solar array is less than expected, then the project's annual average efficiency would 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. The Big Creek/Ventura Load Serving Area would benefit from the incremental increase in energy and capacity provided by PHPP. As a project located inside a major load pocket, PHPP would be likely to provide local reliability support and could facilitate the retirement of other less-efficient power plants.

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	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 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, 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 the existing Big Creek/Ventura LSA power plants that it would displace (see Greenhouse Gas Table 4 below) and most other

dispatchable gas-fired generation in the state, would be more efficient and lower GHG-emitting than the existing fleet.

The Role of PHPP in Local Generation Displacement

The proposed PHPP project would have a net heat rate of 6,285 Btu/kWh[12] in combined-cycle mode with solar input. The heat rate, energy output and GHG emissions of local generation resources near the PHPP are listed in **Greenhouse Gas Table 4**. Compared to most other new and existing units in the Big Creek/Ventura LSA, PHPP would be more efficient, and emit fewer GHG emissions per MWh of generation. Local 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. Because PHPP is inside the Big Creek/Ventura LSA, it would be able to provide capacity during most system operating conditions.

[12] 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.

Greenhouse Gas Table 4
Big Creek/Ventura LSA, Local 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
Palmdale Hybrid Power Project (PHPP)	6,970	4,993	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

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[13] power that would not obstruct penetration of renewable energy. In general, combustion turbines can ramp up

[13] 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.

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.[14] The PHPP would also realize 10% of its output from renewable solar power during peak demand periods.

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 5** 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.

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.[15] 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.

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[14] 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).

[15] The extent to which uncommitted energy efficiency savings are already represented in the current Energy Commission demand forecast is a subject of study for the 2009 IEPR.

Greenhouse Gas Table 5
Estimated Changes in Non-Renewable Energy Potentially Needed to Meet California Loads, 2008-2020

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

Source: Energy Commission staff 2009.
Notes:
a. Not including 8% transmission and distribution losses.
b. Based on 8% transmission and distribution losses, or 42,885 GWh x 0.08 = 46,316 GWh.
c. Renewable standards are calculated on retail sales and not on total generation, which accounts for 8% transmission and distribution losses.
d. Based on net energy (including 8% transmission and distribution losses), not on 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, such as coal-fired generation, generation that relies on water for once-through cooling, and aging power plants (CEC 2007). Some of the existing plants that are likely to require 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 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 6**.

Greenhouse Gas Table 6
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[16], all the coal contracts (including those in **Greenhouse Gas Table 6**, 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.

[16] 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.

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) 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 7** 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. Existing aging and OTC natural gas generation average 0.6 to 0.7 MTCO2/MWh, which is less efficient, higher GHG emitting, than a new natural gas-fired combined-cycle 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 7
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	Utility	LADWP	Yes	1,046	1,529	0.578
Haynes CC	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.

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.

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% annual 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.

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 facility will 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 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 reliability in the Big Creek/Ventura LSA.
- 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 in the Big Creek/Ventura LSA.
- The PHPP would utilize the General Electric Power Systems (GE) Rapid Start Process (RSP) to allow for fast startup capability.
- The PHPP would help a load-serving entity (LSE) meet resource adequacy (RA) requirements.

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 8**, 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.

CONCLUSIONS

PHPP, as an addition to the California electricity system, would be an efficient, new, dispatchable 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 and peaking projects 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.

Greenhouse Gas Table 8
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.
Local Generation Displacement	• Would be able to satisfy/partially satisfy local capacity area (LCA) resource requirements. • 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. • Would be able to 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).

Staff notes that mandatory reporting of GHG emissions per Air Resources Board greenhouse gas regulations would occur, and this would enable the ARB to gather the information needed to regulate PHPP in trading markets if required by the regulations implementing the California Global Warming Solutions Act of 2006 (AB 32). The project may be subject to additional reporting requirements and GHG reduction or trading requirements as these regulations are more fully developed and implemented.
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 could 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. The utility that enters into a contract with PHPP would 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.

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 ARB, such as GHG emissions cap and trade markets.

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BIOLOGICAL RESOURCES

Chris Huntley

SUMMARY OF CONCLUSIONS

Construction of the Palmdale Hybrid Power Plant (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 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 and linear facilities would result in the permanent loss of 416.11 acres of native and non-native plant communities. Joshua Tree Woodland, Mojavean Juniper Scrub, and Mojave Desert Wash Scrub are considered sensitive and would require compensation to reduce impacts to less than significant levels. Construction of the PHPP power block and linear facilities would also result in the loss of Mojave Creosote Bush Scrub; Desert Saltbush Scrub; Rabbitbrush Scrub; Agricultural Land; and Disturbed/Developed Land. In addition, staff is concerned that the vegetation maps provided by the applicant appear to contain mapping errors. Staff intends to resolve this issue at Preliminary Staff Assessment workshops and ensure vegetation communities are accurately characterized in the Final Staff Assessment. Nonetheless, staff has proposed Conditions of Certification **BIO-1** through **BIO-10** to reduce direct and indirect construction impacts to vegetation and common wildlife to less-than-significant levels, based on the information received to date. As stated in Condition of Certification **BIO-10**, permanent impacts to Riparian Communities associated with various streams and desert washes in the Mojave Riparian Forest and Antelope Valley watershed, including the intermittent Little Rock Creek will require a compensation ratio of 5:1. 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.**

Listed sensitive, rare plants were not identified in the project area. Only one California Native Plant Society List 4 species was observed by the applicant during botanical surveys of the project area; however the location and abundance of this plant was not provided. Staff is concerned that while the annual rainfall in the region was adequate to detect some rare plants, the timing of the surveys (April-June) would have missed early blooming desert plants in

2008. Staff is 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. Staff expects rare plant surveys to be conducted by qualified botanists. Staff has developed Condition of Certification **BIO-11** which requires pre-construction surveys and avoidance of rare plants. Implementation of this condition would reduce impacts to rare plants to less-than-significant levels.

Construction of the PHPP has the potential to directly and indirectly impact numerous sensitive wildlife species including nesting birds, coast horned lizards, small mammals, and burrowing owls. Potential direct and indirect construction impacts to wildlife at the plant site and along 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-21**, and **BIO-22**.

Construction of power block and linear facilities also has 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). Although not detected in the project area the applicant has elected to consider the Mohave ground squirrel as being present in the project area. Tortoise was not detected in the project area and Swainson's hawk was observed by both CDFG and staff on the PHPP project site and transmission line corridor. Potential take of desert tortoise and Mohave ground squirrel and loss of habitat for these species would be fully mitigated with implementation of staff's proposed Conditions of Certification **BIO-13, BIO-14, BIO-21,** and **BIO-22.** The applicant proposed a 1:1 ratio for impacts to Mohave ground squirrel on the power plant site and 3:1 for the transmission line routes. However, staff and California Department of Fish and Game (CDFG) have proposed a 2:1 ratio for the power plant site and 3:1 for the transmission line routes.

Compensatory mitigation for the loss of desert tortoise habitat was not proposed by the applicant. Staff concurs with the applicant and considers the acquisition of lands for Mohave ground squirrel to be sufficient to mitigate for impacts to the long term recovery of desert tortoise. In addition, staff recommends Condition of Certification **BIO-14** to off-set long term tortoise predation risks associated with ravens. 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, staff finds that the project will cause potential impacts to the Swainson's hawk and has proposed Conditions of Certifications **BIO-16** and **BIO-17** to mitigate for this species. These Conditions of Certification will likely require revision as the total amount of foraging habitat for Swainson's hawk has not been fully quantified. Staff is concerned that the existing acreages calculated for Swainson's hawk are inadequate and will require additional information from the applicant prior to the final drafting of these conditions. Staff intends to coordinate with the applicant to resolve this matter and develop revised Conditions of Certification for the Final Staff Assessment.

The Conditions of Certifications proposed by staff for listed species would meet the requirements of impact avoidance and minimization measures, as required by the U. S. Fish and Wildlife Service (USFWS) and the CDFG. Implementation of these conditions would reduce impacts to desert tortoise, Mohave ground squirrel, and Swainson's hawk to less-than-significant levels and would also satisfy the CDFG's requirements under California's Fish and Game Code section 2081.

Road grading and access to the transmission line alignment would require vehicle access through State jurisdictional waters. To reduce potential impacts to jurisdictional features staff has proposed Condition of Certification **BIO-22**. With implementation of this condition impacts to the 0.12 acres of State waters would be mitigated to less-than-significant levels. This condition would also fulfill requirements of the CDFG's Lake and Streambed Alteration Agreement (LSAA) program pursuant to Fish and Game Code Section 1600 et seq.

With implementation of staff's proposed conditions of certification, construction, operation, decommissioning of the PHPP would comply with all federal, state, and local laws, ordinances, regulations, and standards relating to biological resources and would mitigate potential significant impacts to biological resources to less-than-significant levels.

INTRODUCTION

This section of the Preliminary 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; communications with representatives from the CDFG and USFWS, and independent research.

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.

Applicable Law	Description
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.
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

Applicable Law	Description
	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 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

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 (823 m), 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 Ave S located approximately 5 miles south of the proposed project site;
- A 7.4-mile reclaimed water supply pipeline extending west along E 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 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.

The AFC and Draft Biological Assessment identified nine vegetation communities within the plant site and along the linear facilities (COP 2008a; AECOM 2009e). These plant communities are include 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.

The expected permanent loss to these communities from the construction and operation of the PHPP are identified in **Biological Resources Table 2** (COP 2008a).

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	83.0	0	0	11.96	1.53	**96.49**
Joshua Tree Woodland	167.0	0	0	2.2	1.53	**170.73**
Desert Saltbush Scrub	0	0	0	4.62	0	**4.62**
Rabbitbrush Scrub	83.0	50.0	0	0.31	0	**133.31**
Mojavean Juniper Scrub	0	0	0	0	4.57	**4.57**
Mojave Desert Wash Scrub	0	0	0	0.12	0	**0.12**
Agricultural Land	0	0	0	5.08	0	**5.08**
Urban and Disturbed Lands	0	0	0	1.19	0	**1.19**
Total (acres)	**333.0**	**50.0**	**0**	**25.48**	**7.63**	**416.11**

*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.

The applicant identified nine plant communities in the project area; however staff noted several other plant communities in the project alignment during reconnaissance-level surveys of the transmission line ROW south of Highway 138 in September 2009. These included California Annual Grasslands, Big Basin Scrub, Riparian Scrub, and various coastal/desert scrub communities. While elements of these communities can be components of other plant communities, this information was not presented in the biological data provided by the applicant. In addition, during a review of the field maps, staff noted that the vegetation maps provided in the Draft Biological Assessment (AECOM 2009e) appeared to contain mapping errors. For example, portions of the transmission line alignment containing large numbers of Joshua trees (AECOM 2009e; Figures 3-P and 3-Q) were mapped as Creosote Bush Scrub.

Potential mapping errors were also noted in areas mapped as Mojavean Juniper Woodland (AECOM 2009e; Figures 3-R, 3-S, 3-t, 3-U). These areas contain populations of Joshua Tree Woodland, Big Basin Scrub (associated with Little Rock Creek), small Riparian Scrub communities, California Annual Grasslands, and various scrub communities (California Buckwheat, Saltbush, and Brittlebush-dominated scrubs [Sawyer and Keeler-Wolf 1995]). In addition, much of the transmission line alignment between Little Rock Creek and the Vincent Substation is in the post-burn recovery stage. While this can make vegetation mapping more complicated (e.g. major shrubs which characterize a plant community may be burnt and crown sprouting has not yet occurred), it is important to note the current vegetative cover present during the mapping effort

as fire ecology may result in habitat conversion. This information was not presented by the applicant but is noted in staff's assessment.

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*).

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 (*Bromus tectorum*) 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 has raised concerns regarding the mapping effort for this plant community. While this community is considered to be an open woodland and may intergrade with Joshua Tree Woodland or Creosote Bush Scrub on drier soils (Holland 1986), staff believes that a more detailed mapping unit is required to accurately reflect project impacts to vegetation communities in the project area. For example, a large portion of the open lands mapped as Mojave Juniper Scrub on the lower slopes of the San Gabriel Mountains between Little Rock Creek and the Vincent Substation are actually dominated by non-native annual grasses such as cheat grass, red brome (*Bromus madritensis* ssp. *rubens*), and wild oat (*Avena* sp.). The species list provided in the Final Biological Resources Technical Report (ENSR 2008) did not note the presence of wild oats was although this species was commonly observed by staff on many of the slopes above the Vincent Substation.

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.

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*). This section of the wash appears to be routinely crossed by agricultural vehicles.

Staff noted that Little Rock Creek near the intersection of Cheseboro and Mt. Emma Roads the wash is more characterized by alluvial fan species. At the transmission line crossing habitat consisted of large areas of Big Basin Scrub on the upper terraces with Mojave Desert Wash Scrub dominated by scalebroom (*Lepidospartum squamatum*) along much of the intermediate terraces. However,

this plant community was not mapped by the applicant. Scattered mulefat (*Baccharis salicifolia*) occurred along the margins of the creek and large open areas within the drainage supported dried algal mats.

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, would likely qualify as Waters of the United States (AECOM 2009d). 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, unless exempt. Because the California Energy Commission has preemptive authority for the permitting of the project a 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.

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*).

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 and 2008 survey efforts (ENSR 2008; COP 2008a); however, its location was not identified in the applicant's report. Staff considers the rainfall conditions during the 2006 and 2008 surveys to be generally adequate for determining the presence/absence of most rare plant species listed below. However, the early rainfall and the timing of the surveys (i.e. April) may have missed early flowering species such as pygmy poppy (*Canbya candida*), a CNPS List 4 plant common to the Antelope Valley. Staff is concerned 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 is 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. Although many wildlife biologists are well trained in plant identification, not only were wildlife biologists conducting rare plant surveys, they were conducting them during wildlife surveys where the focus and methods may be different.

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**

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
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	**Moderate**
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	**Low**
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	**Moderate**
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**

Scientific Name	Common Name	Status	Potential For Occurrence On-Site
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**
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 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.

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 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 during field surveys in April 2008 along transmission line Segment 1 (1,200' ZOI).

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).

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 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. 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 33 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-23**).
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:** Potential 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 693 acres (**BIO-20**); raven management plan (**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 an a

Biological Resource	Impact/Mitigation
	yet to be determined amount of native lands that support foraging due to construction of transmission line Segment 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**).
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. **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**).
Mohave Ground Squirrel	**Impact:** Potential take of individuals during construction and operation; permanent loss of 331 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 693 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 33 acres along the transmission line. Impacts to 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 300 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 693 acres of desert scrub communities. 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. 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. The destruction of plants and soil crusts by windblown sand and dust exacerbates the erodibility of the soil and accelerates the loss of nutrients (Okin et al. 2001). Soil erosion from construction activities and vehicle activity, which affects vegetation and soil properties, could have an adverse effect on both tortoise and 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

State and federally listed plant species were not identified within the PHPP area during the surveys conducted by the applicant in 2006 and 2008. The applicant indicates that rainfall in the project area was adequate to initiate most plant expression and that no rare plants would be directly impacted by the proposed project. Staff concurs with the assessment regarding precipitation events for the 2008 rain year; however, a review of the botanical data suggests that numerous plant species were either not fully addressed or were overlooked during the survey and assessment of potential impacts to biological resources. Staff is also concerned with the timing of the surveys. As measured rainfall occurred early in the 2008 season, short-lived annuals such as pygmy poppy (*Canbya candida*, a CNPS List 4 species) would likely have flowered and desiccated prior to the commencement of surveys. This would have limited the ability of the surveyors to detect some rare plants. Staff is 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.

Staff also has concerns that the special-status plant table provided by the applicant in the AFC is missing 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 California androsace (*Androsace elongata* ssp. *acuta,* a CNPS List 4.3 species), 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, some of the plants identified only to genera by the applicant have the potential to be rare species (i.e., *Cryptantha* sp., *Gilia* sp.). These taxa, which include winged cryptantha (*Cryptantha holoptera*), Bailey's woolly buckwheat (*Eriogonum baileyi* var. *praebens*), and Cuyama gilia (*Gilia latiflora* ssp. *Cuyamensis*), have been recorded in the region and may occur in the project area. By not providing the species, subspecies or in some cases variation, staff is not able to ascertain if the species observed is rare. In addition, it is unknown where these species were recorded in relation to the project footprint. Staff was also concerned that one species included in the plant appendix, crowned muilla

(*Muilla coronate*, a CNPS List 4.2 species), was never mentioned as having the potential to occur. Although other sensitive plant species were not observed, staff considers there to be a potential for some sensitive plants to occur in the project footprint.

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 is present 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)

for arroyo toads 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 2008 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.

Although arroyo toads were not detected during surveys of the project area and staff largely concurs that the potential for this species to occur in the project area is low, their absence cannot be ruled out in upstream areas that were not surveyed by the applicant. Current USFWS protocols for arroyo toad indicate that an area must be considered occupied if known populations occur within 1000 meters of the proposed action. In addition, some more terrestrial species including arroyo toads are linked to aquatic resources for a very limited time during the breeding season. 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 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 may occur upstream, 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 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 tortoises or their sign was 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.

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 565.5 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** 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 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 (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*). These species require a more permanent water source and riparian vegetation in the project area is not expected to support nesting habitat. In addition several species of special concern including

long eared owl (*Asio otus*), yellow breasted chat (*Icteria virens*), vermilion flycatcher (*Pyrocephalus rubinus*), and summer tanager (*Piranga rubra*) have a low to moderate potential to occur. 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. 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 Swainson's hawk 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 has 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 1994). 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 detected by staff along transmission line Segment 1 near 90th Street in September 2009. Although staff believes the applicant would have detected these birds had they been nesting within the survey area and they were likely foraging or dispersing birds; staff is concerned that the applicant has dismissed potential impacts to this species.

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 ten-mile radius of an active nest must be considered (CDFG 1994). Although agricultural lands are important foraging habitat the loss of Joshua tree woodland and creosote bush scrub remain

important habitat for this species. Staff is concerned that although surveys did not detect nesting birds in the project area, the scale of the survey effort would not have detected Swainson's hawks within a ten-mile radius. Coupled with the recent information on nesting in the Antelope Valley staff is requiring 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 10 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.

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 protocol surveys for this species within one year of construction of the project, and the acquisition of mitigation lands if nesting is noted within ten miles of the project site. If nests are 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 1994). 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 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.

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.

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. 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.

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 300 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). 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. Several major jurisdictional features also occur in the project area and are spanned by the transmission line. These include Little Rock Creek/Wash, Palmdale Ditch, and the California Aqueduct. The latter two drainages would most likely qualify as Waters of the United States because of their connectivity to Palmdale Lake and the Aqueduct (COP 2008a).

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. However, in response to the July 29, 2009 workshop the applicant has provided new information regarding potential impacts to jurisdictional waters (AECOM 2009g).

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 unique 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 acres 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.

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 is currently developing a comprehensive, regional raven management plan that would implement recommendations contained in the USFWS *Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008a). Staff's proposed Condition of Certification **BIO-14** would require the applicant to contribute to this fund. These fees would contribute to a region-wide management and monitoring program in the California Desert Conservation Area. These fees would be used to fund the monitoring and reporting program, provide field inspections of raven nest sites, and identify and remove ravens which are actively predating desert tortoise. Staff's proposed Condition of Certification **BIO-14** specifies that the applicant complete a final Raven Monitoring, Management, and Control Plan in consultation with staff, CDFG, and USFWS. The in-lieu fee would offset contributions of the project to cumulative impacts associated with regional increases in raven numbers, and the project-specific raven management efforts proposed by the applicant would reduce impacts to desert tortoise from raven predation to less-than-significant levels.

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.

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 are 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 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. 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 693 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 projects 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** requires the avoidance of nest sites and the perseveration of foraging habitat for this species. 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 cumulatively 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, and must secure the appropriate permits to satisfy these LORS. 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 joint 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 the following state permits:

Biological Resources Table 5 provides a summary of the proposed project's compliance with federal, state, and local LORS.

Biological Resources Table 5
Summary of Impacts/Mitigation

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.	Currently applicant is not expected to result in take of listed species and a 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.
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** includes preconstruction nest surveys, no-disturbance buffers around active nests, and monitoring of nests to minimize impacts to nesting birds including fully protected species.
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-24** would ensure that the project remains 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.	The project owner shall obtain a Streambed Alteration Agreement and abide by its stated conditions. Additionally, 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.	The project owner shall obtain a Streambed Alteration Agreement and 401, 401 certification. Additionally, 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.	Permits and authorization to remove, transport, or otherwise impact Joshua Trees and/or cacti will be obtained by the project owner prior to project approval.
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-24** 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	Implementation of Staff's proposed Conditions of Certification **BIO-1** through **BIO-24** would ensure that the project remains in compliance with the City of Palmdale General Plan.

Applicable Law	Description	Rationale for Compliance
	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 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).	The Energy Commission has preemptive jurisdiction over the proposed project. Therefore, no local discretionary permits, such a Conditional Use Permit for activities within an SEA, are required.
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	Permits and authorization to remove, transport, or otherwise impact Joshua Trees, California junipers, and/or cacti will be obtained by the project owner prior to project approval.

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-24** contains measures to ensure that impacts to biological resources are addressed prior to the planned permanent or unexpected permanent closure of the project.

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.

Many of staff's proposed Conditions of Certification require the submittal of draft plans, 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. No later than July 31, 2010 b. At least 60 days prior to the start of any ground-disturbing activities
BIO-12	Report describing results of arroyo toad protocol and clearance surveys and compliance with mitigation measures	Within 30 days of completion of arroyo toad protocol and 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. Within 60 days of publication of the Energy Commission Decision b. At least 60 days prior to start of any project-related ground disturbance activities c. Within 30 days after initiation of translocation activities d. Within 30 days of completion of desert tortoise clearance surveys
BIO-14	Final Raven Monitoring, Management, and Control Plan	At least 60 days prior to start of any project-related ground disturbance 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 b. Swainson's Hawk Monitoring and Mitigation Plan (to be prepared only if	a. Within 30 days of commencement of construction activities b. At least 30 days prior to the start of any project-related site

Condition of Certification	Plan/Report to be Submitted	Timing
	pre-construction surveys detect nesting Swainson's hawks within one mile of proposed construction activities)	disturbance activities
BIO-17	a. Formal acquisition proposal for Swainson's hawk HM lands describing the parcel(s) intended for purchase b. Draft agreements to delegate land acquisition to CDFG or an approved third party and agreements to manage HM lands c. Management plan for the HM lands and associated funds	a. No less than 90 days prior to acquisition of the HM lands b. Prior to land acquisition and at least 60 days prior to start of any project-related ground disturbance activities c. Within 90 days after the land 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. Within 60 days of publication of the Energy Commission Decision 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	a. Within 60 days of publication of the Energy Commission Decision b. At least 60 days prior to start of any project-related ground disturbance activities c. Within 30 days of completion of Mohave ground squirrel clearance surveys
BIO-20	a. Formal acquisition proposal for Mohave ground squirrel habitat describing the parcel(s) intended for purchase b. Draft agreements to delegate land acquisition to CDFG or an approved third party and agreements to manage compensation lands c. Management plan for the compensation lands and associated funds	a. No less than 90 days prior to acquisition of the property b. Prior to land acquisition, at least 60 days prior to the start of any project-related ground disturbance activities c. Within 90 days after the land 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

Condition of Certification	Plan/Report to be Submitted	Timing
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

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;

[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.

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 90 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 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 30 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 Desert Tortoise Translocation 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 prior to any site or related facilities mobilization disturbance and one set subsequent to completion of project construction. Provide planned timing of aerial photography and a description of why times were chosen. Provide a final accounting of the before/after acreages and a determination of whether additional habitat compensation is necessary in the Construction Termination Report;

9. Duration for each type of monitoring and a description of monitoring methodologies and frequency;

10. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;

11. All 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 large 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. 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 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 AND COMPENSATION FOR IMPACTS TO NATIVE VEGETATION COMMUNITIES

BIO-10 The project owner shall provide restoration/compensation 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. Native plant communities including Joshua Tree Woodland and Mojavean Juniper Scrub will be mitigated at a ratio of no less than 2:1 through the purchase of off-site habitat. Permanent impacts to Riparian Communities will require a ratio of 5:1. 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 (off-site mitigation may be required); (b) locations and details for top soil storage; (c) the plant species to be used; (d) seed collection guidelines; (d) a schematic depicting the mitigation area; (e) time of year that the planting will occur and the methodology of the planting; (f) a description of the irrigation

methodology if used; (g) measures to control exotic vegetation on site; (h) success criteria; (i) a detailed monitoring program; and j) 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 the disturbed soils. The upper 1 inch of topsoil which contains the seedbank shall be scraped and stockpiled for use as the top-dressing for the revegetation area. An additional 6 to 8 inches of soil below the top 1 inch of soil shall also be scraped and separately stockpiled for use in revegetation areas. All other elements of soil stockpiling 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 funds required or compensation acreage that must be purchased to compensate for any additional habitat disturbances at the adjusted market value at the time of construction to acquire and manage habitat. 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.

For Joshua Tree Woodland and Mojavean Juniper Scrub, no less than 90 days prior to acquisition of the property, the project owner, or a third-party approved by the CPM, in consultation with CDFG and USFWS, shall submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the parcel(s) intended for purchase. These lands may be collated within lands acquired to off-set impacts to Mohave ground squirrels. All mitigation lands must be within Los Angeles County.

Draft agreements to delegate land acquisition to CDFG or an approved third party and agreements to manage compensation lands shall be submitted to Energy Commission staff for review and approval (in consultation with CDFG) prior to land acquisition. Such agreements shall be mutually approved and executed at least 60 days prior to start of any project-related ground disturbance activities. The project owner shall provide written verification to the CPM that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient(s). Alternatively, before beginning project ground-disturbing activities or any other activities that could result in take, the project owner shall provide Security in accordance with this condition. Within 90 days after 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, for the compensation lands and associated funds.

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 1A, 1B, 2, 3, or 4 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. 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 2000) 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. 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, 2, 3, and 4 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, through the context of a Biological Opinion, 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 USFWS and/or 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 July 31, 2010 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 were detected during the 2010 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. 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 and USFWS. 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 protocol 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 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 protocol and 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: Within 60 days of publication of the Energy Commission Decision the project owner 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 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 Energy Commission. The Raven Plan shall: identify conditions associated with the project that might provide raven subsidies or attractants; describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities; describe control practices for ravens; address monitoring during construction and for the life of the project; and discuss reporting requirements. For the first year of reporting the project owner shall provide quarterly reports describing implementation of the Raven Plan. Thereafter the reports shall be submitted annually for the life of the project. The Raven Plan shall also include a requirement for payment of an in-lieu fee to a third-party account established by the USFWS to support a regional raven monitoring and management plan (USFWS 2009).

Verification: At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide the CPM, USFWS, and

CDFG with the final version of the Raven Plan that has been reviewed and approved by USFWS and CDFG. The CPM shall determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved Raven Plan must be made only after consultation with the Energy Commission staff, USFWS, and CDFG. The project owner shall notify the CPM no less than five working days before implementing any CPM-approved modifications to the Raven Plan.

Within 30 days after completion of project construction, the project owner shall provide to the CPM for review and approval a report identifying which items of the Raven Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.

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.

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 within one year of construction of the project. Surveys will include all areas within one mile of the project in regions with suitable nesting habitat for Swainson's hawks. This includes but is not limited to areas supporting Joshua Tree Woodlands and agricultural lands. The survey periods shall follow a specified schedule: Period I occurs from 1 January to 20 March, Period II occurs from 20 March to 5 April, Period III occurs from 5 April to 20 April, Period IV occurs from 21 April to 10 June, and Period V occurs from June 10 to July 30. No fewer than three surveys per period in at least two survey periods shall be completed immediately prior to the start of project construction. 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 nest site is found, 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, 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 one 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 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 10-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). The location of all active nests will be determined by conducting pre-construction surveys within a 10-mile radius of the project area and by consulting with CDFG for known records. The surveys shall identify all potential nest sites and inspect all historic Swainson's hawk nests. The project owner shall be required to provide compensation for impacts to any foraging habitat impacted within 10 miles of an active nest.

a. 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.

Management Authorization holders/Project sponsors shall provide for the long-term management of the HM lands by funding a management endowment (the interest on which shall be used for managing the HM lands).

The responsibilities for acquisition and management of the HM lands may be delegated by written agreement to CDFG or to a third party, such as a non-governmental organization dedicated to Mojave Desert habitat conservation, subject to approval by the CPM, in consultation with CDFG prior to land acquisition or management activities. The acquisition and management of HM lands shall include the following elements:

1. Selection Criteria for HM Lands. The HM lands selected for acquisition shall:

   a. Be in 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.

2. Review and Approval of HM Lands Prior to Acquisition. A minimum of three months prior to acquisition of the property, the project owner, or a third-party approved by the CPM, in consultation with CDFG, shall submit a formal acquisition proposal to the CPM and CDFG describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as HM lands for Swainson's hawk in relation to the criteria listed above. Approval from the CPM, in consultation with CDFG, shall be required for acquisition of all parcels in advance of purchase.

3. Mitigation Security for HM Lands and Avoidance/Minimization Measures. The project owner or an approved third party shall

complete acquisition of the proposed HM lands prior to initiating ground-disturbing project activities. If Security is provided, the project owner, or an approved third party, shall complete the proposed HM lands acquisition within 12 months of the start of project ground-disturbing activities. The project owner shall also provide financial assurances to the CPM, with copies of the document(s) to CDFG, to guarantee that an adequate level of funding is available to implement all impact avoidance, minimization, and compensation measures required during construction (as described in Condition of Certification **BIO-16**) and for management of the HM lands. Financial assurance shall be provided to the CPM in the form of an irrevocable letter of credit or another form of security ("Security") approved by the CPM, prior to initiating ground-disturbing project activities. If necessary to draw on these funds, such funds shall be used solely for implementation of the measures associated with the project.

4. HM Lands Acquisition Conditions. The project owner shall comply with the following conditions relating to acquisition of HM lands after the CPM, in consultation with CDFG, has approved the proposed HM lands and received Security, if any, as described above.

   a. Preliminary Report: The project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary documents for the proposed HM lands. All documents conveying or conserving HM lands and all conditions of title/easement are subject to a field review and approval by the CPM, in consultation with CDFG, California Department of General Services and, if applicable, the Fish and Game Commission and/or the Wildlife Conservation Board.

   b. Title/Conveyance: The project owner shall transfer fee title or a conservation easement to the HM lands to CDFG under terms approved by CDFG. Alternatively, a non-profit organization qualified to manage compensation lands (pursuant to California Government Code section 65965) and approved by CDFG and the CPM may hold fee title or a conservation easement over the HM lands. If the approved non-profit organization holds title, a conservation easement shall be recorded in favor of CDFG in a form approved by CDFG. If the approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If a Security is provided, the project owner or an approved third party shall complete the proposed HM lands acquisition within 12 months of the start of project ground-disturbing activities.

c. Enhancement Fund. The project owner shall fund the initial protection and enhancement of the HM lands by providing the enhancement funds to the CDFG. Alternatively, a non-profit organization may hold the enhancement funds if they are qualified to manage the HM lands (pursuant to California Government Code section 65965) and if they meet the approval of CDFG and the CPM. If CDFG takes fee title to the HM lands, the enhancement fund must go to CDFG.

d. Endowment Fund. Prior to ground-disturbing project activities, the project owner shall provide to CDFG a capital endowment in the amount determined through the Property Analysis Record (PAR) or PAR-like analysis that will be conducted for the HM lands. Alternatively, a non-profit organization may hold the endowment fees if they are qualified to manage the HM lands (pursuant to California Government Code section 65965) and if they meet the approval of CDFG and the CPM. If CDFG takes fee title to the compensation lands, the endowment must go to CDFG, where it will be held in the special deposit fund established pursuant to California Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation shall manage the endowment for CDFG and with CDFG guidance.

The project owner and the CPM shall ensure that an agreement is in place with the endowment holder/manager to ensure the following conditions:

- Interest. Interest generated from the initial capital endowment shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved HM lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action designed to protect or improve the habitat values of the HM lands.

- Withdrawal of Principal. The endowment principal shall not be drawn upon unless such withdrawal is deemed necessary by the CDFG or the approved third-party endowment manager to ensure the continued viability of the species on the HM lands. If CDFG takes fee title to the HM lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established pursuant to Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation will manage the endowment for CDFG with CDFG guidance.

- Pooling Endowment Funds. CDFG, or a CPM- and CDFG-approved non-profit organization qualified to hold endowments pursuant to California Government Code section 65965, may pool the endowment with other endowments for the operation, management, and protection of the HM lands for local populations of Swainson's hawk. However, for reporting purposes, the endowment fund must be tracked and reported individually.

e. Reimbursement Fund: The project owner shall provide reimbursement to the CDFG or approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other state agency reviews; and overhead related to providing HM lands.

The project owner is responsible for all HM lands acquisition/easement costs, including but not limited to, title and document review costs, as well as expenses incurred from other State agency reviews and overhead related to providing HM lands to the department or approved third party; escrow fees or costs; environmental contaminants clearance; and other site clean-up measures.

Verification: No less than 90 days prior to acquisition of the property, the project owner, or a third-party approved by the CPM, in consultation with CDFG, shall submit a formal acquisition proposal to the CPM and CDFG describing the parcel(s) intended for purchase.

Draft agreements to delegate land acquisition to CDFG or an approved third party and agreements to manage HM lands shall be submitted to Energy Commission staff for review and approval (in consultation with CDFG) prior to land acquisition. Such agreements shall be mutually approved and executed at least 60 days prior to start of any project-related ground disturbance activities. The project owner shall provide written verification to the CPM that the HM lands have been acquired and recorded in favor of the approved recipient(s). Alternatively, before beginning project ground-disturbing activities, the project owner shall provide Security in accordance with this condition. Within 90 days after the land purchase, as determined by the date on the title, the project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, for the HM lands and associated funds.

Within 90 days after completion of project construction, the project owner shall provide to the CPM verification that disturbance to Swainson's hawk habitat has been quantified and that funds required acquire and manage the habitat have been designated.

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). If burrowing owls are detected within the impact area or within 500 feet of any proposed construction activities, the Designated Biologist shall prepare a Burrowing Owl Monitoring and Mitigation Plan in consultation with CDFG, USFWS, and Energy Commission staff. This plan shall include detailed measures to avoid and minimize impacts to burrowing owls in and near the construction areas and shall be consistent with CDFG guidance (CDFG 1995).

2. Artificial Burrow Installation. Prior to any ground-disturbing activities, the project owner shall install no less than four artificial burrows, or at least two burrows for each owl displaced by the project as close as possible to the existing location if owls are detected in the project footprint or within 250 feet of construction. If disturbance does not result in nest abandonment no artificial burrows would be required. Design of the artificial burrows shall be consistent with CDFG guidelines (CDFG 1995). The Designated Biologist shall survey the site selected for artificial burrow construction to verify that such construction will not affect desert tortoise or Mohave ground squirrel. The design of the burrows shall be approved by the CPM in consultation with CDFG and USFWS. If artificial burrows are required the owner shall obtain by purchase the land required to support the burrows or ensure the burrows are located in an area such as the transmission line easement where construction/development would not occur.

3. Surveys of Relocation Area. The Designated Biologist shall survey the relocation area(s) containing the artificial burrows installed in accordance with Item 2 above during the nesting season to assess use of the artificial burrows by owls using methods consistent with Phase II and Phase III California Burrowing Owl Consortium Guideline protocols (CBOC 1993). Surveys shall start upon completion of artificial burrow construction and shall continue for a period of five years. If survey results indicate burrowing owls are not nesting on the relocation area, remedial actions shall be developed and implemented in consultation with the CPM, CDFG, and USFWS to correct conditions at the site that might be preventing owls from nesting there. A report describing survey

results and remedial actions taken shall be submitted to the CPM, CDFG, and USFWS no later than January 31st of each year for five years.

The Burrowing Owl Relocation Area Management Plan shall include monitoring and maintenance requirements, details on methods for measuring compliance goals and remedial actions to be taken if management goals are not met. A report describing results of monitoring and management of the relocation area shall be submitted to the CPM, CDFG and USFWS no later than January 31st of each year for the life of the project.

Verification: Within 60 days of publication of the Energy Commission Decision, the project owner shall submit to the CPM, CDFG, and USFWS a draft Burrowing Owl Relocation Area Management Plan if burrowing owls will be relocated. If capture is proposed the plan shall include the information on the permitted bird handler. Prior to any ground-disturbing activities on the project site the project owner shall submit to the CPM a final Burrowing Owl Relocation Area Management Plan that reflects review and approval by Energy Commission staff in consultation with CDFG and USFWS.

If pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities, the Designated Biologist shall provide to CDFG, USFWS, and the CPM a Burrowing Owl 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, USFWS, and the CPM for the duration of construction on the implementation of burrowing owl avoidance and minimization measures described in the Burrowing Owl 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.

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 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.

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: Within 60 days of publication of the Energy Commission Decision the project owner shall submit to Energy Commission Staff 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 To fully mitigate for habitat loss and potential take of Mohave ground squirrel, the project owner shall acquire, in fee or in easement, no less than 693 acres of land suitable for this species and shall provide funding for the enhancement and long-term management of these compensation lands. 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. The responsibilities for 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 Mojave Desert habitat conservation, subject to approval by the CPM in consultation with CDFG, prior to land acquisition or management activities. If habitat disturbance exceeds that described in this analysis, the project owner shall be responsible for acquisition and management of additional compensation lands or additional funds required to compensate for any additional habitat disturbances. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat. The acquisition and management of compensation lands shall include the following elements:

1. 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 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.

2. Review and Approval of Compensation Lands Prior to Acquisition. A minimum of three months prior to acquisition of the property, the project owner, or a third party approved by the CPM in consultation with CDFG, shall submit a formal acquisition proposal to the CPM and CDFG describing the parcel(s) intended for purchase. 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. Approval from the CPM, in consultation with CDFG, shall be required for acquisition of all parcels comprising the 693 acres in advance of purchase.

3. Mitigation Security for Compensation Lands and Avoidance/Minimization Measures. The project owner or an approved third party shall complete acquisition of the proposed compensation lands prior to initiating ground-disturbing project activities. If Security is provided, the project owner, or an approved third party, shall complete the proposed compensation lands acquisition within 12 months of the start of project ground-disturbing activities. The project owner shall also provide financial assurances to the CPM, with copies of the document(s) to CDFG, to guarantee that an adequate level of funding is available to implement all impact avoidance, minimization, and compensation measures described in Condition of Certification **BIO-19**. Financial assurance shall be provided to the CPM in the form of an irrevocable letter of credit or another form of security ("Security") approved by the CPM, prior to initiating ground-disturbing project activities. If necessary to draw on these funds, such funds shall be used solely for implementation of the measures associated with the project.

   Prior to initiation of ground disturbance, the Security shall be provided by the project owner and approved by the CPM, in consultation with CDFG, to ensure funding in the amount of $3,846,150. These Security amounts were calculated as follows and may be revised upon completion of a Property Analysis Record (PAR) or PAR-like analysis of the proposed compensation lands:

   a. Land acquisition costs for compensation lands, calculated at $4,000/acre for 693 acres: $2,772,000.00;

b. Costs of enhancing compensation lands, calculated at $250/acre for 693 acres: $173,250.00; and

c. Costs of establishing an endowment for long-term management of compensation lands, calculated at $1,300/acre for 693 acres: $900,900.00

4. Compensation Lands Acquisition Conditions. The project owner shall comply with the following conditions relating to acquisition of compensation lands after the CPM, in consultation with CDFG, has approved the proposed compensation lands and received Security, if any, as described above.

   a. Preliminary Report: The project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary documents for the proposed 693 acres. All documents conveying or conserving compensation lands and all conditions of title/easement are subject to a field review and approval by the CPM, in consultation with CDFG, California Department of General Services and, if applicable, the Fish and Game Commission and/or the Wildlife Conservation Board.

   b. Title/Conveyance: The project owner shall transfer fee title or a conservation easement to the 693 acres of compensation lands to CDFG under terms approved by CDFG. Alternatively, a non-profit organization qualified to manage compensation lands (pursuant to California Government Code section 65965) and approved by CDFG and the CPM may hold fee title or a conservation easement over the habitat mitigation lands. If the approved non-profit organization holds title, a conservation easement shall be recorded in favor of CDFG in a form approved by CDFG. If the approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If a Security is provided, the project owner or an approved third party shall complete the proposed compensation lands acquisition within 12 months of the start of project ground-disturbing activities.

   c. Enhancement Fund. The project owner shall fund the initial protection and enhancement of the 693 acres by providing the enhancement funds to the CDFG. Alternatively, a non-profit organization may hold the enhancement funds if they are qualified to manage the compensation lands (pursuant to California Government Code section 65965) and if they meet the approval of CDFG and the CPM. If CDFG takes fee title to the compensation lands, the enhancement fund must go to CDFG.

d. Endowment Fund. Prior to ground-disturbing project activities, the project owner shall provide to CDFG a capital endowment in the amount determined through the Property Analysis Record (PAR) or PAR-like analysis that will be conducted for the 693 acres of compensation lands. Alternatively, a non-profit organization may hold the endowment fees if they are qualified to manage the compensation lands (pursuant to California Government Code section 65965) and if they meet the approval of CDFG and the CPM. If CDFG takes fee title to the compensation lands, the endowment must go to CDFG, where it will be held in the special deposit fund established pursuant to California Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation shall manage the endowment for CDFG and with CDFG guidance.

The project owner and the CPM shall ensure that an agreement is in place with the endowment holder/manager to ensure the following conditions:

- Interest. Interest generated from the initial capital endowment shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action designed to protect or improve the habitat values of the compensation lands.
- Withdrawal of Principal. The endowment principal shall not be drawn upon unless such withdrawal is deemed necessary by the CDFG or the approved third-party endowment manager to ensure the continued viability of the species on the 693 acres. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established pursuant to Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation will manage the endowment for CDFG with CDFG guidance.
- Pooling Endowment Funds. CDFG, or a CPM- and CDFG-approved non-profit organization qualified to hold endowments pursuant to California Government Code section 65965, may pool the endowment with other endowments for the operation, management, and protection of the 693 acres for local populations of Mohave ground squirrel. However, for reporting purposes, the endowment fund must be tracked and reported individually.

e. Reimbursement Fund: The project owner shall provide reimbursement to the CDFG or approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State agency reviews; and overhead related to providing compensation lands.

The project owner is responsible for all compensation lands acquisition/easement costs, including but not limited to, title and document review costs, as well as expenses incurred from other State agency reviews and overhead related to providing compensation lands to the department or approved third party; escrow fees or costs; environmental contaminants clearance; and other site clean-up measures.

Verification: No less than 90 days prior to acquisition of the property, the project owner, or a third-party approved by the CPM, in consultation with CDFG, shall submit a formal acquisition proposal to the CPM and CDFG describing the parcel(s) intended for purchase.

Draft agreements to delegate land acquisition to CDFG or an approved third party and agreements to manage compensation lands shall be submitted to Energy Commission staff for review and approval (in consultation with CDFG) prior to land acquisition. Such agreements shall be mutually approved and executed at least 60 days prior to the start of any project-related ground disturbance activities. The project owner shall provide written verification to the CPM that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient(s). Alternatively, before beginning project ground-disturbing activities, the project owner shall provide Security in accordance with this condition. Within 90 days after the land purchase, as determined by the date on the title, the project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, for the compensation lands and associated funds. If habitat disturbance exceeded that described in this analysis, the CPM shall notify the project owner of any additional funds required or lands that must be purchased to compensate for any additional habitat disturbances at the adjusted market value at the time of construction to acquire and manage habitat.

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.

CLOSURE PLAN MEASURES

BIO-24 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. The facility closure plan shall address biological resources-related mitigation measures. In addition to these measures, the plan must 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;

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

Beverly E. Bastian and Pamela Daly

SUMMARY OF CONCLUSIONS

For the Palmdale Hybrid Power Plant (PHPP) project, proposed by the City of Palmdale (applicant), staff lacks some information it needs to conclude its analysis of the California Register of Historical Resources (CRHR) eligibility of the cultural resources on and near the project areas and its analysis of the project's potential impacts to cultural resources.

The applicant has proposed a land treatment unit for Heat Transfer Fluid spill remediation, but to date has not provided a location or dimensions for this unit. To complete its analysis of the project's potential impacts on cultural resources, staff needs the additional information on the size (length, width, and depth) of the land treatment unit and a map showing its location. If the proposed location has not been surveyed for cultural resources, the applicant needs to conduct such a survey and provide the results of the survey to staff.

In March, 2009, the applicant added to the project description an earthen berm intended to mitigate the visual impacts of the project along Avenue M and other plant site peripheral roads, and in August, 2009, the applicant provided specifications on the dimensions (10 feet wide, 8 feet tall, 3,050 feet long) and location of the berm. To complete its analysis of the project's potential impact to cultural resources, staff needs to know if an off-site borrow area would be needed to supply the material for this berm, and, if such an area is needed and is not a commercial site, whether or not the area has been surveyed for cultural resources. If it has not, the applicant needs to conduct such a survey and provide the results of the survey to staff.

Staff identified five additional previously known archaeological sites whose locations staff considered close enough to project areas to make them subject to potential physical impacts. These sites are CA-LAn-805, CA-LAn-878, 19-1709, 19-2717, CA-LAn-2772, and CA-LAn-2774. The applicant apparently did not consider these sites close enough to project areas to make them subject to potential physical impacts, and so did not include them among the previously known sites that they attempted to relocate. Thus, the applicant provided no updated information on these sites. Staff needs information to make recommendations on the CRHR eligibility of these sites. The applicant needs to field-check these sites, update the site records to provide information on their character and condition, and provide the updated records to staff.

The project's proposed transmission line changes (i.e., removal of existing line supports and installation of new gen-tie supports) could impact the historic Palmdale Ditch and/or an associated bridge where the gen-tie transmission line crosses the ditch. The Palmdale ditch is a 6.5-mile-long canal constructed in 1918–1919 to provide water for agricultural irrigation around Palmdale. Staff needs additional information on the exact location of the applicant's transmission line and access road, and of all the poles that would support the conductors spanning any part or feature of the ditch, and of any spur

roads to those poles, relative to the ditch. Staff needs this relationship depicted on a scaled map. Until staff receives this information, staff cannot complete its analysis of potential impacts and recommend appropriate mitigation, if any would be required.

The proposed project could impact the Southern Pacific/Union Pacific railroad berm in two locations. This stretch of the Southern Pacific Railroad was constructed in 1876, and its completion marked the first connection by rail between northern and southern California. The proposed route for the natural gas and reclaimed water pipelines runs parallel to the railroad right-of-way from Avenue M south to Lockheed Way. It is possible that the trenching could impact the railroad berm along that route. Also, one of the support locations along the gen-tie transmission line route, segment 1, appears to impact the railroad berm. Staff needs additional information on the exact location of the applicant's natural gas line trench and of the pole location, relative to the railroad berm, and scaled maps showing these relationships. Until staff receives this information, staff cannot complete its analysis of potential impacts and recommend appropriate mitigation, if any would be required.

When staff receives the above information, staff expects to conclude as follows:

Staff identified no known cultural resources that the construction of the proposed PHPP project would significantly impact. Staff recommends that the Commission adopt the following 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 any significant impacts from the project on any newly found resources assessed as significant.

With the adoption and implementation of Conditions of Certification **CUL-1** through **CUL-8**, the PHPP project would have a less-than-significant impact on archaeological resources which may be discovered during construction-related excavation activities. 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 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 to less than significant any impacts to previously unknown CRHR-eligible cultural resources encountered during construction or operation. Additionally, with the adoption and implementation of these conditions, the PHPP project would be in conformity with all applicable laws, ordinances, regulations, and standards (LORS).

INTRODUCTION

This cultural resources assessment identifies the potential impacts of the PHPP project 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 California Register of Historical Resources (CRHR). A resource less than 50 years of age must be of exceptional historical importance to be considered for listing.

For the PHPP project, 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 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 compliance with all applicable laws. For this project, which has no federal involvement,[1] the applicable laws are primarily state laws. Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies.

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 NAHC-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.
Health and Safety Code, section 7050.5	Makes it a misdemeanor to disturb or remove human remains found outside a cemetery; also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Local	
Los Angeles County General Plan (Los Angeles County 2008)	• Policy C/OS 12.1: Support an interjurisdictional collaborative system that protects and enhances the County's cultural heritage resources. • 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: Promote public awareness of the County's cultural heritage resources.
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 ER7.1.2: Promote maintenance, rehabilitation, and appropriate reuse of identified landmarks where feasible. • Policy ER7.1.3: Require that new development protect significant historic, paleontological, or archaeological resources, or provide for other appropriate mitigation. • Policy ER7.1.4: Develop and maintain a cultural sensitivity map. Require special studies/surveys to be prepared for any development

[1] Cultural resources in California are also 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.

Applicable Law	Description
City of Palmdale General Plan, 1993	proposals in areas reasonably suspected of containing cultural resources, or as indicated on the sensitivity map. • 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 ER7.1.6: Cooperate with private and public entities whose goals are to protect and preserve historic landmarks and important cultural resources. • Policy ER7.1.7: Promote recognition, understanding and enjoyment of unique historical resources within the community by identifying resources through the use of landmark designation plaques, directional signage, self-guided tours, school curriculum, programs and events. (General Plan Amendment 04-01, adopted by City Council April 14, 2004.) • 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.) Table ER-1: List of Potential Historic Structures in Palmdale Area (1/25/93) Exhibit ER-7: Archaeological Sensitivity Map for Palmdale Area (1/25/93)
City of Palmdale General Plan, 1993	

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 project 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).

VICINITY, SITE, AND PROJECT DESCRIPTION

The proposed PHPP project 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
- 10-foot wide,8-foot-tall, road-screening earthen berm along Avenue M (and other peripheral roads)
- 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)
- HTF spill remediation in a land treatment unit of unspecified size and location
- 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 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, semideciduous shrubs, semisucculents, 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[2]

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[3] 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 Setting

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 PHHP 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,

[2] Geomorphology is the study of landform development processes.

[3] A bajada is an alluvial plain formed as a result of lateral growth of adjacent alluvial fans until they finally coalesce to form a continuous inclined deposit along a mountain front.

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 house, 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, the U.S. 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 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 Littlerock 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 Littlerock Creek to feed 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 project, 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 project.

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 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 with 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 project 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 had heritage ties to Los Angeles County and wanted to be informed about new development projects there. 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 persons on June 23, 2008, describing the proposed PHPP project 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 for Ron Andrade and James Ramos. On April 1, 2009, staff sent letters informing the six Native American individuals or groups about the proposed PHPP project 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 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 CRHR eligibility and potential project impacts.

Cultural Resources Table 2
Known Cultural Resources Located in or Near the Project Areas of the Proposed PHPP Project

Resource Designation	Type of Resource	Project Area	Information Source
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
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
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 Designation	Type of Resource	Project Area	Information Source
Archaeological Resources			
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, surface archaeological 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, and the applicant concluded that they were destroyed by development activities (WSA 2008a, table 10). So the applicant determined that only three previously known archaeological sites, 19-3703, 19-3704, and 19-3705, could be subject to project impacts.

Staff, however identified five additional previously known archaeological sites whose locations staff considered close enough to project areas to make them subject to potential physical impacts. These sites are:

1. CA-LAn-805,
2. CA-LAn-878,
3. 19-1709,
4. 19-2717, and
5. CA-LAn-2772.

The applicant apparently did not consider these sites close enough to project areas to make them subject to potential physical impacts, and so did not include them among the previously known sites that they attempted to relocate. Thus, the applicant provided no updated information on these sites. Staff needs additional information on these sites to assess whether the potential impacts to them could be significant and, if so, staff would need to provide mitigation for those 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 so does not discuss them at length.

With the addition of the 9 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 and two (CA-LAn-2723 and CA-LAn-2726) could not be field checked due to access restrictions. Five known sites were not identified by the applicant as potentially subject to impacts and so were not field checked, but staff considers them subject to impacts and so needs additional information on them. Consequently, at this time staff can address the CRHR eligibility of only 12 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).

Staff needs additional information on five sites, of which two, CA-LAn-805 and CA-LAn-878, are prehistoric sites, and three, 19-1709, 19-2717, and CA-LAn-2772 are historical archaeological sites (refuse deposits).

These counts and site lists may change, depending on the results of the applicant's field check of the five additional known sites staff identified as potentially subject to impacts. The CRHR eligibility of these resources must next be considered.

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 so does not discuss them at length.

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 Littlerock 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 span 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 Southern California Edison'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, then, 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,[4] 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 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

[4] *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.*

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 Impacts, Evaluated for Historical Significance

Counting the five previously known archaeological sites for which staff needs additional information, staff identified 17 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 17 sites include 2 prehistoric sites and 15 historical archaeological sites (all refuse deposits), discussed below.

CA-LAn-805 is a previously known prehistoric archaeological site consisting of a sparse scatter of flaking waste (Toren and Wessel 1978). Until it is field checked, staff cannot make a recommendation on its CRHR eligibility.

CA-LAn-878 is a previously known prehistoric archaeological site consisting of milling stones and flaking waste, with midden present (Duran 1972). Two other prehistoric sites, LAn-1419 (a lithic scatter) and LAn-1420 (a bedrock mortar), had previously been recorded to the northeast of this site, so, if it still present, this site could be important. Until it is field checked, staff cannot make a recommendation on its CRHR eligibility.

19-1709 is a previously known historical archaeological site, consisting of the remains of a stone house foundation and walls and an associated refuse deposit (Norwood 1990). These remains date to the early twentieth century, according to historic maps. Buried refuse deposits are possible at a residential site of this period. Until this site is field checked, staff cannot make a recommendation on its CRHR eligibility.

19-2717 is a previously known historical archaeological site consisting of a refuse deposit probably associated with a former house site that was bulldozed (Shaver 1996). Until it is field checked, staff cannot make a recommendation on its CRHR eligibility.

CA-LAn-2772 is a previously known historical archaeological site consisting of a refuse deposit (Ferraro and Maxon 1999). Until it is field checked, staff cannot make a recommendation on its CRHR eligibility.

The 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 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 thinks 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 (the CRHR Criterion that historical archaeological sites typically must meet), staff concurs with the applicant's recommendation of CRHR ineligibility for all of these 12 sites.

Staff has recommended, then, that 12 historical archaeological refuse deposits are not eligible for the CRHR. Five archaeological sites remain for which staff needs additional information before making a recommendation on their CRHR eligibility. If staff concludes, on the basis of the additional information, that any of these sites could be eligible, staff would need to identify and evaluate project impacts to them.

Built-Environment Resources, Potentially Subject to 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) and 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 unevaluated, so project impacts to them 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) (19-180680)

This building was determined eligible for listing in the NRHP[5] 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 (CA-LAn-1534H)

A historic district consisting of Littlerock 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 Littlerock 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 a historical resource under CEQA.

Southern Pacific Railroad (19-180638)

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 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).

[5] A cultural resource that is listed in the NRHP is automatically eligible for listing in the CRHR, so staff considers a cultural resource recommended as eligible for the NRHP as also potentially eligible for the CRHR.

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 finds 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 (19-187713)

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, so, 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 this resource 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 CR Table 3.

Cultural Resources Table 3
CRHR-Eligible Cultural Resources Subject to Potential Impacts from the Proposed PHPP Project

Resource Designation	Type of Resource	CRHR Eligibility	Integrity
19-180680	Air Force Plant 42: Building 15(150) (c. 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 National Forest Highway (late 1930–early 1940s)	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

Various laws apply to the evaluation and treatment of cultural resources. CEQA requires the Energy Commission to evaluate resources by determining whether they meet several sets of specified criteria. These evaluations then influence the analysis of potential impacts to the resources and the mitigation that may be required to ameliorate any such impacts.

The CEQA Guidelines provide a definition of a historical resource as 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 resources 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)). Historical resources that are automatically listed in the CRHR include California historical resources listed in or formally determined eligible for the NRHP and California Registered Historical Landmarks from No. 770 onward (Pub. Resources Code, § 5024.1(d)).

Under the CEQA Guidelines, a resource is generally considered to be historically significant if it meets the criteria for listing in the CRHR. These criteria are essentially

the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old,[6] 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.

In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (Cal. Code Regs., tit. 14, § 4852(c)).

Even if a resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows the lead agency to make a determination as to whether the resource is a historical resource as defined in Public Resources Code, section 5020.1 (j) or section 5024.1. Whether a proposed project would cause a substantial adverse change in the significance of historical resources is the issue that staff analyzes to determine if the project may have a significant effect on the environment. The 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 would 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

[6] The Office of Historic Preservation's Instructions for Recording Historical Resources (1995) endorses recording and evaluating resources over 45 years of age to accommodate a five-year lag in the planning process.

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 most of the construction activities listed above under “Project, Site, And Vicinity Description,” staff has analyzed the potential impact of the activities to known, CRHR-eligible archaeological resources. Staff, however, has insufficient information on two of these activities, proposed by the applicant subsequent to the submission of the AFC, to complete its analysis of the project’s potential impact to cultural resources. The activities for which additional information is needed are:

- Construction of a land treatment unit for HTF spill remediation (AECOM2009a, revised table 5.16-6R, response to Data Request 82); and
- Construction of a 10-foot wide, 8-foot tall, 3,050-foot-long earthen berm proposed by the applicant to mitigate the visual impacts of the project along Avenue M and other plant site peripheral roads (AECOM 2009q).

The construction of a land treatment unit would entail considerable ground disturbance. The applicant has not indicated the size of the unit or where it would be located. Staff needs the additional information on the size (length, width, and depth) of the land treatment unit and a map showing its location. If the proposed location has not been surveyed for cultural resources, the applicant needs to conduct such a survey and provide the results of the survey to staff.

The construction of a site-screening berm may require the use of an off-site borrow area from which to acquire the great volume of necessary material. Staff needs additional information on the need for an off-site borrow area and, if such an area is needed and is not a commercial site, whether or not the area has been surveyed for cultural resources. If it has not, the applicant needs to conduct such a survey and provide the results of the survey to staff.

Identification and Assessment of Direct Impacts and Recommended Mitigation

Archaeological Resources

Because staff determined that all the known archaeological sites potentially impacted by the proposed PHPP project's construction are not eligible for the CRHR, 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, along the proposed linear facilities, and at the currently unspecified locations of the land treatment unit and the possible borrow area has the potential to directly impact archaeological resources, unidentified at this time. These resources could be buried in the sediments of the project areas or could be in borrow or disposal areas the applicant may later use.

Because of the possibility that prehistoric and historical archaeological deposits could be encountered during construction, CEQA advises a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, and the 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.

To that end as well, the applicant has suggested a number of measures intended to mitigate potential impacts to archaeological resources that could be discovered during the construction of the proposed PHPP project, including the following[7] (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. 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

[7] The applicant's mitigation measures are quoted exactly, but the numbering was changed because they were mis-numbered in the AFC.

The applicant regarded the Palmdale Ditch as an archaeological site and so included two provisions for it (numbers 1 and 2) among the proposed mitigation measures, but staff considers the Ditch a built-environment resource and proposes mitigation for impacts to it under "Built-Environment," below)

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 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. The Native American Heritage Commission 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, although a particular part of that site 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 project 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. Because, however, the geoarchaeological literature study did not dismiss the possibility that buried archaeological deposits could be present in all project areas, staff recommends the full-time archaeological monitoring of all construction activities in all project areas, including foundation excavations for plant equipment and transmission line poles, trench excavation for pipelines, jack-and-bore tunneling/directional drilling wherever it is used, and grading for all road (including transmission line access and spur roads).

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 a Cultural Resources Specialist (CRS) to be retained and available during PHPP construction-related excavations to evaluate any discovered buried resources and, if necessary, to conduct data recovery as mitigation for the project's unavoidable impacts on them. **CUL-2** requires the project owner to provide the CRS with all relevant cultural resources information and maps. **CUL-3** requires the CRS to write and submit to the Energy Commission Compliance Project Manager (CPM) a Cultural Resources Monitoring and Mitigation Plan (CRMMP). **CUL-4** requires the CRS to write and submit to the CPM a final report on all PHPP cultural resources monitoring and mitigation activities. **CUL-5** requires the project owner to train workers to recognize cultural resources and instruct them to halt construction if cultural resources are discovered. **CUL-6** prescribes the monitoring, by an archaeologist and, possibly, by a Native American, intended to identify buried archaeological deposits. **CUL-7** requires the project 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 survey.

Built-Environment

Three 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 other two are possible, but staff needs more definitive information before it can conclude that these impacts would occur. In the absence of that information, staff would recommend conditions of certification to mitigate these 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 over 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 ditch's integrity of setting and integrity of feeling would not be impacted by the replacement of the existing power poles and transmission lines, but the removal of the old transmission line supports and the installation of the new gen-tie supports could physically impact the ditch and/or the bridge. Staff needs additional information on the exact location of the applicant's transmission line and access road, and of all the poles that would support the conductors spanning any part or feature of the ditch, and of any spur road to those poles, relative to the ditch. Until staff receives this information, staff cannot complete its analysis of potential impacts and recommend appropriate mitigation, if any would be required. In the absence of this information, staff, as the applicant has suggested, would recommend a condition of certification to provide for the recordation, to Historic American Engineering Record (HAER) standards for all parts of the ditch or bridge that the project physically impacts.

Southern Pacific Railroad

The proposed project could impact the railroad berm, which staff believes to be, at least in part, the original 1876 berm, in two locations. The route proposed for the natural gas and reclaimed water pipelines runs parallel to the railroad right-of-way from Avenue M south to Lockheed Way. If the applicant has received permission to install its pipelines in the railroad's right-of-way, it is possible that the trenching could impact the railroad berm along that route. Also, one of the monopole locations along the gen-tie transmission line route, segment 1, appears to impact the railroad berm (WSA 2009a,

fig 1, map 9). Staff needs additional information on the exact location of the applicant's natural gas line trench and of the pole location, relative to the railroad berm. Until staff receives this information, staff cannot complete its analysis of potential impacts and recommend appropriate mitigation, if any 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). So the project could physically impact only a part of the old transmission line that 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 since 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 since 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.

Ethnographic Resources

No ethnographic resources were identified by the applicant or staff, so no mitigation measures for proposed PHPP project 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 impact areas of the proposed PHPP project, 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 or to ethnographic resources. Staff expects that significant impacts to two CRHR-eligible built-environment resources, the Palmdale Ditch and the Southern Pacific/Union Pacific Railroad, if not avoided by the applicant, would be reduced to a less-than-significant level by the conditions of certification that staff would devise and recommend. Staff expects additional information provided by the applicant could demonstrate that the possible impacts to the Palmdale Ditch and the Southern Pacific/Union Pacific Railroad would be avoided.

Operation Impacts and Mitigation

During operation of the proposed PHPP, if a leak should develop in the gas or water pipelines supplying the plant, repair of the buried utility could require extensive excavation. So such repairs could impact previously unknown subsurface archaeological resources in areas unaffected by the original trench excavation. The measures proposed for mitigating impacts to previously unknown archaeological resources during the construction of the plant and linear facilities (see "Proposed Conditions of Certification," **CUL-1** through **CUL-8**, below) would also serve to mitigate impacts from repairs occurring during operation of the plant.

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 project 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/may not be a significant impact to cultural resources.

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 project areas 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). 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 project, 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 significant cultural resources and potential project impacts to these cultural resources, and that any impacts have either been avoided or mitigated to a less-than-significant level. Staff, however, has not reviewed the cultural resources studies for these seven projects.

This Preliminary Staff Assessment has identified cultural resources near the proposed PHPP project site, assessed potential PHPP project impacts to these cultural resources, and recommended conditions of certification to mitigate any significant impacts to significant known resources so that the construction of the proposed PHPP project would not result in any significant impacts to cultural resources. Staff has also provided conditions of certification to mitigate any significant impacts to significant archaeological resources discovered during PHPP project construction. Proponents of future projects in the vicinity of PHPP project can mitigate impacts to as yet undiscovered 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 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 project to significant cultural resources discovered during PHPP project 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 project 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 project would result in a less-than-significant impact on known cultural resources and on any new archaeological resources discovered during construction. The proposed PHPP project would therefore be in compliance with 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

CONCLUSIONS AND RECOMMENDATIONS

Staff lacks some information it needs to conclude its analyses of the CRHR eligibility of the cultural resources on and near the project areas and of the project's potential significant impacts to cultural resources.

The applicant has proposed a land treatment unit for Heat Transfer Fluid spill remediation, but to date has not provided a location or dimensions for this unit. To complete its analysis of the project's potential impacts on cultural resources, staff needs the additional information on the size (length, width, and depth) of the land treatment unit and a map showing its location. If the proposed location has not been surveyed for cultural resources, the applicant needs to conduct such a survey and provide the results of the survey to staff.

In March, 2009, the applicant added to the project description an earthen berm intended to mitigate the visual impacts of the project along Avenue M and other plant site peripheral roads, and in August, 2009, the applicant provided specifications on the dimensions (10 feet wide, 8 feet tall, 3,050 feet long) and location of the berm. To complete its analysis of the project's potential impact to cultural resources, staff needs to know if an off-site borrow area would be needed to supply the material for this berm, and, if such an area is needed and is not a commercial site, whether or not the area has been surveyed for cultural resources. If it has not, the applicant needs to conduct such a survey and provide the results of the survey to staff.

Staff identified five additional previously known archaeological sites whose locations staff considered close enough to project areas to make them subject to potential physical impacts. These sites are CA-LAn-805, CA-LAn-878, 19-1709, 19-2717, CA-LAn-2772, and CA-LAn-2774. The applicant apparently did not consider these sites close enough to project areas to make them subject to potential physical impacts, and so did not include them among the previously known sites that they attempted to relocate. Thus, the applicant provided no updated information on these sites. Staff needs information to make recommendations on the CRHR eligibility of these sites. The applicant needs to field-check these sites, update the site records to provide information on their character and condition, and provide the updated records to staff.

The project's proposed transmission line changes (i.e., removal of existing line supports and installation of new gen-tie supports) could impact the historic Palmdale Ditch and/or

an associated bridge where the gen-tie transmission line crosses the ditch. The Palmdale ditch is a 6.5-mile-long canal constructed in 1918–1919 to provide water for agricultural irrigation around Palmdale. Staff needs additional information on the exact location of the applicant's transmission line and access road, and of all the poles that would support the conductors spanning any part or feature of the ditch, and of any spur roads to those poles, relative to the ditch. Staff needs this relationship depicted on a scaled map. Until staff receives this information, staff cannot complete its analysis of potential impacts and recommend appropriate mitigation, if any would be required.

The proposed project could impact the Southern Pacific/Union Pacific railroad berm in two locations. This stretch of the Southern Pacific Railroad was constructed in 1876, and its completion marked the first connection by rail between northern and southern California. The proposed route for the natural gas and reclaimed water pipelines runs parallel to the railroad right-of-way from Avenue M south to Lockheed Way. It is possible that the trenching could impact the railroad berm along that route. Also, one of the support locations along the gen-tie transmission line route, segment 1, appears to impact the railroad berm. Staff needs additional information on the exact location of the applicant's natural gas line trench and of the pole location, relative to the railroad berm, and scaled maps showing these relationships. Until staff receives this information, staff cannot complete its analysis of potential impacts and recommend appropriate mitigation, if any would be required.

When staff receives the above information, staff expects to conclude as follows:

Staff identified no known cultural resources that the construction of the proposed PHPP project would significantly impact. Staff recommends that the Commission adopt the following 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 any significant impacts from the project on any newly found resources assessed as significant.

With the adoption and implementation of Conditions of Certification **CUL-1** through **CUL-8**, the PHPP project would have a less-than-significant impact on archaeological resources discovered during construction-related excavation activities. 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 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 to less than significant any impacts to previously unknown CRHR-eligible cultural resources encountered during construction or operation. Additionally, with the adoption and implementation of these conditions, the PHPP project would be in conformity with all applicable LORS.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of construction-related ground disturbance (includes "preconstruction site mobilization," "ground disturbance," and "construction grading, boring and trenching," as defined in the General Conditions for this project), the project owner shall obtain the services of a Cultural Resources Specialist (CRS) and one or more alternate CRSs, if alternates are needed. The CRS shall manage all monitoring, mitigation, curation, and reporting activities required in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural 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 construction-related 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 Energy Commission projects.

CULTURAL RESOURCES SPECIALIST

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 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 construction-related 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 construction-related ground disturbance may continue up to a maximum of 3 days without a CRS. If cultural resources are discovered then construction-related 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 construction-related 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 construction-related 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 construction-related 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 construction-related 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 construction-related 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 construction-related 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 construction-related ground disturbance, the project owner shall provide the AFC, data responses, confidential cultural resources documents, 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 construction-related 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 construction-related 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 construction-related 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 construction-related 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 construction-related ground disturbance and post-construction-related 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 construction-related 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 construction-related 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 construction-related ground disturbance and cannot be treated prescriptively.
10. A description of the contents and format 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 construction-related 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 construction-related 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).

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 construction-related 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 construction-related 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 construction-related 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 90 days after completion of construction-related 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 cultural materials, if any, from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.
4. 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 construction-related 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 construction-related ground disturbance is completed or suspended, but must be resumed when construction-related 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 construction-related 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 construction-related 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 construction-related 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 construction-related 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 construction-related 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.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of the earth-removing activities in the areas specified in the previous [two] paragraph[s], 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 further 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 construction-related ground disturbance in areas where Native American artifacts may be 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 construction-related 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 construction-related 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. 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.
4. 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.
5. 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.
6. 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.
7. 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 construction-related ground disturbance to the CRS, alternate CRS, and the CRMs in the event of a discovery. Redirection of construction-related 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, construction-related 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. Monitoring and daily reporting as provided in these conditions shall continue during the project's construction-related ground-disturbing activities elsewhere. The halting or redirection of construction-related 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 construction-related 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 construction-related 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 construction-related 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

PHPP COMBINED CYCLE POWER PLANT 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	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
PHPP	City of Palmdale Hybrid Combined-Cycle Power Plant
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

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
SCCIC	South Central Coastal Information Center (CHRIS), California State University, Fullerton
SHPO	State Historic Preservation Officer
Staff	Energy Commission cultural resources technical staff
WEAP	Worker Environmental Awareness Program

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LAND USE

Negar Vahidi

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.

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 general plan and zoning of the site and the character of permitted uses and planned development for the area.

Because the city of Palmdale has not responded to staff's many requests to provide a consistency determination for the transmission line with the city's General Plan and Zoning Ordinance , staff cannot determine whether this portion of the transmission line would be consistent or inconsistent with applicable city laws, ordinances, regulations and standards (LORS). Therefore, staff concludes that the consistency of the transmission line within the city of Palmdale's jurisdiction is undetermined with the city's applicable LORS. Staff encourages the city to review the siting of its transmission line with respect to the affected city zoning designations and provide staff with its specific findings regarding consistency. Staff hopes to resolve this issue post PSA publication and during the PSA Workshop.

Transmission lines in Los Angeles County 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.

Staff has made several attempts to contact Los Angeles County regarding conditional use permit requirements for this portion of the proposed transmission line. Los Angeles County has not responded to staff's requests, and similar to staff's conclusions on the city of Palmdale's applicable LORS, staff cannot conclude that the transmission line would be consistent or inconsistent with the county's applicable LORS.

Because staff is undetermined in regard to the transmission line's consistency with local zoning, staff cannot conclude that the transmission line would be compatible with existing and planned uses.

INTRODUCTION

The land use analysis of the Palmdale Hybrid Power Project 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 Importance Farmlands to non-agricultural uses.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Land use LORS directly applicable to the proposed project include 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	None
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 Zoning (LAC 2009a)	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 grouping of the various land uses within the unincorporated area of the county.

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 the other for 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;
- **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 south, 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 rights-of-way (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 an area with the land use designations Light Industrial and Planned Industrial, 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). Transmission System Engineering staff have required the Facilities Study and Right-of-Way Study be completed by the California ISO and SCE, respectively, to complete their Final Staff Assessment.

Because a new ROW would be required, this segment 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 ROW 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 does not hinder this impact analysis. However, staff will not include a specific length for the pipeline until the issue is resolved during the PSA Workshop.

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]."

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).

The proposed transmission line would traverse areas with 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 an 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, the 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 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 natural gas pipeline, reclaimed water supply pipeline, sanitary wastewater pipeline, and the potable water pipeline associated with the proposed project traverse several city of Palmdale General Plan land use and zoning

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."

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. Therefore, given that the amount of Prime Farmland conversion due to the pole foundations is so minimal, permanent farmland conversion impacts are not expected to be significant. As such, in this area of Segment 1, the potential conversion of Prime Farmland would be less-than-significant impact.

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, and the pole foundations would permanently convert approximately 0.10 acre. As noted above, the pole foundations would result in a less-than-significant conversion of agricultural land. In addition, Segment 2 would traverse land zoned for agriculture; however, construction would occur in an existing SCE transmission line ROW and 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 power plant site and construction laydown area would be located entirely on city-owned property that has been zoned for industrial development. Access to the power plant 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 and 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 ROW.
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 project owner in the AFC (and any amendments), project design and operational components, and siting 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 (PRC 2005). 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 the other for 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.

Normally, in Preliminary Staff Assessments, staff would recommend conditions of certification in order for the applicant to design the project (and its associated linear facilities) in compliance with local LORS such as the General Plan and zoning ordinances. The city of Palmdale has not responded to staff's request for consistency determination for the transmission line within its jurisdiction; thus, staff cannot determine the transmission line consistent or inconsistent with the city of Palmdale's General Plan and Zoning Ordinance. Staff concludes that LORS consistency for the transmission line is undetermined.

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**. The majority of the project-related linear facilities (except for the proposed transmission line) would all be sited underground, and thus their associated impacts would be temporary. Therefore, upon completion of construction, these linear facilities would not result in any LORS inconsistencies.

Based on staff's independent review of the city of Palmdale and Los Angeles County's applicable LORS documents, the proposed PHPP, with the exception of the transmission line would be consistent with those LORS.
As stated above, transmission line consistency with the applicable LORS for Los Angeles County and the city of Palmdale is undetermined.

LAND USE Table 2
Project Compliance with Adopted Applicable Land Use LORS

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
Federal	None		
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 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.	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 sitewould be consistent with the IND land use designation.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
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	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 Energy Commission's review of the proposed project includes a site plan review. Staff concludes that the gas pipeline would be consistent with this zone because the natural gas pipeline would be sited underground and any associated impacts would be temporary and, as stated in the Facility Design section of this document, the gas pipeline would be constructed to accepted industry standards. Therefore, upon completion of construction, the gas pipeline would not result in any LORS inconsistencies
	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	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. Similar to the reasons described for the portion of the natural gas pipeline traversing the R-1 Zone, staff finds that the portion of the gas pipeline would be consistent with the R-2 zone.
	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 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.	Yes	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. Similar to the reasons described for the portion of the natural gas pipeline traversing the R-1 and R-2 Zones, staff finds that the portion of the gas pipeline would be consistent with the C-3 zone.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	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	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. Similar to the reasons described for the portion of the natural gas pipeline traversing the R-1, R-2, and C-3 Zones, staff finds that the portion of the gas pipeline would be consistent with the C-5 zone.
	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 gas and water pipelines) Undetermined (for the transmission line)	The proposed natural gas pipeline would traverse the M-1 zone for approximately 0.5 mile, and the proposed sanitary wastewater pipeline would traverse the M-1 zone for approximately 0.1 mile. Both linear components would be subject to the city's Site Plan Review approval. Similar to the reasons described above for the portions of the natural gas pipeline traversing the R-1, R-2, C-3, and C-5 Zones, staff finds that these linear facilities would be consistent with the M-1 zone. A portion of the transmission line would cross this zone classification. Because the city of Palmdale has not provided staff with its opinion on the proposed transmission line's consistency with their M-1 zoning, staff cannot conclude this use either consistent or inconsistent with the M-1 zone.
	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	Yes (for the proposed PHPP site and gas and water pipelines) Undetermined (for the proposed transmission lines)	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 t site would be consistent with the M-2 zoning designation. The proposed linear components would traverse zone districts outside of the proposed project site. The proposed natural gas pipeline would traverse the M-2 zone for approximately 0.6 mile, 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, 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

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	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.		Plan Review. The Energy Commission's review of the proposed project includes a site plan review. Staff concludes that the gas pipeline would be consistent with this zone similar to the reasons discussed above for the portions of the natural gas pipeline and wastewater pipeline traversing the R-1, R-2, C-3, C-5, and M-1 Zones. Staff finds that these linear facilities would be consistent with the M-2 zone. Transmission lines are not specifically identified as a use permitted subject to site plan approval and a portion of the transmission line would cross the M-1 and M-2 zone classifications. Because the city of Palmdale has been silent on the proposed transmission line's consistency with their M-1 and M-2 zoning, staff cannot conclude this use to be consistent or inconsistent with the M-1 and M-2 zones.
	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	The proposed natural gas pipeline would traverse the M-3 zone for approximately 0.6 mile, and the proposed reclaimed water supply pipeline would traverse the M-3 zone for approximately 0.6 mile. Similar to the reasons described above for linear facilities traversing the R-1, R-2, C-3, C-5 , M-1, and M-2 Zones, staff finds that these linear facilities would be consistent with the M-3 zone.
	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. (Zoning Ordinance Amendment 97-3, adopted by City Council September 10, 1997.)	Yes (for the proposed PHPP site and gas pipeline) Undetermined (for the proposed transmission lines)	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). Similar to the reasons described above for gas and water pipelines traversing the R-1, R-2, C-3, C-5 , M-1, M-2, and M-3 Zones, staff finds that these linear facilities would be consistent with the M-4 zone. Transmission lines are not specifically identified as a use permitted subject to site plan approval and a portion of the transmission line would cross the M-4 zone classification. Because the city of Palmdale has been silent on the proposed transmission line's consistency with their M-1 and M-2 zoning, staff cannot conclude this use to be consistent or inconsistent with the M-4 zone.
	ARTICLE 71 PUBLIC FACILITIES (ZONE PF)	Yes	The proposed natural gas pipeline would traverse the PF zone for approximately 0.4 mile, the proposed reclaimed water supply pipeline

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	Section 71.05 Uses Permitted Subject to Site Plan Review Approval B. Public, quasi-public and institutional uses, including: 12. Utility corridors.		would traverse the PF zone for 0.2 mile, and the proposed water pipeline would traverse the PF zone for <0.1 mile. Similar to the reasons described above, staff finds that these linear facilities would be consistent with the P-F zone.
	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	The proposed natural gas line would traverse the CD-MX zone for approximately 0.1 mile. This is an overly 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.
	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	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. The Energy Commission's review of the proposed project includes a site plan review. Similar to the reasons discussed above for the portions of the proposed water and gas lines traversing the R-1, R-2, C-3, C-5, M-1, M-2, M-3, M-4, and PF Zones, staff finds the proposed project's natural gas pipeline would be consistent with the C-D Zone and the related CD-MX overlay.
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	Undetermined	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 the 230-kV transmission line that would be constructed within an existing SCE transmission line ROWBecause transmission lines are not specifically listed as a use, staff sought the

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	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 necessary, to serve current and future County residents.		county's interpretation of its general plan.To date, staff has been unsuccessful in obtaining the county's interpretation. Because the county has not provided staff with its opinion on consistency, staff cannot determine the proposed transmission line is consistent with this portion of the county general plan, at this time.
	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.	Undetermined	The majority of Segments 1 and 2 of the proposed transmission line ROW would traverse the Non-Urban land use designation. Because transmission lines are not specifically listed as a use, staff sought the county's interpretation of its general plan.To date, staff has been unsuccessful in obtaining the county's interpretation. Because the county has not provided staff with its opinion on consistency, staff cannot determine the proposed transmission line is consistent with this portion of the county general plan, at this time.
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:	Undetermined	The majority of Segments 1 and 2 of the proposed transmission line would traverse the Non-Urban land use designation. Because transmission lines are not specifically listed as a use, staff sought the county's interpretation of the Antelope Valley Area Plan. To date, staff has been unsuccessful in obtaining the county's interpretation. Because the county has not provided staff with its opinion on consistency, staff cannot determine the proposed transmission line is consistent with the Antelope Valley Area Plan, at this time.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	(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. D. General Conditions for Development 3. Non-residential uses in non-urban areas a. Location (1.) The proposed use should be located and designed so as not to conflict with established community land use and circulation patterns.	Undetermined	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 Area Plan. To date, staff has been unsuccessful in obtaining the county's interpretation. Because the county has not provided staff with its opinion on consistency, staff cannot determine the proposed transmission line is consistent with the Antelope Valley Area Plan, at this time.
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.**	Undetermined	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. The A-1 and A-2 zones do not specifically allow for siting of high voltage transmission lines but electric substations and generating plants are conditionally permitted uses in the A-1 and A-2 zones. Therefore, staff assumes that transmission lines would also be conditionally permitted uses in these zones and no land use or zoning designation change would be required for this use. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code. To date, staff has been unsuccessful in obtaining the county's interpretation. Because the county has not provided staff with its opinion on consistency, staff cannot determine the proposed transmission line is consistent with this portion of the county zoning code, at this time.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	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.		
	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.	Undetermined	Segments 1 and 2 of the proposed transmission line would traverse this zone designation within unincorporated Los Angeles County. Because electric substations and generating plants are conditionally permitted uses under the Los Angeles County zoning requirements, staff assumes that transmission lines would also be conditionally permitted uses in these zones. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code. To date, staff has been unsuccessful in obtaining the county's interpretation. Because the county has not provided staff with its opinion on consistency, staff cannot determine the proposed transmission line is consistent with this portion of the county zoning code, at this time.
	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	Undetermined	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 electric substations and generating plants are conditionally permitted uses under the Los Angeles County zoning requirements, staff assumes that transmission lines would also be conditionally permitted uses in these zones. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code. To date, staff has been unsuccessful in obtaining the county's interpretation.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	22.28.230 (Zone C-M), subject to the limitations and conditions set forth therein.		Because the county has not provided staff with its opinion on consistency, staff cannot determine the proposed transmission line is consistent with this portion of the county zoning code, at this time.
	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 would alter the community's character, while providing for adequate drainage and other community safety features.	Undetermined	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 portion of the proposed transmission line would be constructed within the existing SCE transmission line ROW. Because the transmission line is proposed to be sited within an existing ROW and electric substations and generating plants are conditionally permitted uses under the Los Angeles County zoning requirements for the A-1 Zone, staff assumes that transmission lines would also be conditionally permitted uses. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code. Within the CSD. To date, staff has been unsuccessful in obtaining the county's interpretation. Because the county has not provided staff with its opinion on consistency, staff cannot determine the proposed transmission line is consistent with this portion of the county zoning code within this CSD, at this time.
	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.	Undetermined	Approximately 12 miles of the transmission line would cross the East Antelope Valley Community Standards District (CSD) which is located east and southeast of the city of Palmdale (PHPP 2008). As such, 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 ROW. Because the transmission line is proposed to be sited within an existing ROW and electric substations and generating plants are conditionally permitted uses under the Los Angeles County zoning code, staff assumes that transmission lines would also be conditionally permitted uses. Because transmission lines are not specifically listed, staff sought the county's interpretation of its zoning code within this CSD. To date, staff has been unsuccessful in obtaining the county's interpretation. Because the county has not provided staff with its opinion on consistency, staff cannot determine the proposed transmission line is consistent with this portion of the county zoning code within this CSD, at this time.

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**, development of the proposed project and its linear facilities would be compatible with existing surrounding land uses. The proposed power plant site would be located in an area primarily dominated by industrial development and zoned by the city for those uses.

Once constructed, the underground linear facilities would not result in any permanent changes to, or conflicts with, the existing land uses.

City of Palmdale zoning along the proposed transmission line route within its jurisdiction would be M-2 (General Industrial) and M-4 (Planned Industrial). Los Angeles County zoning for the part of the proposed transmission line route within its jurisdiction would be Light Agriculture (A-1) and Heavy Agriculture (A-2) (21 miles); Open Space (OS) (one mile); Resort and Recreation (R-R) (0.3 mile); and Manufacturing (M-1) (1.5 miles).

Because the city of Palmdale (as the applicant) has not responded to staff's many requests to provide a consistency determination for the transmission line with the city's General Plan and Zoning Ordinance, staff cannot determine this portion of the transmission line consistent or inconsistent with applicable city LORS. Therefore, staff concludes that the consistency of the transmission line with the city's applicable LORS is undetermined. Staff encourages the city to review the siting of its transmission line with respect to the affected city zoning designations and provide staff with its specific findings regarding consistency. Staff hopes to resolve this issue post PSA publication and during the PSA Workshop.

Transmission lines in Los Angeles County 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. Staff has made several attempts to contact Los Angeles County regarding conditional use permit requirements for this portion of the proposed transmission line. Los Angeles County has not responded to staff's requests, and similar to staff's conclusions on the city of Palmdale's applicable LORS, staff concludes that the consistency of the transmission line with the county's applicable LORS is undetermined. Staff encourages the city of Palmdale to facilitate with Los Angeles County a review of the proposed transmission line with its affected county zoning designations to provide staff with its opinion on consistency. Staff hopes to resolve this issue after the PSA has been published, during the PSA Workshop.

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 miles 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 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 the proposed power plant site would be consistent with local LORS, the proposed power plant would not be considered an incompatible land use with the surrounding and nearby uses, including sensitive receptors.

From a land use perspective, the siting of the PHPP site at the proposed location would be compatible with nearby surrounding sensitive receptors. The city of Palmdale and Los Angeles County have not responded to staff's requests for consistency determination for the transmission line. Therefore, staff cannot conclude that the proposed transmission line and ROW would be compatible with surrounding sensitive receptors.

The **Air Quality, Hazardous Materials Management, Noise, Public Health, Traffic and Transportation,** and **Visual Resources** sections provide detailed analyses of the noise, dust, public health hazards or nuisance and adverse traffic or visual impacts on surrounding sensitive receptors such as residential uses.

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 2006, §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 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. While the land use effects of the proposed PHPP transmission line are undetermined at this time, 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.

CONCLUSIONS AND RECOMMENDATIONS

- The proposed project would not result in a significant conversion of any Farmland (as classified by the FMMP) to non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts.

- 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.
- Staff encourages the city of Palmdale and Los Angeles County to provide staff with their respective opinions on general plan and zoning consistency for the portion of the transmission line within their jurisdictions. The proposed project's cumulative land use impacts would be less than significant.

Staff proposes no conditions of certification.

REFERENCES

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PHPP 2009a. Palmdale Hybrid Power Project/City of Palmdale/S. Head/AECOM (tn: 53028). Submittal of the E-mail Responses to New Data Request. Dated August 27, 2009. Submitted to CEC/Docket Unit on 08/27/2009.

PHPP 2009b. Palmdale Hybrid Power Project/City of Palmdale/S. Head/AECOM (tn: 50363). Supplemental Response to CEC Data Requests Set 1. Dated March 2, 2009. Submitted to CEC/Docket Unit on 03/03/2009.

PHPP 2009c. Palmdale Hybrid Power Project/City of Palmdale/S. Head/AECOM (tn: 51417). Responses to CEC Data Request Set 2(91-162) and Supplemental Response #4 to CEC Data Request Set 1. Dated May 1, 2009. Submitted to CEC/Docket Unit on 05/01/2009.

PHPP 2009d. Palmdale Hybrid Power Project/City of Palmdale/S. Head/AECOM (tn: 51623). Email Response from Applicant to Data Request 142 - detailed Land Use maps. Dated May 1, 2009. Submitted to CEC/F. Miller/Docket Unit on 05/19/2009.

PHPP 2008a. Palmdale Hybrid Power Project/City of Palmdale/S. Williams (tn: 47383). Submittal of the Application for Certification for the Palmdale Hybrid Power Project. Section 2.0 – Project Description. Dated July 30, 2008. Submitted to CEC/M. Jones on 07/30/09

PHPP 2008b. Palmdale Hybrid Power Project/City of Palmdale/S. Williams (tn: 47383). Submittal of the Application for Certification for the Palmdale Hybrid Power Project. Section 5.7 – Land Use. Dated July 30, 2008. Submitted to CEC/M. Jones on 07/30/09.

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SOIL AND WATER RESOURCES

Christopher Dennis, P.G.

SUMMARY OF CONCLUSIONS

Based on the information received to date, California Energy Commission (Energy Commission) staff finds that:

- Implementation of Best Management Practices (BMPs) during the Palmdale Hybrid Power Project (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 PHPP construction 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-3** are met.
- The use of recycled water for PHPP 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 PHPP's proposed powerblock would not impact waters of the State or waters of the U.S. The service utilities and the electrical transmission line would not impact waters of the U.S., but could temporarily impact waters of the State. Potential impacts to waters of the State would be avoided by prohibiting construction in any of these State waters 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-6** are met. This ZLD system would have the added benefit of conserving water and partially removing an existing impact to groundwater quality.
- The removal of sanitary wastewater from the PHPP through a sewer line connected to the County of Los Angeles Sanitation Districts (LACSD) sewer system 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-8** are met.

Completion of staff's analysis of the proposed project is subject to the following:

- Applicant's submittal of a draft construction SWPPP for the proposed project;
- Identification of the disposal method of an estimated 1.2 million gallons of hydrostatic test water. This information is needed for staff to evaluate potential impacts associated with the disposal of this test water;

- Obtaining the applicant's final visual soil berm design dimensions, soil volume and source, soil compaction criteria, and BMPs that would be used to protect the berm against wind and water erosion; and
- The applicant has not identified portions of the transmission line alignment. Staff, therefore, cannot determine whether there may be significant impacts related to flooding until the applicant provides additional information on the alignment.

If these issues can be satisfactorily resolved, staff will also be able to make the following findings:

- 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

INTRODUCTION

This section analyzes potential impacts to soil and water resources from the construction and operation of the PHPP. Where the potential for impacts is 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, or would be absent the Energy Commission's exclusive jurisdiction, 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 & 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 of 1967. The CWA also establishes protection of navigable waters through Section 401. Section 401 certification through the Army Corps of Engineers and Regional Water Quality Control Board (RWQCB) is required if there are potential impacts to surface waters of the State and/or Waters of the United States, such as perennial and ephemeral drainages, streams, washes, ponds, pools, and wetlands. Section 401 requires impacts to these waters to be quantified and mitigated.
Resource Conservation and Recovery Act, 40 CFR Part	The Resource Conservation Recovery Act (RCRA) of 1976 seeks to prevent surface and groundwater contamination, sets guidelines for determining hazardous

260 et seq.	wastes, and identifies proper methods for handling and disposing of those wastes.
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.
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 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, 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	This section specifically identifies the use of potable domestic water for industrial

Section 13552.6	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.
CWC 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 Section 60306	This section 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 17, Division 1, Chapter 5	This chapter addresses the requirements for backflow prevention and cross connections of potable and non-potable water lines.
California Code of Regulations, Title 22, Division 4, Chapter 1	Article 1 specifies the use of recycled water for dust control must be disinfected to at least a secondary-23 level.
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 Discharge and Waste Reclamation Permits	Requires obtaining a new or modifying an existing WDRs Permit and a Wastewater Reclamation Permit to reuse effluent from wastewater treatment plants for industrial cooling of PHPPs.
State Water Resources Control Board WQO 99-08	The SWRCB regulates storm water discharges associated with construction PHPPs affecting areas greater than or equal to 1 acre to protect state waters. Under Order 99-08, the SWRCB has issued a National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges associated with construction activity. Projects can qualify under this permit if specific criteria are met and an acceptable Storm Water Pollution Prevention Plan (SWPPP) is prepared and implemented after notifying the SWRCB with a Notice of Intent.
State Water Resources Control Board 2003-003-DWQ	This general permit applies to the discharge of water to land that has a low threat to water quality. Categories of low threat discharges include piping hydrostatic test water.
Local LORS	
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.
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	The City of Palmdale requires a grading permit for earth moving activities

Code	exceeding 3 feet in depth or 20 cubic yards in volume.
County of Los Angeles Sanitation District No.14 Master Ordinance and Rate and Mean Loadings Ordinance	This ordinance establishes sewer connection fee requirements and loading limitations for a connection to LACSD District No. 14 sewer service.
State Policies and Guidance	
Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq.)	In the 2003 Integrated Energy Policy Report (IEPR), consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy that would approve the use of fresh water for cooling purposes by PHPPs only where alternative water supply sources and alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound."
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 unreasonable affect present and anticipated beneficial uses, and will not result in waste quality less than adopted policies; and 2) requires that any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters, must meet WDRs which will result in the best practicable treatment or control of the discharge necessary to assure that: a) a pollution or nuisance will not occur and b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.
SWRCB Resolutions 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 PHPP 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 Sources of Drinking Water Policy / Res. No. 88-63	States that all groundwater and surface water of the State are considered to be suitable for municipal or domestic water supply with the exception of those waters that meet specified conditions.
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 between 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 electrical transmission line would be constructed in a variety of soil types which 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 electrical transmission line were 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 (LADWP2009). Due to this apparent continued overdraft, one groundwater pumper has sued other groundwater pumpers in the basin and initiated what is now an ongoing adjudication in the basin (LADWP2009; SC2009). Reclaimed water discharged to evaporation/percolation ponds, irrigation sites, and furrowed land from the Palmdale and Lancaster Water Reclamation plants (WRPs) does not appear to be a part of the adjudication. However, due to the quality of groundwater in the basin being impacted by salt, particularly nitrates, and nutrients from the Palmdale and Lancaster WRPs, the Lahontan Regional Water Quality Control Board (RWQCB) has issued orders requiring the WRPs to cleanup and abate the salt and nutrient impacts (RWQCB2002; RWQCB2003a). As part of the abatement, the WRPs have been seeking industrial users of their treated wastewater.

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 fluid (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 the summer of 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

Soil Erosion and Storm Water Control

The PHPP proposes to manage stormwater in accordance with PHPP-specific grading plans, a construction SWPPP, a DESCP, and in accordance with Los Angeles County Stormwater Runoff and Pollution Control ordinance, and the City of Palmdale Floodplain

[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.

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 the PHPP.

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 (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). Drinking water would also be supplied by the Waterworks, 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).

Process Wastewater

Process wastewater would be generated from the following sources (COP2008a):

- Cooling Tower Circulating Water System Blowdown
- HRSG Blowdown
- CTG 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 lead 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 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 Phase 1 Environmental Site Assessment (ESA) was conducted for some portions of the areas proposed for the electrical transmission line tower construction and the associated construction staging areas (AECOM2009g). An additional Phase 1 ESA will be required for other portions of the alignment once they have been identified. Specific procedures for further Phase 1 ESA and need for any mitigation of RECs identified in the electrical transmission line construction and laydown areas are described in the **Waste Management** section.

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 & Water Table 1** were used to determine the threshold of 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 & Water Table 1** and whether there would be a significant impact under the California Environmental Quality Act (CEQA). Staff also evaluated the project's compliance with LORS and policies, including the Energy Commission's and State Water Resources Control Board's policy against using freshwater for PHPP cooling unless other sources or other methods of cooling would be environmentally undesirable or economically unsound.

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 PHPP substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding or substantial erosion or siltation on or offsite?
- Would the PHPP create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?
- Would the PHPP place within a 100-year flood hazard area structures which would impede or redirect flood flows?
- Would the PHPP violate any water quality standards or waste discharge requirements?
- Would the PHPP 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 PHPP contribute to any lowering of groundwater levels in the groundwater wells of other public or private water users?
- Would the PHPP contribute to any lowering of the groundwater levels such that protected species or habitats are affected?
- Would the PHPP cause substantial degradation to surface water or groundwater quality?

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. Staff also provides specific conditions of certification related to a potential impact.

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 & Water Table 2**.

Soil & 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
Electrical 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 Electrical Transmission Line Total Area	**Approximately 314 acres**	

Source: COP2008a; AECOM2009g.

As indicated in **Soil and Water Table 2**, several service utilities would be installed for the PHPP. An electrical transmission line would be connected 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 water would be used for dust suppression and staff assumes it would also be used for hydrostatic testing. Potential impacts to soils related to increased erosion or release of hazardous materials could be possible during construction. Potential storm water impacts could result if increased runoff flow rates and volume discharges from the site were to increase flooding downstream. Water quality could be impacted by the discharge of hazardous materials released during construction.

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 electrical 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 increased 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 produce 134 pounds per year (lbs/yr) of fugitive dust and an additional 0.02 lbs/yr would be generated along 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. The requirement to use soil weighting and bonding agents following grading would conserve freshwater by reducing the need for water as a means to control fugitive dust.

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 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, 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 from up to a 100-year storm event that would run on to the project and manage this storm water onsite through the use of 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 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 PSA. 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 (AECOM2009i). No storm water from storm events up to 100-year storm events would leave the PHPP site. 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 electrical 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 would not be affected by or exacerbate flooding. Similar conditions of certification would be proposed for the electrical transmission line once the entire transmission line route has been established.

Proposed Visual Berm

A 10-foot wide, 8-foot tall, 3,050-foot long earthen berm has been proposed by the applicant to mitigate the visual impacts of the project. This earthen berm would need armoring or other means of protecting the berm soil from wind and storm water erosion. Erosion of this berm from water would degrade its purpose as a visual screen and increase sediment loading down slope of the berm to the PHPP's detention basins on one side and a drainage culvert along Avenue M on the other side. Silt and sand blown from the berm on windy days could impact anyone using Avenue M adjacent to the berm.

Staff will require appropriate BMPs for the berm once its final design is complete. In addition, the applicant stated that the source of the soil for the berm would come from the solar field area. Staff estimated that the volume of the berm would be at least 122,000 cubic feet. The applicant's estimate of the volume of soil that would be required to build the berm (30,725 cubic yards) is inaccurate and the actual volume of soil that would be required to build the berm would likely require changes to the applicant's grading plans. Additional discussion of the berm can be found in the **Biological Resources**, **Cultural Resources**, and **Visual** sections of this Preliminary Staff Assessment (PSA).

Water Supply

A summary of the PHPP proposed construction and operation water supply demand, source, and volume requirements is provide in **Soil & Water Table 3** below.

SOIL & 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 AFY)
	Solar Field Construction and Dust Suppression	Secondary Treated Water trucked in from the Palmdale WRP	560,000 gpd (627 AFY)	650,000 gpd (728 AFY)
	Drinking Water[2]	Bottled Water	720 gpd (0.79 AFY)	1,534 gpd (1.7 AFY)
	Total Construction Water Demand[3]		**---**	**803 AFY**
Operation	Cooling Water; Boiler Makeup; and Maintenance	Tertiary Treated Water from the Waterworks Regional Recycled Water Pipeline	3,091 AFY (75%)	4,121 AFY
	Mirror Washing	Tertiary Treated Water from the Waterworks Regional Recycled Water Pipeline	46 AFY	46 AFY
	Landscaping[4]	Tertiary Treated Water from the Waterworks Regional Recycled Water Pipeline	Included in the Total Water Requirement	
	Fire Protection (used as necessary)	Tertiary Treated Water from the Waterworks Regional Recycled Water Pipeline	250,000 gallons	250,000 gallons
	Drinking and Sanitation	Potable Water from the Los Angeles County Waterworks No. 40	2.2 AFY (amount of the will-serve letter)	3.6 AFY
	Total Operational Water Demand		**3,281 AFY**	**4,121 AFY**

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.
3. Up to 1,174,116 gallons (3.6 acre-feet) of water could be required for hydrostatic testing. Staff assumes the Palmdale WRP would supply this water.
4. Water that would be used for landscaping was not identified by the applicant and therefore is assumed to be included in the total operational water demand.

Construction

To meet the estimated construction water demand, an average daily volume of 65,000 gallons per day (73 AFY) 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). Because the applicant has not identified the source of the hydrostatic test water, staff assumes that the hydrostatic test water would come from the same supply as the construction water (i.e., secondary-treated water supplied by the Palmdale WRP). As illustrated in **SOIL & WATER Tables 4** and **6** below, the Palmdale WRP is producing over 10,000 AFY 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** in order to ensure the applicant can obtain the necessary construction water supply and has a negotiated and executed agreement with LACSD No. 14 (Palmdale WRP) for the supply of the PHPP's construction water.

The PHPP construction water would be delivered from the Palmdale WRP by 4,000-gallon capacity water trucks (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 PSA.

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 before recycled water projects are implemented.

The applicant proposes to comply with Titles 17 and 22 of the California Code of Regulations (CCR), which address the use of recycled water. Under these regulations, the project owner is required to prepare an Engineer's Report describing the production, distribution and use of recycled water and to obtain review and approval from DPH. The Engineer's Report will verify that Palmdale WRP's recycled water meets the standards for unrestricted use and that the plumbing constructed for PHPP is inspected 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 (LADWP2005). 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' Urban Water Management Plan for the Antelope Valley (LADWP2005) 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. The tertiary-treated wastewater would originate from the Palmdale WRP (District #14) and Lancaster WRP (District #20). The Palmdale and Lancaster WRPs are part of a partnership of 24 independent special districts that form the LACSD. Both the Palmdale and Lancaster WRPs are under RWQCB orders to protect beneficial uses of groundwater. These orders require the WRPs to reduce the amount of salt and nutrients impacting the groundwater from the WRPs (RWQCB2002; RWQCB2003a). To abate this impact, the WRPs have been disposing of the wastewater through land application and agricultural reuse. As part of their continuing abatement, the WRPs are now in the process of upgrading their facilities to allow for tertiary treatment of the wastewater and subsequent sale of this wastewater for industrial use.

Tertiary-treated water will be supplied to Waterworks under a 25-year contract between the Waterworks and the County of Los Angeles Sanitation Districts No. 14 and 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 has provided the applicant with a Will Serve letter to provide the PHPP with enough water to satisfy the PHPP maximum operational water demand of 4,121 AFY (L&W2009lb). However, the following elements must be completed before the PHPP would have a reliable water supply for plant operations.

1. A signed agreement must be negotiated and executed prior to project operation between the applicant and Waterworks for the reliable delivery of recycled water to the PHPP;

2. The tertiary treatment systems at the Palmdale and Lancaster WRPs must be completed; and

3. The regional recycled water supply pipeline by the Waterworks must be completed for timely startup of the PHPP.

The tertiary-treated water would be delivered by Waterworks through a 7.4-mile, 18-inch diameter pipeline that would be installed underground along existing road right-of-ways. 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). 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 then be processed by a cooling tower blowdown clarifier and ZLD to remove the minerals and allow the water to 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 ten 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 increase. On average, over the last ten years, the annual processing of wastewater to secondary levels by the Palmdale WRP has been 10,231 acre-feet and 14,346 acre-feet by the Lancaster WRP. Staff believes there is a sufficient volume of wastewater available for tertiary treatment to adequately supply the PHPP water requirement.

SOIL & WATER Table 4
Historical Recycled Water Production

Year	Palmdale Water Reclamation Plant	Lancaster Water Reclamation Plant
	Total Annual Volume (AFY)	Total Annual Volume (AFY)
1997	9,251	11,312
1998	9,318	12,656
1999	9,598	13,216
2000	10,147	13,778
2001	10,270	13,888
2002	9,968	14,336
2003	10,304	14,784
2004	10,528	14,896
2005	10,864	15,232
2006	11,432	16,688
2007	10,864	17,024
Ten Year Annual Average	**10,231**	**14,346**

Source: AECOM2009a.

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 the first quarter of 2012, which would allow the PHPP to receive tertiary-treated water in time for the estimated PHPP startup date of 2013. However, funding delays for these components could delay completion of these components and delivery of tertiary-treated water to the PHPP. In addition, the applicant and Waterworks have not entered a formal agreement for the delivery of tertiary-treated water to the proposed PHPP.

SOIL & 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	Unknown
Piping – Blackbird Lane/Sierra Highway to Avenue M/Sierra Highway	November 2011 (currently under construction)		Unknown
Piping – Avenue M/Sierra Highway to Avenue K/Sierra Highway	November 2011 (currently under construction)	Federal Stimulus Funds and the Army Corps of Engineers	Unknown
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	Sanitation District #20 and the State Water Resources Control Board	SWRCB Funding Approved
Lancaster WRP Upgrade to Tertiary Treatment	First Quarter 2011	Sanitation District #14 and the State Water Resources Control Board	Unknown
Piping – Connection from the Proposed Project to Avenue M/Sierra Highway	During construction of the Proposed Project	Applicant (proposed project)	Unknown

Source: AECOM2009I.

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**. Once the Palmdale and Lancaster WRP upgrades are complete, the tertiary treatment capacity will be equal to the current secondary-treatment capacity.

SOIL & 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
2007 Actual Average Secondary Treatment	9.7 mgd (10,873 AFY)	15.2 mgd (17,038 AFY)	24.9 mgd (27,911 AFY)
Current Secondary Treatment Capacity	15 mgd (16,813 AFY)	16 mgd (17,934 AFY)	31 mgd (34,747 AFY)
2012 Designed Tertiary Treatment Capacity	15 mgd (16,813 AFY)	16 mgd (17,934 AFY)	31 mgd (34,747 AFY)

Source: AECOM2009I;

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 (when entered into) 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.

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 1,269 AFY surplus of recycled water available from the Palmdale and Lancaster WRPs after the Waterworks has taken delivery of its contracted allotment of 13,500 AFY. Of the 13,500 AFY that the Waterworks is allotted, the PHPP would require 4,121 AFY 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 & WATER Table 7
Tertiary-Treated Water Supply and Demand

Recycled Water Source and Use		Volume (AFY)
Supply	Volume of Tertiary-Treated Water Available in 2007	27,911
Existing Demand	L.A. County Waterworks Contracted Annual Volume	-13,500
	Piute Ponds, Apollo Park, and Impoundment Areas	-3,590
	City of Lancaster	-5,020
	City of Palmdale	-2,528
	Palmdale Water District	-2,004
Volume of Recycled Water Remaining		**1,269**

Source: AECOM2009a; KJ2006.

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 34,747 AFY. This increase in treatment capacity equates into an increased capacity of 6,836 AFY over the 2007 production volume.

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.

To determine if protected waters could be impacted by the proposed PHPP, the applicant prepared a preliminary water jurisdiction report (AMEC2009). This report concluded that while waters of the U.S. or State would not be impacted by construction of the PHPP power block and solar field, waters of the State could be impacted by construction of the service utilities and the electrical transmission line (AECOM2009g). To minimize potential impacts to waters of the State, 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 line.

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. These plans would contain 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. Conditions of Certification **SOIL&WATER-1** and **-2** require the project owner to prepare plans to implement, monitor, and maintain BMPs appropriate for the construction and operating of the proposed project.

Groundwater quality in the AVGB would be affected by 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 source of groundwater recharge from the AVGB, it would also remove a source of salt and nutrient loading to the groundwater as prescribed by RWQCB orders. The salt and nutrient loading to groundwater from the WRPs discharges has been impacting groundwater quality. Land application and agricultural reuse above rates that can be utilized by crops or vegetation are not acceptable by the RWQCB, and as a result, the Palmdale and Lancaster WRPs are developing alternative uses 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 improve groundwater quality 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.

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 broader 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. The equipment wash water would be transported to an appropriate treatment

facility. Disposal of the hydrostatic test water has not been described in the AFC. However, because a large volume of hydrostatic test water could be generated, the method of disposing of this water needs to be explained. This water could be treated and used by the project at the start of operations or discharged to land under a general waste discharge permit for discharges to land with a low threat to water quality. Depending on the disposal method chosen, differing concerns and potential impacts would result. With the exception of the hydrostatic test water, 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-6** 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-7.**

The sanitary wastes from sinks, toilets, and other sanitary facilities would be discharged to a sanitary sewer line connected to the Palmdale WRP. This water would be treated and made available as recycled tertiary water in the regional recycled water pipeline system. No significant impacts are expected associated with recycled of the sanitary wastewater. Staff proposes Condition of Certification **SOIL&WATER-8** 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 PHPPs, 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 PSA, 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 AFY 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

CLEAN WATER ACT

Staff has determined that the PHPP would satisfy the requirements of the RWQCB 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**. In addition, Condition of Certification **BIO-23** would be required to comply with California Department of Fish and Game's Streambed Alteration Agreement requirements.

SWRCB RESOLUTION 75-58, ENERGY COMMISSION'S 2003 INTEGRATED ENERGY POLICY REPORT, AND THE WARREN-ALQUIST ACT

The California Energy Commission, under legislative mandate specified in the *2003 Integrated Energy Policy Report (IEPR)*, would approve the use of fresh water for cooling purposes by projects it licenses 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.). The use of recycled water by the PHPP for its construction and operations water demand would be consistent with the requirements of SWRCB Resolution 75-78, the Energy Commission's 2003 IEPR, and the Warren-

Alquist Act. In addition, with respect to wastewater, the Energy Commission's 2003 IEPR specifies that "the Energy Commission would require zero liquid discharge technologies unless such technologies are shown to be „environmentally undesirable' or „economically unsound.'" The applicant has proposed use of a ZLD system in compliance with this policy. Staff supports the proposed ZLD system and believes that this proposal meets the intent of no liquid discharge offsite that otherwise could degrade the surface or groundwaters of the state.

CALIFORNIA WATER CODE SECTION 13523

Through compliance with Conditions of Certification **SOIL&WATER-3** and **-4,** the RWQCB, after consulting with and receiving the recommendations from DPH, would prescribe requirements for the use of recycled water for construction and operation of the PHPP.

CALIFORNIA WATER CODE SECTION 13551

Section 13551 of the California Water Code prohibits the use of potable domestic water for non-potable uses if 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.

CALIFORNIA CODE OF REGULATIONS TITILE 17 AND TITLE 22

Through compliance with Condition of Certification **SOIL&WATER-3** and **-4,** the California Department of Public Health 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.

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.

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

The agency comments that were received relating to soil and water resources and have been incorporated into this PSA section. A summary of the one agency comment letter received is presented below. No public comments have been received.

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 in to this PSA. The source of the construction water would come from the Palmdale WRP as secondary-23 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 AFY 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 PSA. 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 (California Public Resources Code, Division 15, Section 25000 et seq.).

CONCLUSIONS

Based on the information received to date, Energy Commission staff finds that:

- Implementation of BMPs during PHPP 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. 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 PHPP construction 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-3** are met.
- The use of recycled water for PHPP 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 PHPP's proposed powerblock would not impact waters of the State or waters of the U.S. The service utilities and the electrical transmission line would not impact waters of the U.S., but could temporarily impact waters of the State. Potential impacts to waters of the State would be avoided by prohibiting construction in any of these State waters 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-6** are met. This ZLD system would have the added benefit of conserving water and partially removing an existing impact to groundwater quality.
- The removal of sanitary wastewater from the PHPP through a sewer line connected to the LACSD sewer system 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-8** are met.

Completion of staff's analysis of the proposed project is subject to the following:

- Applicant's submittal of a draft construction SWPPP for the proposed project;
- Identification of the disposal method of an estimated 1.2 million gallons of hydrostatic test water. This information is needed for staff to evaluate potential impacts associated with the disposal of this test water;
- Obtaining the applicant's final visual soil berm design dimensions, soil volume and source, soil compaction criteria, and BMPs that would be used to protect the berm against wind and water erosion; and
- Portions of the transmission line alignment have not been identified by the applicant. Therefore, staff cannot determine whether there may be significant impacts related to flooding until the applicant provides additional information on the alignment.

If these issues can be satisfactorily resolved, staff will also be able to make the following findings:

- 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 immitigable 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 Preliminary Staff Assessment and shall contain the following elements:

- **Vicinity Map:** A map shall be provided indicating the location of all PHPP elements 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 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 relevant portions of the DESCP shall clearly show approval by the chief building official (CBO). In addition, the PHPP owner shall do all of the following:

a. No later than 90 days prior to start of site mobilization, the PHPP owner shall submit a copy of the DESCP to the County of Los Angeles, the RWQCB, the CMP for review and comment. The CPM shall consider comments received from Los Angeles County and RWQCB.

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 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: Waste in discharges of storm water must be reduced or prevented to achieve the best practicable treatment level using controls, structures, and management practices. The project owner shall comply with all requirements (with the exception of purely administrative requirements, e.g., filing a Notice of Intent) contained in State Water Resources Control Board's *Waste Discharge Requirements For Discharges of Storm Water Runoff Associated With Construction Activity, General Permit No. CAS00002* and all subsequent revisions and amendments. The project owner shall develop, obtain CPM approval of, and implement a construction Storm Water Pollution Prevention Plan (SWPPP) for the construction of the project.

Verification: At least 60 days prior to project construction, the project owner shall submit to the CPM two copies of the final Construction SWPPP for review and approval. The project owner shall retain a copy of the Construction SWPPP onsite at all times. The project owner shall submit two copies to the CPM of all correspondence between the project owner and the RWQCB regarding the general permit for construction activity for discharge of storm water associated with construction activity within 10 days of its receipt or submittal.

WATER SUPPLY – CONSTRUCTION WATER

SOIL&WATER-3: The PHPP's proposed use of secondary-treated water during construction for dust control, soil compaction, and hydrostatic testing shall be secondary-23 recycled water from the Palmdale Water Reclamation Plant (WRP) and shall 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 copies of the executed agreement between the applicant and the County of Los Angeles Sanitation District No. 14 for the supply of secondary-23 treated 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 secondary-treated water from the Palmdale WRP for PHPP construction until this agreement is executed with two copies provided to the CPM for verification.

Verification: No later than 60 days prior to construction, the PHPP owner shall submit two copies of the executed agreement for the supply and onsite use of recycled water for PHPP construction. The PHPP owner shall submit to the CPM two copies of the Engineering Report and Cross Connection inspection report for approval by the CPM and include all comments from the Lahontan Regional Water Quality Control Board and the California Department of Public Health prior to the delivery of recycled water from the Waterworks.

WATER SUPPLY – OPERATION WATER

SOIL&WATER-4: The project's proposed use of recycled water for PHPP operations shall be tertiary-treated water from the Los Angeles County Waterworks regional supply pipeline and shall comply with CCR Title 22, Division 4, Chapter 3 and Title 17, Division 1, Chapter 5. The project owner shall provide the CPM two copies of the executed Recycled Water Purchase Agreement (agreement) between the applicant and the Los Angeles County Waterworks (Waterworks) for the long-term supply (30 years) of tertiary-treated water to the PHPP for operation. The agreement shall specify all terms and costs for the delivery and use of recycled water by the PHPP. The PHPP shall not connect to the Waterworks recycled water pipeline for PHPP operation until this agreement is executed with two copies provided to the CPM for verification.

Verification: No later than 60 days prior to operation, the PHPP owner shall submit two copies of the executed agreement for the supply and onsite use of recycled water for PHPP operation. The PHPP owner shall submit to the CPM two copies of the Engineering Report and Cross Connection inspection report for approval by the CPM and include all comments from the Lahontan Regional Water Quality Control Board and California Department of Public Health 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 in gallons per day the volume of potable and recycled water supplied to the PHPP. The metering devices shall be operational for the life of the project. An annual summary of daily water use by the PHPP, differentiating between

potable and recycled water, shall be submitted to the CPM in the annual compliance report.

Verification:

1. Beginning six months after the start of construction, the PHPP owner shall prepare a semi-annual summary of amount of water used for construction purposes. The summary shall include the monthly range and monthly average of daily water usage in gallons per day and shall distinguish the recorded potable and recycled water use.
2. At least 60 days prior to use of any water source for PHPP construction and operation, respectively, 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. The PHPP owner shall provide a report on the servicing, testing, and calibration of the metering devices in the annual compliance report.
3. The PHPP owner shall prepare an annual summary, which will include the monthly range and monthly average of daily operations water usage in gallons per day, and total water used on a monthly and annual basis in acre-feet. In this report, the recorded potable and recycled water use shall be distinguished. The annual summary shall also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" would correspond to the date established for the annual compliance report submittal.

ZERO LIQUID DISCHARGE SYSTEM REQUIREMENTS

SOIL&WATER-6: 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 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 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 the PHPP owner's Annual Compliance Report.

WASTEWATER COLLECTION SYSTEM REQUIREMENTS

SOIL&WATER-7: 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 manager 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-8: Prior to commercial operation, the project owner shall provide the CPM and the County of Los Angeles Sanitation District No. 14 (LACSD No.14) all information and documentation required to satisfy LACSD No.14 Master Ordinance and Rate and Mean Loadings Ordinance for the discharge of sanitary wastewater into the LACSD No.14 sewer system. During operation, any monitoring reports provided to LACSD No.14 shall also be provided to the CPM. The CPM shall be notified of any violations of discharge limits or amounts.

Verification: At least 60 days prior to commercial operation, the project owner shall submit the information and documentation required to satisfy LACSD No.14 Master Ordinance and Rate and Mean Loadings Ordinance for review and comment, and to the CPM for review and approval.

During PHPP operation, the project owner shall submit any wastewater quality monitoring reports required by LACSD No.14 to the CPM in the annual compliance report. The project owner shall submit any notice of violations from LACSD No.14 to the CPM within 10 days of receipt and fully explain the corrective actions taken in the annual compliance report.

REFERENCES

AECOM2009a – AECOM / S. J. Head (tn: 49688). Applicant's Responses to CEC Data Request, Set 1 (#1-88). Dated on 01/12/09. Submitted to CEC / Docket Unit on 01/12/09.

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LADWP2005 – Los Angeles Department of Water and Power. Urban Water Management Plan for the Antelope Valley. Website publication: http://dpw.lacounty.gov/wwd/web/docs/ (December 2009).

LADWP2009 – Los Angeles Department of Water and Power. Antelope Valley Integrated Regional Water Management Plan. Website publication: http://dpw.lacounty.gov/wwd/web/docs/ (November 2009).

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PA2008 – Agreement for the Purchase and Sale of Recycled Water and Related Facilities – Lancaster Water Reclamation Plant and Palmdale Water Reclamation Plant (1/23/2009).

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RWQCB2003a – California Regional Water Quality Control Board, Lahontan Region. Adopted Cleanup and Abatement Order No. R6V-2003-056 Requiring Los Angeles County Sanitation District No. 20 and the City of Los Angeles World Airports Palmdale Water Reclamation Plant to Cleanup and Abate Waste Discharges to the Ground Waters of the Antelope Hydrologic Unit, Los Angeles County (November 24,2003).

RWQCB2003b – California Regional Water Quality Control Board, Lahontan Region. Administrative Civil Liability Order No. R6V·2007·0034 for the Los Angeles County Sanitation District No. 14 and District No. 20 for Violation Of Waste Discharge Requirements Specified by Board Order (November 29,2007).

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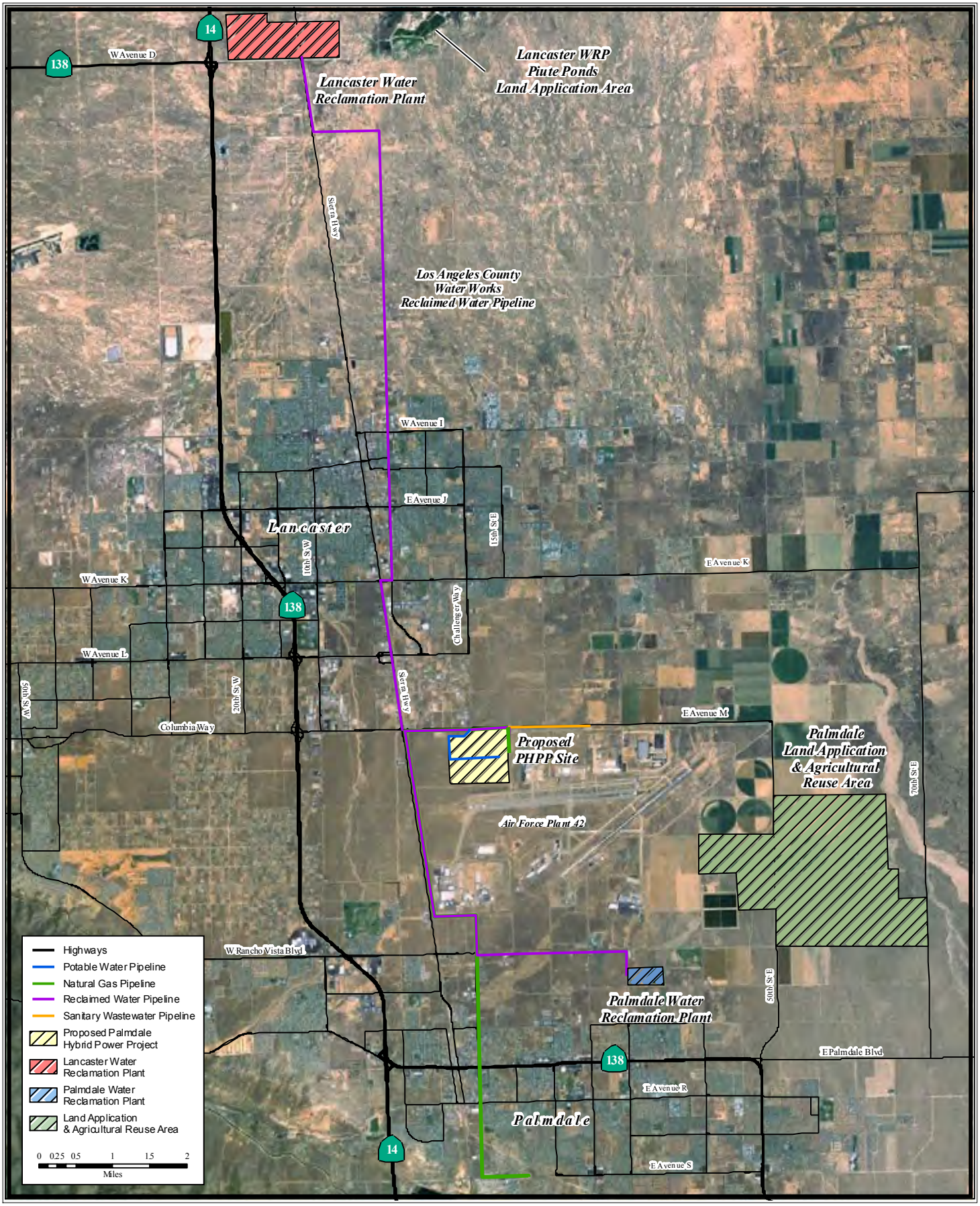
SOIL AND WATER RESOURCES - APPENDIX A

ACRONYMS USED IN THE SOIL AND WATER RESOURCES SECTION

amsl	above mean sea level	gpd	gallons per day
AF	acre-feet	gpd/ft	gallons per day per foot
AFY	acre-feet per year	gpm	gallons per minute
AVGB	Antelope Valley Groundwater Basin	IEPR	Integrated Energy Policy Report
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	RCRA	Resource Conservation and Recovery Act
DPH	Department of Public Health	REC	Recognized Environmental Condition
DTSC	Department of Toxic Substances Control	ROC	Record of Conversation
DWR	Department of Water Resources	RWQCB	Regional Water Quality Control Board
ESA	Environmental Site Assessment	SWPPP	Storm Water Pollution Prevention Plan
FEMA	Federal Emergency Management Agency	SWRCB	State Water Resources Control Board
ft/day	feet per day	TDS	total dissolved solids
fps	feet per second	µS/cm	microsiemens per centimeter
PSA	Preliminary Staff Assessment	USCS	Unified Soil Classification System
ft/ft	feet per foot	WRP	Wastewater Reclamation Plant
ft/yr	feet per year	ZLD	Zero Liquid Discharge

SOIL & WATER - FIGURE 1

Palmdale Hybrid Power Project - Site Vicinity Map



CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, FEBRUARY 2010

SOURCE: California Energy Commission - ESRI Data - Tele Atlas Data

TRAFFIC AND TRANSPORTATION

Bob Fiore

SUMMARY OF CONCLUSIONS

Staff cannot conclude at this time that the Palmdale Hybrid Power Plant (PHPP) would be in compliance with applicable federal, state and local laws, ordinances, regulations, and standards (LORS) pertaining to traffic and transportation:

- The city of Palmdale Circulation Element requires the submittal and approval of a site plan that demonstrates the provision of parking, internal circulation and emergency access. The AFC did not provide sufficient information to determine if the project complies with requirements of the Circulation Element. The review of a site plan would ensure compliance with local LORS pertaining to parking, internal circulation and emergency access, as required.
- Avenue M and other proposed project access routes are located within both jurisdictions, Palmdale and Lancaster. City of Lancaster LORS are applicable to the proposed project.

Staff identified project-induced impacts and analyzed the impacts on the region's transportation system. Staff cannot conclude at this time that impacts induced by the Palmdale Hybrid Power Plant (PHPP) would be reduced to less than significant:

- Traffic data for Lancaster roadways is necessary for staff to assess environmental impacts.
- Improvements to Avenue M are not recommended by the applicant for staff to assess this route as a viable alternative.
- The applicant did not address Lancaster LORS or demonstrate that traffic data provided is consistent with Lancaster traffic counts. The Energy Commission recently received informal comments from the city of Lancaster. At the time of this publication, staff was not able to include the comments in the assessment of Lancaster LORS or traffic data due to scheduling constraints.
- The applicant states that 10th Street East and Avenue L intersection is un-signalized. This intersection is signalized. It is not demonstrated that the signalization at 10th Street East and Avenue L intersection operates at an acceptable level of service or would operate at an acceptable LOS with recommended improvements. The applicant does present data pertaining to volumes and capacity on10th Street East.

Staff cannot conclude at this time whether stack heights, vertical velocity plumes and visible water vapor plumes would have an impact on military flight paths and patterns. If it is determined that the HRSG stack heights, vertical velocity plumes and visible water vapor plumes pose a hazard to flight paths and patterns, then staff would recommend that the project owner comply with safety measures as provided by the FAA and military. In addition, if the HRSG stack height poses a hazard to flight paths or patterns, then the staff would recommend that lighting and marking per FAA Advisory Circular 70/7460-1.

Once the PHPP is operational, traffic volumes generated by the project would be minimal and insignificant on the transportation system but conditions of certification may be required to address project-induced vertical velocity plume and visible water vapor plume impacts. Construction and some operational impacts induced by the project would be reduced to less than significant with the implementation of recommended 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

The Traffic and Transportation analysis includes identifying applicable transportation laws, ordinances, regulations and standards (LORS) and determining the project's compliance with these LORS accordingly. Federal, state and local traffic transportation LORS applicable to the project are contained in Traffic and Transportation Table 1. Applicable LORS and a description of the project's compliance, or non-compliance, with applicable LORS are contained Traffic and Transportation Table 8.

[1] California Code of Regulations, Title 14, § 15063

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.
Palmdale Municipal Code Zoning Ordinance Adopted December 14, 1994 Ordinance No. U-1060	An ordinance providing for the creation of zones in the incorporated area of the City of Palmdale and prescribing area requirements, classes of uses and standards of development for buildings, structures, improvements and premises in said several zones.
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 city limits. Palmdale is located in the Antelope Valley region of California. Surrounding land uses include United States Air Force Plant 42/ Palmdale Airport, vacant land and other industrial uses. Access to PHPP is proposed on at the intersection of East Avenue M and 10th Street East. **Traffic and Transportation Figures 1-4** illustrate important aspects of the regional and local roadway 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, Avenue M, Sierra Highway, 10th Street East (Challenger Way), Avenue M-12 and Avenue N. Avenue M provides access to the subject 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.

A significant economic stimulus for the Antelope Valley is the accessibility to a major rail mainline. Union Pacific Railroad operates and maintains a major railroad corridor within close proximity to PHPP. It is located along Sierra Highway within the proposed project's vicinity. A rail siding extends easterly along Avenue M-12 and northerly along the USAF Plant 42/ Palmdale Airport boundary, along Avenue M and to 30th Street East.

Antelope Valley Transit Authority (AVTA) provides public transportation for the Palmdale and Lancaster areas of Los Angeles County. The AVTA and Southern California Association of Governments perform the transportation planning functions for the Antelope Valley and these agencies coordinate regional transit services.

Military operations and installations are integral to the overall transportation function within the Antelope Valley. Palmdale Hybrid Power Project (PHPP) is proposed on lands adjacent to Air Force Plant 42. Air Force Plant 42 is a large joint use military installation. Air Force operations, general aviation and other similar operations occur at Air Force Plant 42.

Bike routes and trails are other means of transportation in Palmdale. Avenue M is an adopted Master Plan bike route. No trails are located within the proposed project's vicinity.

A significant portion of the Antelope Valley's water is transported via the California Aqueduct. There are no laterals or other surface waterway within the vicinity of the proposed project.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This section presents an assessment of the transportation system. It identifies current and projected traffic and transportation conditions, within PHPP's affected environment, that could be impacted by the project. The project is then evaluated for potential impacts on the current and projected traffic and transportation system. Mitigation is recommended for potential impacts the proposed project may induce. The types of facilities the project could impact within the project's affected environment include:

- traffic routes, volumes and patterns
- railway transport and roadway safety crossings
- bikeways and pedestrian access
- public transit and school bus safety
- airport flight paths and patterns
- transmission lines, pipelines and canals

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 4 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, is located approximately .25 miles west of the proposed project site. It 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 Antelope Valley Freeway 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 2 hours from a power plant project. Travel of construction workers could affect regional roadways SR-14, SR-138 and SR-58 because these routes are within 2 hours from the subject site. 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.

Traffic and Transportation Figure 1 illustrates the street classifications for particular routes within Palmdale and Lancaster. For example, SR-14 is a freeway and Avenue M, Avenue L and Sierra Highway are arterials within the proposed project's vicinity.

Existing Roadway Function and Conditions

Antelope Valley Freeway (SR-14)

The Antelope Valley Freeway (SR-14) is a north-south and 6-lane freeway located approximately 1 mile west of the subject site. According to the Palmdale's Speed Limits Map (refer to **Traffic and Transportation Figure 3** for speed limits for particular routes)[2], 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-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.)[3] AM peak hour volume in May 2007 was 3,281 or 51% of the peak direction capacity and 65% during PM peak hour[4]. 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 (Major Arterial, Palmdale)

Avenue M provides the primary access to the proposed project site. It is an east-west running, 4-lane regional arterial roadway. The speed limit for Avenue M is 55mph 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 easterly of 10th Avenue East. According to the Palmdale's Traffic Signal map (refer to **Traffic and Transportation**

[2] http://www.cityofpalmdale.org/departments/traffic/maps/maps.asp

[3] http://www.dot.ca.gov/dist07/maps/pdf/D7_base_postmile.pdf

[4] http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2007kndfactors.PDF

Figure 2 for particular intersections), there are 4 traffic signals along Avenue M. The traffic signals are located between SR-14 and Sierra Highway spaced approximately 0.25 mile apart. There are no traffic signals between Sierra Highway and 10th Street 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 Palmdale Airport. Avenue M is a City designated truck route (refer to **Traffic and Transportation Figure 2** for truck routes).

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.

Avenue L (Arterial, Lancaster)

Avenue L is an east-west running 4-lane arterial roadway. It has similar function as Avenue M but Avenue L would carry traffic a longer distance from SR-14 to the proposed project site. Avenue L is classified as an arterial by the City of Lancaster.

PHPP AFC Table 5.13-6, shows the volume of traffic on Avenue L, east of SR-14, is approximately 59% of capacity. Traffic volume capacity is 27,000 vehicles each direction. Average Daily Traffic (ADT) and AM and PM peak hour volume Level of Service (LOS) for Avenue L are not discussed in the AFC. Without the project (PHPP AFC Table 5.13-6), Avenue L's projected 2011 volumes for is 69% of capacity. Under the 2011 no project conditions scenario data, the ADT is expected to increase by approximately 17%.

Sierra Highway (Major Arterial, Palmdale)

Sierra Highway was the primary north-south route serving the Antelope Valley between the Los Angeles area and northern Los Angeles County. 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. 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[5], 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

[5] http://www.cityofpalmdale.org/departments/traffic/maps/08-21-2008_GIS_00011-33_TrafficVolumeMap.pdf

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. The potential impacts induced by the project to roadways, and recommended mitigation(s), are discussed in the **Direct/ Indirect Impacts and Mitigation** section.

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[1]	Percent of Capacity	2011 Est Trucks
SR-14 North of Ave L	Freeway/ 6	79,000	60%	7268	101,100	77%	9,301
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 St 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
Ave L East of SR-14	Arterial/ 6	32,000	59%	NA	37,400	69%	NA
Sierra Hwy. North of Ave 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 Taffic

Source: PHPP 2008a, p. 5.13-9

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)[6] defines six levels

[6] National Research Council, Highway Capacity Manual, Third Edition, 2000.

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 roadways 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. **Traffic and Transportation Table 3** summarizes the LOS levels for V/C ratio determinations for roadways within this traffic analysis per the Caltrans HCM.

Traffic and Transportation Table 3
Level of Service Criteria for Roadways

Level of Service	Volume/Capacity	Description
A	0.00 – 0.60	Free flow; insignificant delays
B	0.61 – 0.70	Stable operation; minimal delays
C	0.71 – 0.80	Stable operation; acceptable delays
D	0.81 – 0.90	Approaching unstable flow; queues develop rapidly but no excessive delays
E	0.91 – 1.00	Unstable operation; significant delays
F	> 1.00	Forced flow; jammed conditions

Source: HCM

Traffic and Transportation Table 4 presents Caltrans HCM LOS levels determinations for intersections. It is based on the average vehicle delay per second at a particular intersection and turning movement. LOS A indicates little or no delay or little or no stacking. LOS F indicates excessive delay and exceeds capacity.

Traffic and Transportation Table 4
Level of Service Criteria for Intersections

Level of Service	Un-signalized Intersection Delay Per Vehicle (in Seconds)	Signalized Intersection Delay Per Vehicle (in Seconds)
A	Less than 10	Less than 10
B	10 to 15	10 to 20
C	15 to 25	20 to 35
D	25 to 35	35 to 55
E	35 to 50	55 to 80
F	50 or more	80 or more

Source: HCM

Existing Intersection Function and Conditions

Traffic and Transportation Table 5 summarizes the results of the existing morning and afternoon peak-hour LOS analysis for the study area intersections. As shown, all study area intersections operate at an acceptable LOS (LOS C or better) during the morning and afternoon peak hours, except at the following intersections:

- SR-14 southbound to East Avenue M going east/ north in the AM and PM

- SR-14 southbound to East Avenue M going west/ south in the PM
- SR-14 northbound to East Avenue M going west/south in the AM and PM
- SR-14 northbound to East Avenue M going west in the AM
- Sierra Highway and East Avenue M going east/ west in the AM and PM
- 10 St. West and East Avenue M going west in the PM

Traffic and Transportation Table 5
Intersection Level of Service Summary

Intersection	Direction	AM Peak Hour		PM Peak Hour	
		Existing	2011 No Project	Existing	2011 No Project
SR-14 SB/ W. Ave. L	East/ North	B	C	B	B
SR-14 NB/ W. Ave. L	East/ South	B	B	C	C
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
10 St. East/ E. Ave. L	West/ South	B	C	C	D
Sierra Highway/ E. Ave. M	East/ West	D	D	D	D
10 St. West/ E. Ave. M	East/ West	C	C	C	D
10 St. West SB/ E. Ave. M	East/ West	E	F	F	F
10 St. West SB/ E. Ave. M	West/ South	B	C	C	D

Source: PHPP 2008a, p. 5.13-8

Traffic and Transportation Table 5 also summarizes the results of the 2011 No project conditions morning and afternoon peak-hour LOS analysis for the study area intersections. As shown, all study area intersections would operate at an acceptable LOS (LOS C or better) during the morning and afternoon peak hours, except at the following intersections:

- SR-14 southbound to East Avenue M going east/ north in the AM and PM
- SR-14 southbound to East Avenue M going west/ south in the PM
- SR-14 northbound to East Avenue M going west/south in the AM and PM
- SR-14 northbound to East Avenue M going west in the AM
- 10 St. East and East Avenue L going south in the PM
- Sierra Highway and East Avenue M going east/ west in the AM and PM
- 10 St. West and East Avenue M going west in the PM and going west/south in the AM and PM

The potential impacts induced by the project to intersections, and recommended mitigation(s), are discussed in the **Direct/Indirect Impacts and Mitigation** section.

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 (ICTF) 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.

Avenue L crosses over the UPRR right-of-way (ROW). The Avenue M crossing is an at-grade. UPRR provides active warning devices at this juncture to control cross railroad traffic. The potential impacts induced by the project to railways, and recommended mitigation(s), are discussed in the **Direct/ Indirect Impacts and Mitigation** section.

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 4**). Class II bike paths are typically striped or separated routes along major corridors. Currently Avenue M is neither striped or separated for a Class II bike path.

According to the Antelope Valley Transit Authority route map and the City of Palmdale interactive GIS mapping, two bus routes are located in the vicinity of the PHPP 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. Pedestrian access to the proposed plant site from these stops would occur via Avenue M's road shoulder.

The potential impacts induced by the project to bicycle and pedestrian access and routes, and recommended mitigation(s), are discussed in the **Direct/ Indirect Impacts and Mitigation** section.

Public Transportation - School Bus Routes and Safety

As stated above, public bus transportation is provided by Antelope Valley Transit Authority[7]. 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. Route 1 serves the Palmdale transfer center and Route 4 serves the Lancaster transfer center where

[7] http://www.avta.com/

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.

Antelope Valley School Transportation Agency[8] operates school bus routes in the area. School bus routes include Avenue L, Avenue M, 10th Street East and Sierra Highway. The potential impacts induced by the project to public transportation and school bus routes, and recommended mitigation(s), are discussed in the **Direct/Indirect Impacts and Mitigation** section.

Airports

PHPP is located adjacent and northwest to United States Air Force (USAF) Plant 42 and Palmdale Airport. AirNav.com provides current information for various airports around the country. The following is a summary of information pertaining to USAF Plant 42/ Palmdale Airport[9] as provided by AirNav.com:

- Aircraft Operations: Average 176 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
- Runway 72/252: 6,000 feet in length x 75 feet in width
- Runway 72/252 Traffic Pattern: Runway 72 is left and runway 252 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

According to AirNav.com, the USAF Plant 42 and Palmdale Airport are a joint-use facility between the City of Los Angeles and the US Air Force. Combined operations average about 176 per day (12 months ending April 30, 2008). USAF Plant 42/ Palmdale Airport runways 07/25 are located approximately 3,000 feet south of the

[8] http://www.manta.com/coms2/dnbcompany_0wz0d8

[9] http://www.airnav.com/airport/KPMD

power plant's proposed power block. Runways 4/22 are located approximately 10,000 feet south of the proposed project. Runway 7 observes 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.

The US Air Force (USAF) 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 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, Los Angeles World Airports (LAWA) and the Air Force entered into a Joint Use Agreement allowing domestic commercial air service from Plant 42. LAWA leases land for the terminal from USAF and uses Plant 42 runways. The orientation for the runways are 038°-218° (Runways 04/22, generally angled east-west) and 072°-252° (Runways 07/25, generally angled northeast-southwest), about 12,000 feet in length and 150 feet wide. Overhead traffic patterns are flown at an altitude of approximately 1,500 (military) to 2,000 (others) feet above ground level (AGL) and arrival altitudes vary depending on the direction and speed of prevailing winds. Overhead flight patterns maneuver to the southeast of Runways 04/22 and north of Runways 07/25.

The AICUZ depicts arrival, departure and closed flight tracks. These flight tracks and clear zones are illustrated on **Traffic and Transportation Figures 5-8**. 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
- VTR rectangular closed patterns pattern to the southeast of Runway 04/22 and north of Runway 0725
- Re-entry VFR patterns

LAWA, a city of Los Angeles department with a separate seven-member Board of Airport Commissioners, governs four airports. LA/Palmdale Regional Airport is one of the airports that LAWA owns and operates. Palmdale Airport operates under a joint use agreement with US Air Force Plant 42 (USAF Plant 42).

LAWA acquired several thousand acres within Palmdale and adjacent to Plant 42. The purpose for acquiring the land was to build a regional airport to augment the commercial air passenger services at Bob Hope Airport in Burbank and at Los Angeles International

Airport (LAX). Due to its location and distance from major population centers, Palmdale Airport was not able to attract commercial airline passengers as intended. As a result, the regional airport was not constructed and Palmdale Airport continues to share USAF Plant 42 airfield.

At present, there are no commercial flights operating at the Palmdale Airport and LAWA employs only a small number of tradesmen to maintain the terminal and surrounding grounds (S. Tribble, 2009). According to Mr. Tribble, LAWA is currently seeking alternative uses for the land it acquired and planned for the regional airport, including solar power plants. Since there are no commercial carriers currently operating at Palmdale Airport, flight patterns and paths cannot be identified if commercial services were to restart.

Other airports within the vicinity of Palmdale Airport/ USAF 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

The potential impacts induced by the project to airport operations, and recommended mitigation(s), are discussed in the **Direct/Indirect Impacts and Mitigation** section.

Transmission Lines, Pipelines and Other Linear Facilities

According to the project description in the AFC, an 8.7-mile and 20-inch natural gas pipeline would be installed in existing right-of-way (ROW). It would extend from a Southern California Gas facility on Avenue S and traverse north along 10th Street East then traverse west along Lockheed Way then traverse north along Sierra Highway and then traverse east along Avenue M to 10 Street East and traverse south along the project 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.

PHPP would install a one-mile and 6-inch wastewater disposal line in 10th Street East ROW 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.

The potential impacts induced by the project to transmission lines, pipelines and other linear facilities, and recommended mitigation(s), are discussed in the **Direct/Indirect Impacts and Mitigation** section.

DIRECT/INDIRECT IMPACTS AND MITIGATION

This section evaluates the proposed projects' potential impacts on the current and projected traffic and transportation system. Mitigation is recommended for potential impacts the proposed project may cause. Current and projected conditions are analyzed together with the project's likely environmental effects to determine the potential for environmental impact.

Environmental impacts, according to the California Environmental Quality Act (CEQA), are stated in terms of no impact, less than significant, less than significant with mitigation and significant. To determine whether there is a potentially significant impact generated by a project, California Energy Commission (Energy Commission) staff reviews the project using the criteria found in the CEQA Guidelines, Appendix G, and applicable LORS utilized by governmental agencies. Specifically, staff analyzed whether the proposed project would do 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, and;
- result in inadequate emergency access;
- conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

Roadway and Intersection Levels of Service

Construction Impacts and Mitigation - Roadways

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. 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. Any construction workforce traffic coming from Los Angeles would use SR-14 to either Avenue L or Avenue M. Construction related traffic originating from Bakersfield would use SR-58 to SR-14 and Avenue L. 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 persons 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 6** shows the proposed construction traffic trip distribution and existing roadway segment ADT and 2011 projected roadway segment ADT.

Traffic and Transportation Table 6
2011 No Project and Peak Construction Roadway Segment Characteristics

Roadway Segment	Roadway Classification/ Lanes	Projected Construction Traffic	Existing ADT	2011 Est. ADT[1]	Capacity
SR-14 North of Ave L	Freeway/ 6	306	79,000	101,100	132,000
SR-14 South of Ave M	Arterial/ 6	536	99,000	126,675	132,000
Ave L East of SR-14	Arterial/ 6	998	54,000	37,400	54,000
Ave M East of SR-14	Arterial/ 4	-	36,000	27,900	36,000
Ave M Sierra Hwy. to 10th St W	Arterial/ 4	154	36,000	26,500	36,000
Ave M 10th St W to 20th St W	Arterial/ 4	154	36,000	17,950	36,000

[1] ADT = Average Daily Taffic

Source: PHPP 2008a, p. 5.13-9 and p. 5.13-15

The applicant proposes to route construction workforce trips from SR-14 to Avenue L and then east to 10th Street East. These routes are in Lancaster and not Palmdale. It should be noted that the applicant does not cite Lancaster LORS pertaining to these routes and does not appear to have consulted the city of Lancaster.

Antelope Valley Freeway (SR-14)

PHPP AFC Table 5.13-8 shows background traffic volumes for SR-14 and projects 306 and 536 construction related traffic trips on SR-14 north of Avenue L and south of Avenue M, respectively. Peak construction is likely to occur during 2011 or later. **Table 6** shows that construction related traffic would not cause traffic volumes to exceed the design capacity of SR-14.

However, SR-14 at milepost 59.80 (near Palmdale Blvd.) would be 96% of peak direction capacity during PM peak hour under the 2011, No Project scenario. The project's 536 (south of Avenue M) construction related traffic trips would increase the percentage of peak direction capacity on SR-14. Caltrans traffic counts, at post mile 59.80 (SR-14 near Palmdale Blvd.)[10], during AM peak hour in May 2007 were 3,281 or 51% of the peak hour direction capacity and 65% during PM peak hour[11]. According to the applicant, the ADT is expected to increase by 29% on SR-14. If the 29% increase is applied to Caltrans PHV (one way peak hour volume), then the one way volume in 2011 would be 4,232 or 87% of the peak direction capacity and 96% during PM peak hour. Construction traffic could contribute 536 trips to peak direction capacity, which would result in 7,185 peak direction trips. At milepost 59.80, 7,185 trips would be 104% of peak direction trips.

In addition, SR-14 becomes extremely congested on weekends and holidays usually during Friday evenings and Sunday nights. Though data and statistics are not readily available, the influx of recreational travelers would likely contribute to degrade LOS on SR-14 during Friday PM peak hour conditions.

Avenue M

Though the applicant proposes to route (PHPP AFC 5.13.3.2, pg. 5.13-13) construction related traffic from Avenue M to Avenue L, and 10th Street East from SR-14 for access to the proposed project site, it is projected that Avenue M would incur 154 construction related trips. This represents a negligible increase to the overall traffic volume capacity to this route. The increase in traffic on Avenue M is not anticipated to cause significant capacity limitations to the route with the routing of construction related traffic to Avenue L and 10th St. East.

Avenue L

The design capacity for Avenue L is 54,000 ADT at 6 lanes. Avenue L is not 6 lanes for a significant portion of its length. Avenue L is projected to incur 998 construction workforce traffic trips per day. This represents a 3% increase to the current traffic volume capacity. The design capacity of Avenue L is 54,000 ADT and if 998 daily construction workforce trips are added to the existing or to the projected ADT for

[10] http://www.dot.ca.gov/dist07/maps/pdf/D7_base_postmile.pdf

[11] http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2007kndfactors.PDF

Avenue L in 2011 it would not exceed design capacity. 10th Street East is likely to experience capacity limitations because the 998 construction workforce trips projected to use Avenue L would also use 10th Street East. 10th Street East ADT was not addressed in the AFC.

Sierra Highway

Some construction workforce traffic could travel other routes like Sierra Highway because the worker trip might originate in Victorville or San Bernardino. Sierra Highway is currently over capacity (103%) but as stated the applicant proposes to route construction related traffic to SR-14, Avenue L and 10th Street East and did not address potential impacts to Sierra Highway.

Palmdale Policies

Palmdale Circulation Element Policy C1.4.2 ensures that "approvals of new development are correlated with any roadway improvements that would be necessary to maintain the existing level of service or LOS C, whichever is less, and other performance characteristics applicable to the affected roadways." It further states that development shall not be authorized until measures are in place to construct any necessary improvements; these measures may include, but not be limited to, payment of traffic impact fees or construction of street improvements as required in the conditions of approval. Policy C1.4.3 states that established street design standards must provide the capacities that are needed to adequately serve the projected travel demand.

In addition, Palmdale Circulation Element Policy C2.1.1 requires Transportation Demand Management Plans from major employers, as defined by the Air Quality Management District (AQMD) and the Congestion Management Plan. The City of Palmdale Zoning Ordinance, Chapter 10, Article 101, establishes the requirement for Transportation Demand Management. Article 101 requires sidewalks or other pathways from the external pedestrian circulation system to each building and bus stop improvements if required by the City. Non-residential development of 50,000 sq. ft. or more shall set aside 10% of employee parking for carpool/ vanpool parking and be located close to employee entrances. The employer shall also provide a bulletin board, display case, or kiosk displaying transportation information located where the greatest number of employees are likely to see it, to the satisfaction of the City. In the event that such structure is placed outdoors, the design and location shall be subject to review and approval by the Director of Planning. Information in or on such structure shall include, but is not limited to, the following:

1. Current maps, routes and schedules for public transportation serving the site.

2. Telephone numbers for transportation information, including numbers for the regional ridesharing agency and local transit operators.

3. Ridesharing promotional material supplied by commuter-oriented organizations.

4. Bicycle route and facility information, including regional/local bicycle maps and bicycle safety information.

5. A listing of facilities available at the site for carpoolers, vanpoolers, bicyclists, transit riders and pedestrians.

6. A statement that preferential carpool/vanpool spaces for employees are available and a description of the procedures for obtaining such spaces.

According to the Antelope Valley AMQD (AVAQMD), there are no current mandatory transportation demand management requirements. AVAQMD defers to the city of Palmdale "as proponent" to suggest a TDM for the project, or to the Energy Commission to identify a need for a TDM as part of the environmental review process. AVAQMD also does not define "major employers" as cited by the City's General Plan Policy (De Salvio, 2009).

It is also City policy to designate truck routes serving industrial facilities while minimizing impacts (**Palmdale Circulation Element** Policy C.1.7.3) and routing truck traffic around residential development (**Palmdale Circulation Element** Policy C.1.7.2). Avenue L and 10th Street East are located in or partially located in the city of Lancaster. These routes pass by residential areas. Staff recently received unofficial comments from the City of Lancaster and expects formal comments to be submitted prior to the final staff assessment (FSA).

Staff recommends Condition of Certification TRANS-1 to offset traffic volume impacts to SR-14 at milepost 59.80 and to be in compliance with City LORS pertaining to TDM and the routing of trucks to minimize impacts to residential areas. TRANS-1 would require the project owner to implement and oversee a traffic control plan to include:

- Prepare and distribute a map of the route for construction workers to use to access the proposed project site (SR-14 to east on Avenue L to south on 10th Street East).
- Prepare a TDM program in conjunction with AVTA and the cities of Palmdale and Lancaster.
- Limit truck deliveries to the hours of 9:30am to 3:30pm

Traffic data for Lancaster roadways is necessary for staff to assess environmental impacts. (See recommended condition of certification **TRANS-2**)

- Improvements to Avenue M are not recommended by the applicant for staff to assess whether this route as a viable alternative.
- The applicant did not address Lancaster LORS or demonstrate that traffic data provided is consistent with Lancaster traffic counts. The Energy Commission recently received informal comments from the city of Lancaster.
- The applicant does not present data pertaining to volumes and capacity on10th Street East.

Construction Impacts and Mitigation – Intersections

As shown in Traffic and Transportation Table 5, some intersections would operate at unacceptable levels of service without the project and with the addition of the construction related traffic additional intersections also reach unacceptable LOS

designation. Traffic and Transportation Table 7 identifies construction related traffic peak hour levels of service under 2011 No-Project conditions and the anticipated PHPP 2011 construction related traffic peak hour LOS for critical intersections in the vicinity of the project. As shown, with the addition of the PHPP project's 2011 peak construction related traffic, the LOS of six additional intersection segments would result in reduced LOS in the A.M. or P.M. peak hours.

Traffic and Transportation Table 7
Intersection Level of Service 2011 No Project and 2011 Peak Construction

Intersection	Direction	AM Peak Hour		PM Peak Hour	
		2011 No-Project	2011 Peak Workforce	2011 No-Project	2011 Peak Workforce
SR-14 SB/ W. Ave. L	East/ North	C	C	B	B
SR-14 NB/ W. Ave. L	East/ South	B	B	C	C
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
10 St. East/ E. Ave. L	West/ South	C	F	D	F
Sierra Highway/ E. Ave. M	East/ West	D	D	D	D/E
10 St. West/ E. Ave. M	East/ West	C	C	D	D
10 St. West SB/ E. Ave. M	East/ West	F	F	F	F
10 St. West SB/ E. Ave. M	West/ South	C	F	D	F

Source: PHPP 2008a, pages 5.13-8 and 5.13-13

As evidenced by **Table 7**, most Avenue M intersections are operating below acceptable LOS and would continue to be with the proposed project. Because Avenue M intersections are impacted, the applicant is proposing to route construction related traffic to Avenue L and 10th Street East to avoid Avenue M.

According to the City of Lancaster General Plan, Plan for Physical Mobility, the minimum acceptable Level of Service (LOS) during peak hour traffic is LOS D. The 998 projected construction related traffic trips would reduce four intersections to unacceptable LOS, per cities of Palmdale and Lancaster policy. Project-induced impacts that reduce intersections to below acceptable LOS are considered significant. The AFC (PHPP AFC Section 5.13.3.2, page 5.13-13) states that the following intersection improvements would minimize project-induced intersection impacts:

- traffic control signal at East Avenue M and 10th Street East
- temporary signalization at East Avenue L and 10th Street East, re-stripe an exclusive left turn pocket and for a combination through right turn lane at said intersection

Traffic data for Lancaster intersections is necessary for staff to assess environmental impacts.

- The applicant states that 10th Street East and Avenue L intersection is un-signalized. This intersection is signalized. It is not demonstrated that the signalization at 10th Street East and Avenue L intersection operates at an acceptable level of service or would operate at an acceptable LOS with recommended improvements since the information contained in the AFC is contradictory to actual conditions.

As stated above, the Palmdale Circulation Element policies require roadways to be constructed concurrent with new development. The city of Palmdale Circulation Element also states that development shall not be authorized until measures are in place to construct any necessary roadway improvements and that street design standards must provide the capacities that are needed to adequately serve the projected travel demand.

Staff recommends that the applicant provide the missing information as listed below:

- Improvements to Avenue M for staff to assess whether this route is a viable alternative.
- Lancaster LORS and Lancaster traffic counts.
- Volumes and capacity on10th Street East.
- 10th Street East and Avenue L intersection is signalization. Re-examine operations at 10th Street East and Avenue L intersection

This would provide staff the information necessary: for determining compliance with Lancaster LORS; for evaluating impacts to roadways and intersections; and for assessing viable alternatives. Once it is determined which route and intersection improvements would reduce impacts to less than significant then staff would recommend Condition of Certification TRANS-2. TRANS-2 would require the project owner to work with the cities of Palmdale and Lancaster to get improvements installed prior to construction and provide documentation that improvements to roadways and intersections have been completed.

The applicant states that the maximum number of project-induced truck trips would occur during foundation construction and not coincide with peak month construction workforce trips. The anticipated number of truck trips generated by the project per month and per construction phase is not provided in the AFC. 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 3 passenger cars or passenger car equivalent (PCE) of 3 cars to 1 truck. If the project generates 15 truck trips (average) during the peak construction workforce month, it would add approximately 45 one-way trips. The trips were not calculated into AFC Table 5.13-7, Year 2011 Intersection Peak Hour Levels of Service with Average and Peak Construction, but it is unlikely that the 45 one-way PCE trips would significantly alter the results.

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 intersection LOS. Consequently, no operations-related mitigation measures are required.

Weight and Load Limitations

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.

It is a requirement of the California Vehicle Code and California Streets and Highway Code, 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 recommends Condition of Certification **TRANS-3**. **TRANS-3** 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. The project owner must also obtain necessary state and local permits for all project-related overweight and oversize vehicles and use trailing warning and police control, if necessary.

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 siding the 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 Air Force Plant 42, is located immediately south of the proposed plant site. It is located in the restricted boundary of Air Force Plant 42.

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 Preliminary Staff Assessment (PSA).

Because the project would require the delivery of hazardous materials, staff recommends Condition of Certification TRANS-3, which requires that the project owner obtain the necessary permits from US DOT, Caltrans, Lancaster and Palmdale for the delivery of hazardous materials on public roadways. Permits obtained pursuant to the Code of Federal Regulations and the California Vehicle Code and Streets and Highways Code would include a description of quantities and routes and ensure operator training and qualifications.

Public Right-of-way Encroachment

As stated herein, 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-4, 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 would 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 require minimizing stacking (multiple vehicles forming a line of traffic) problems associated with construction workers entering and exiting the plant when their shifts begin and end, and would divert construction-related traffic to the maximum extent feasible away from residential areas.

Avenue M Turning Movements

The proposed primary site access would intersect Avenue M at 10th Street East. 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. At present, the cities of Palmdale and Lancaster design standards and manuals addressing development access have been requested but have not been obtained nor have comments been received by the cities of Palmdale and Lancaster.

A left turn lane and acceleration and deceleration lanes at the main entrance to USAF Plant 42 demonstrate the necessity to provide left turn lanes and acceleration and deceleration lanes at the proposed power plant site. Staff recommends Condition of Certification **TRANS-2**, requiring the project owner to improve Avenue M to include a left turn lane into the project site and acceleration and deceleration lanes entering and exiting the project site to minimize the potential for traffic hazard on Avenue M and consistent with established project accesses along Avenue M.

Ground Fogging Plume Hazard

The PHPP consists of a hybrid natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment. PHPP heat recovery steam generators (HRSG) and cooling tower (10 cell) exhaust would result in thermal and visible plumes during project operation. 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 a visible plume with the potential to affect roadways and airport ground operations. Predicted ground level fogging would occur beyond the proposed project's property line at 15th Street East no more than 5 hours per year and at East Avenue M no more than one hour a year. Ground fogging plume is generated by atmospheric conditions, which can vary beyond what was assumed in the modeling. These plumes would affect small segments of roads infrequently, making extensive mitigation unwarranted. However, the plumes can pose visibility issues on local roads creating a potential hazard for motorists. To minimize the potential motorist visibility hazard, staff recommends Condition of Certification TRANS-6 requiring the project owner to work with the cities of Palmdale and Lancaster to provide a temporary warning sign or provide flagmen to alert drivers to the hazard when conditions make it necessary.

Glare Hazard Potential

As reported in the Energy Commission's Final Staff Assessment for the Victorville 2 Project, glare associated with the solar mirrors is a concern as it could present a distraction for flight operations that occur closer to ground level or when a parabolic mirror is not tracking the sun correctly and the intensity of the reflected light would be like that reflected by a flat mirrored surface (NREL 2007). Staff concurs with the applicant that the likelihood glare would pose a safety hazard to pilots is minimal, however, it is documented that for low level flying aircraft there could be a potential for hazard due to glare. To minimize the glare hazard to low level flying aircraft staff recommends Condition of Certification **TRANS-7,** which would require that the project owner monitor the parabolic mirrors to ensure that they are tracking the sun correctly, and when not in use they position the mirrors in such a manner (mirror side pointed to the ground) as to reduce the potential for glare. In addition, **TRANS-7** would require the project owner to establish a glare complaint resolution process should any complaints be made by pilots.

Airport Operations

According to AirNav.com USAF/ Palmdale Airport operations consist of 80% military, 8% local general aviation, 8% transient general aviation, 2% air taxi and 2% commercial (cargo carriers).

As stated in the discussion of airports, United States Air Force (USAF) Plant 42 and Palmdale Airport is a joint-use facility located adjacent to the proposed project site. The nearest runway is located within 3,000 feet of the power plant's proposed power block. Runways 7/25 are located within 3,000 feet south of the proposed project and runways 4/22 are located within 10,000 feet south of the proposed project. Arrival and departure air traffic using runway 7 and runway 25 could fly over the proposed project according to AirNav.com runway information and according to the AICUZ flight tracks as depicted on **Traffic and Transportation Figures 5-7**.

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, as depicted on **Traffic and Transportation Figure 8**.

The applicant's data request response states that aircraft operations north of runways 7 through 25 would not fly over the proposed power plant site. In addition, it states that the proposed power plant would clear both instrument and visual flight rules departures protected airspace. The data request response also included a letter from Lt. Colonel Ronald Ortiz written to Inland Energy, Inc., dated April 11, 2006. It states that the Air Force does not take exception to the location of the proposed power plant. It further states that the location will need to go through FAA review and coordination as part of the normal permitting process. The Air Force stated in the letter that it prefers a north to south design and the location of HRSG stacks as close to existing buildings as possible.

The AFC indicates that the power block would be constructed in a north to south design and concludes that the Air Force does not have any concerns with the proposed power plant. The letter does not specifically address the impacts of the HRSG stack heights, vertical velocity plumes and visible water vapor plumes on flight paths and patterns.

There are three concerns relevant to flight paths and patterns. The three concerns are height of structures near airports, vertical velocity plumes and visible plumes generated from industrial exhaust.

HRSG Stack Height

United States Department of Transportation, Federal Aviation Administration Title 14, Chapter 1, Part 77.13 requires an executed FAA Form 7460-1 for project construction within 10,000 feet from runways of 3,200 feet in length or greater. FAA Form 7460-1 execution is required if the proposed project would introduce any construction or alteration that is greater in height than an imaginary surface extending outward and upward at the following applicable slope 100 to 1 for the horizontal distance of 20,000 feet from project to the nearest 3,200 foot (FAA 2009a). Part 77.23 establishes standards for determining obstructions. Part 77.25 and Part 77.28 establish civilian and

military airport imaginary surfaces. Part 77.23, 77.25 and 77.28 are administered by airport personnel. FAA Regulations, Part 77, also establishes standards for determining obstructions to air navigation, which includes VFR/ IFR aeronautical communications, minimum flight altitudes and physical, electromagnetic or line-of-sight constraints on existing or proposed air navigation communications, radar and control system facilities. In order of superiority, an adverse effect exists if it first exceeds the obstruction standards of Part 77 and is found to have physical or electromagnetic radiation effect on air navigation.

In addition, the FAA prepared Order JO 7400.2G, effective 8/27/2009, Section 3, Identifying/Evaluating Aeronautical Effect for the prime objective to ensure the safety of air navigation and the efficient use of airspace by aircraft. It establishes the standards for determining imaginary surfaces and inner horizontal surfaces (IHS).

According to AFC Figure 2-6, Site Elevation, PHPP HRSG stacks would be 130-feet in height and would be the tallest structures of the plant but according to AFC Section 2.4.6.2, PHPP HRSG stacks would be 145 feet tall. The AFC states that the HRSG stacks fall within the Inner Horizontal Surface (IHS) per Part 77.28. It concludes that the HRSG stacks plus the mean sea level would be 2,646 feet (2,501 feet + 145 feet = 2,646 feet). According to IHS per Part 77.28 the maximum height for structures within a military airport's imaginary surface is 2,543 feet, the established airport elevation, plus 150 feet, or 2,693 feet. Using the military imaginary surface calculation the HRSG stacks would be 2,688 feet (2,543 feet + 145 feet = 2,688 feet). The 2,688 feet would be less than the elevation of 2,693 feet allowed.

Furthermore, FAA Advisory Circular 70/7460-1, Obstruction Lighting/Marking Requirements, requires that any temporary or permanent structure, including all appurtenances, that exceeds an overall height of 200-feet above ground level (AGL) or exceeds any obstruction standard contained in FAA Form 7460, should normally be marked and/or lighted (FAA 2009b). If the HRSG stacks exceed any obstruction standard that poses a hazard to flight paths or patterns, then the staff would recommend lighting and marking per FAA Advisory Circular 70/7460-1.

The applicant has not provided a copy of an executed FAA Form 7460-1. Staff contacted the FAA and retrieved a determination letter stating the proposed stack heights, as proposed, would not exceed the IHS. The letter further states that any equipment used during construction exceeding the 2,646 feet AMSL would require additional submittal and execution of FAA Form 7460-1. At present staff is not aware of proposed equipment to be used in construction of the power plant or transmission facilities that exceed the established standards.

At the request of USAF Plant 42 officials, Energy Commission staff explained the siting process and discussed the traffic and transportation section of the AFC with them. USAF Plant 42 officials expressed some concerns with the stack heights, specifically that C-130 aircraft perform maneuvers directly over the proposed project power block area. It was explained to USAF Plant 42 officials that the PSA is preliminary and any comments received from USAF Plant 42 officials would be considered and included in the FSA, where appropriate. Energy Commission staff anticipates that the USAF will provide new comments regarding this matter.

Flight Paths and Patterns Vertical Velocity Plume Hazard Potential The PHPP consists of a hybrid natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment. PHPP heat recovery steam generators (HRSG) and cooling tower (10 cell) exhaust would result in thermal and visible plumes during project operation. Plume Traffic Impact Modeling Analysis, Appendix TT-1, was performed to evaluate vertical velocity plumes and Appendix VR-3 was performed to evaluate visible plumes on the transportation system within the vicinity of the project.

Vertical velocity plumes are currents of air emitted upward from the HRSG stacks and cooling tower. Vertical velocity plumes can be emitted at a velocity as to affect anything that travels over or through its current. Visible water vapor plumes are a result of exhausted heat from the HRSGs or cooling tower mixed with atmospheric condition. Vertical velocity and visible plumes may affect traffic and transportation within the immediate vicinity of the project and may impact airspace above and around the proposed plant's power block. Please refer to the **VISUAL RESOURCES** section of the PSA for discussion of visible plumes as it relates to visual resources.

Vertical velocity plumes generated by the PHPP gas turbine/HRSG stacks and cooling tower, under calm wind conditions, are predicted to exceed 4.3 meters per second (m/s) at heights as much as approximately 990 and 940 feet above ground level, respectively. The worst-case dead calm wind and cool to cold ambient conditions used in the velocity calculations would 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 would remain relatively high, and may exceed 4.3 m/s above 500 feet AGL, during very low wind speed conditions (less than 1 m/s hourly average). These low wind speed conditions occur relatively frequently at the site location, over 2.4 hours per day on average or approximately 10% of the time. Vertical velocity plumes may impact flight patterns and paths as described above.

The Federal Aviation Administration (FAA) conducted a study pertaining to vertical velocity plumes (Safety Study Report DOT-FAA-AFS-420-06-1, Safety Risk Analysis of Aircraft Overflight of Industrial Exhaust Plumes). The underlying presumption is that velocity from industrial facilities exhaust may cause air disturbances. Two hazards were identified and include turbulence that may cause airframe damage and flight stability and the possibility of adverse effects associated with high levels of water vapor that may cause icing and restricted visibility. These hazards are considered most critical for general aviation aircraft. Analysis of statistical data concluded that that the accident/ incident rate for exhaust plumes to be less than the target level of safety and therefore, "acceptably low." The study also concludes that direct overflight below 1,000 feet AGL should be avoided. If vertical velocity plumes exceed 4.3 meters per second (m/s), aircraft airframe damage or an aircraft's flight path may be upset when flying at low levels.

As stated herein, flight tracks occur over the proposed project site but there is not sufficient data to determine if flight tracks would crossover the HRSG stacks or cooling towers and at what altitude. Flight arrival and departure altitudes vary with wind conditions and other atmospheric conditions. Aircraft ascend to an altitude of approximately 1,500 feet and descend from an altitude of 1,500 feet approximately one

mile from the runways. Without specific details pertaining to altitudes of flight operations over the power block, it is difficult to determine the potential impact of vertical velocity plumes on flight paths and patterns.

USAF Plant 42 officials have expressed to staff some concerns, specifically that C-130 aircraft perform maneuvers directly over the proposed project power block area and the potential for vertical velocity plumes to impact flight operations. Energy Commission staff anticipates that the USAF will provide formal comments regarding this matter, which will be addressed in the FSA.

Flight Paths and Patterns and Visible Plume Hazard Potential Visible water vapor plumes occur as a result of cooling tower or HRSG stacks exhaust combined with the presence of low temperature and high humidity weather. Visible plume impacts on air traffic and transportation safety becomes problematic when visible water vapor plumes are at a height, width and length to obstruct visibility. As discussed earlier, ground fogging plumes have similar attributes and affects on ground transportation safety.

Energy Commission staff assesses visible water vapor plume impacts on visual resources primarily to determine whether such plumes are expected to occur more than 20% of seasonal (November to April) daylight clear hours. Seasonal Annual Cooling Tower Impact (SACTI) and Combustion Stack Visible Plume (CSVP) modeling was performed to assess the potential for visible water vapor plumes to occur from the HRSG stacks and cooling towers. **Appendix VR-3** provides detailed analysis of visible water vapor plumes during seasonal daylight clear hours.

For transportation purposes, visible water vapor plumes can present visibility issues during other times beyond seasonal daylight clear hours such as nighttime and on cloudy days. AirNav.com states that general aviation and nighttime flights occur at the Air Force Plant 42/ Palmdale Airport. Appendix VR-3 provides summary tables that contain an estimate of the potential frequency of the visible water vapor plumes that would be generated by the proposed project's HRSGs and cooling towers for all hours, and a table of the height, length and width of visible water vapor plumes that would be generated by the proposed project's cooling towers during seasonal clear hours. The frequency and size of HRSG visible water vapor plumes would be much lower than those from the cooling towers; therefore, the main concern for air traffic visible obstruction is the cooling tower visible water vapor plumes.

A review of the CSVP modeling results for all hours conditions indicates that the cooling tower visible water vapor plumes could have lengths greater than 3,000 feet as much as 0.6 to 0.8% of the time; plume heights that are greater than 1,500 feet could occur as much as 0.9 to 1.1% of the time, and plume heights greater than 300 1,000 feet could occur as much as 2.3 to 2.8% of the time. The SACTI modeling results for large plumes during all hours are similar in frequency to the CSVP modeling results.

The western portion of runways 7/25 is approximately 3,300 feet south of the HRSG stacks and cooling towers. Given the height, width and length of the modeled visible water vapor plumes, there are some hours where the visible water vapor plume from the cooling tower is likely to pass over the 7/25 runways, causing the potential for visible obstruction; or pass through normal flight paths or cause visual obstructions from those

flight paths toward the airport or other operating aircraft. As indicated, the percentage of time that visible water vapor plume could occur is relatively small and projecting the amount of time a water vapor plume would be present depends substantially on atmospheric conditions and project operations.

USAF Plant 42 officials expressed to staff some concerns regarding visible water vapor plumes. Energy Commission staff anticipates that the USAF will provide formal comments regarding this matter, which will be addressed in the FSA.

Migratory Bird Hazard Potential

AirNav.com reports that USAF/ Palmdale Airport 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. There would be no impact associated with migratory bird hazards. Refer to **WATER RESOURCES** and **BIOLOGICAL RESOURCES** sections for more detailed discussion pertaining to the retention facilities and migratory birds.

Railways

Project construction related traffic is proposed to be routed to 10th Avenue East, Avenue L and SR-14. Avenue L crosses over the UPRR mainline. In addition, Avenue M crossing with the UPRR mainline is signalized and gate controlled.

Emergency Access

In the event of an emergency at the PHPP site during construction, emergency vehicles would likely use either Avenue M to the intersection with 10th Avenue East to access the project site. Fire Station #37, located at 38318 East 9th Street, is the nearest fire station to the project site. Palmdale Circulation Element Policy C1.4.4 requires a minimum 26-foot wide paved access from an improved public street to all developments. Access roads shall be increased to 28 feet in width within 200 feet of an intersection with a public street. A main access drive and at least one additional emergency access would provide standard acceptable emergency access to the proposed project. For additional discussion of emergency services serving the facility, refer to the WORKER SAFETY and FIRE PROTECTION section in this PSA.

Staff recommends Condition of Certification **TRANS-8** to ensure the proposed project complies with local emergency access LORS. **TRANS-8** requires the project owner to coordinate with the Los Angeles County Fire Department to ensure adequate emergency access and submit a site plan to Palmdale Public Works to ensure emergency access meets city design criteria and standards, per City policy.

Parking and Internal Circulation

Palmdale's Zoning Ordinance provides requirements for off-street parking and internal circulation (Article 63) and parking design standards (Article 87). Since the proposed project is in the schematic phase, internal circulation cannot be fully evaluated. Parking requirements pursuant to Article 87 for industrial/manufacturing uses is for each structure:

- 1 - 5,000 square feet - One space for each 500 square feet of gross floor area (GFA)

- 5,001 - 10,000 square feet - One space for each 750 square feet of GFA
- 10,001 - 50,000 square feet - One space for each 1,000 square feet of GFA
- 50,001 + square feet. - One space for each 1,250 square feet of GFA

(Includes up to 25% of GFA used for office space; over 25% of GFA, office space requires one space per 250 square feet).

Based on the peak construction workforce commuters, parking for the construction of the PHPP will occupy 10 acres of the 50 acres construction laydown area. A standard parking space is 9 feet by 18 feet. Peak construction demand for parking would be 767 spaces plus 10-15 spaces for trucks. During peak construction approximately 3 acres would be required for construction parking (767x (9x18)/ 43,560 = 2.85 acres). Large parking areas may present land use and visual resource effects. For further discussion on land use and visual resource effects refer to the **LAND USE** and **VISUAL RESOURCE** sections of the PSA.

As required by Palmdale Zoning Ordinance, Article 63, provides the requirements to ensure proper internal circulation of land development projects. The applicant has not submitted an internal circulation plan for review by staff. At the present time, staff cannot conclude that the project would provide adequate internal circulation. Staff requests that the applicant provide a schematic plan illustrating the proposed project's internal circulation with sufficient detail to assess sight distances, turning radii, etc. Staff's would also recommend Condition of Certification **TRANS-9** requiring the project owner to prepare a site plan, ensuring parking and internal circulation is adequate and does not pose safety hazards, per City policy.

No off-site construction worker parking is anticipated for the construction of PHPP, however, during off-site project activities (pipeline and transmission line facilities) the immediate construction workforce would park along the portion of the pipeline or transmission line being constructed (PHPP 2009a). However, should the landowner not authorize this, construction workforce will be required to park at the designated power plant parking area and then be bussed all together to the work area or obtain an easement for staging near the place where construction is to occur. Off-site construction vehicle parking impacts would be minimized by staff's recommended Condition of Certification **TRANS-1**, which requires the preparation of a construction traffic control plan to include a parking plan for workers, construction vehicles, and trucks during transmission line and pipeline construction.

Bicycle and Pedestrian Access

Palmdale's Zoning Ordinance requires the construction of sidewalks along a project's frontage (Article 63). In addition, 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; this is contrary to the City General Plan Circulation Element policy. The Palmdale General Plan Circulation Element cross-section for regional arterials shows the right-of-way to be 126 feet, including an 18-feet median and two 8-foot walks and landscaping strips on each side. At build out, Avenue M should be constructed accordingly.

AVTA provides bus stops at Avenue M at 10th Street West for Route 1 and Avenue M at Sierra Highway for Route 4. Pedestrian access to the proposed plant site from these stops would occur via Avenue M's road shoulder.

Staff's recommends Condition of Certification **TRANS-5** for the proposed project to comply with Palmdale Zoning Ordinance, Article 63, and to provide adequate pedestrian and bicycle access.**TRANS-5** requires the project owner to construct a pedestrian sidewalk and Class II bike lane (per the Circulation Element's cross-section of regional arterial roads) along the project's frontage on Avenue M.

Public Transportation - School Bus Routes and Safety

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.

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 AVSTA but at present the AVSTA has not expressed any concerns.

Linear Facilities

The project would require an 8.7-mile and 20-inch natural gas pipeline, a 7.4-mile and 14- inch water line, a 1-mile and 6-inch wastewater line and 35.6 miles of transmission line. The proposed natural gas pipeline and water and wastewater lines would be located in existing and developed ROW. Parts of the transmission line would not be in existing ROW and would require construction of access roads for the purposes of constructing the transmission lines.

The installation of the of the natural gas pipeline and water line would impose impacts to the Sierra Highway, which would be further constrained with the proposed project, and to the Class I bike route. Sierra Highway's volume is likely to be greatest during peak hours. The installation of the pipeline and water line could impede bicycle and pedestrian access on the Class 1 bike route along Sierra Highway. Condition of Certification **TRANS-1** requires a traffic control plan to mitigate construction impacts and would require the installation of the natural gas pipeline and water line to occur during non-peak hours.

The construction of the transmission line would impose visual impacts to Pearblossom Highway, a designated scenic corridor. Refer to the **VISUAL RESOURCES** section of the PSA for further discussion of visual impacts to Pearblossom Highway.

The construction of the transmission line would also require the construction of access roads and temporary staging areas. The parts of the transmission line construction are in rural areas, hence no existing ROW to install the facilities. The project owner would be required to obtain easements to construct access roads and for staging areas.

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. Therefore, temporary roadway congestion resulting from PHPP could combine with other construction projects within the area, and congestion resulting from future development could create a temporary cumulative significant impact. Construction-related traffic and activities associated with PHPP could also have the potential to combine with these projects and result in cumulative impacts to emergency vehicle access; parking; disruption of public transportation, pedestrian, bicycle, or rail travel; and physical damage to local transportation facilities.

However, PHPP Conditions of Certification **TRANS-1** through **TRANS-9** are proposed to ensure that potentially significant impacts associated with short-term transportation and traffic impacts resulting from proposed project construction are reduced to less-than-significant levels. Furthermore, 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 roadway and intersection improvements) and would require approval from the city of Palmdale, Lancaster or Caltrans, and as well as other affected jurisdictions and agencies. Therefore, PHPP contribution to this impact is considered reduced to a level that is not cumulatively considerable. The mitigation and approval would reduce not only project level transportation and traffic impacts of these projects, but reduce project-specific transportation and traffic impacts of cumulative projects as well. As agency approval of projects is gained, jurisdictional staggering of project construction and timing may occur to further reduce any potential cumulative transportation and traffic impacts. Therefore, PHPP would not have a considerable cumulative contribution to transportation and traffic impacts within the area.

Compliance With Laws, ordinances, regulations, and standards Traffic and Transportation Table 8 provides a general description of applicable statutes, regulations, and standards adopted by the federal government, the State of California, Palmdale and Los Angeles County pertaining to traffic and transportation with which the project is required to comply. Conditions of certification have been proposed to ensure project consistency with a law, ordinance, regulation, or standard where it was not already mandated by federal or state regulations.

TRAFFIC AND TRANSPORTATION Table 8
Compliance with Applicable LORS

Applicable LORS	Description	Compliance
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.	Yes. At present there are no proposed obstructions that exceed the established standard. The applicant has not provided a copy of an executed FAA Form 7460-1. Staff contacted the FAA and retrieved a determination letter stating the proposed stack heights, as proposed, would not exceed the IHS.
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.	Yes. Condition of Certification TRANS-3, 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. 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.	Yes. Condition of Certification TRANS-3 would require that all project related overweight 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 recommended Condition of Certification TRANS-4, 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. It includes standards to govern the design of various roadways in the community, and identifies the location where improvements to existing roadways	Yes. Condition of Certification **TRANS-2**, would require the project owner to ensure improvements to roadways and intersections are completed prior to site grading .

	should be programmed as well as indicating the general location of rights-of-way for future roads.	
City of Palmdale General Plan Circulation Element	**Policy C1.4.1:** Strive to maintain a Level of Service (LOS) C or better to the extent practical; in some circumstances, a LOS D may be acceptable for a short duration during peak periods.	Yes. Condition of Certification **TRANS-2**, would require the project owner to ensure improvements to roadways and intersections are completed prior to site grading.
City of Palmdale General Plan Circulation Element	**Policy C1.4.2:** Ensure that approvals of new development are correlated with any roadway improvements that would be necessary to maintain the existing level of service or LOS C, whichever is less, and other performance characteristics applicable to the affected roadways. Development shall not be authorized until measures are in place to construct any necessary improvements; these measures may include, but not be limited to, payment of traffic impact fees or construction of street improvements as required in the conditions of approval.	Yes. Condition of Certification **TRANS-2**, would require the project owner to ensure improvements to roadways and intersections are completed prior to site grading. Condition of Certification TRANS-5 requires the project owner to implement frontage improvements to Avenue M.
City of Palmdale General Plan Circulation Element	**Policy C1.4.3:** Establish street design standards which provide the capacities that are needed to adequately serve the projected travel demand.	Yes. Condition of Certification **TRANS-2**, would require the project owner to ensure improvements to roadways and intersections are completed prior to site grading.
City of Palmdale General Plan Circulation Element	**Policy C1.4.4:** Promote safe circulation and emergency access, through the following means: 1. Require a minimum 26-foot wide paved access from an improved public street to all developments. Individual single family residences (not associated with a tract map) are excluded from this requirement except as deemed necessary by the Los Angeles County Fire Protection District. Access roads shall be increased to 28 feet in width within 200 feet of an intersection with a public street.	Yes. Condition of Certification **TRANS-8** would require the project owner to coordinate with the Los Angeles County Fire Department to ensure adequate emergency access and submit a site plan to Palmdale Public Works to ensure emergency access meets city design criteria and standards.
City of Palmdale General Plan Circulation Element	**Policy C1.4.5:** Locate and design intersections so as to promote safe and efficient circulation.	Yes. Condition of Certification **TRANS-2**, would require the project owner to ensure improvements to roadways and intersections are completed prior to site grading.
City of Palmdale General Plan Circulation Element	**Policy C.1.7.2:** To the extent feasible, route through truck traffic around existing and future residential neighborhoods.	Yes. Condition of Certification **TRANS-1** would require the project owner to implement and oversee a traffic control plan. Condition of Certification **TRANS-1** would require the project applicant to limit truck deliveries to the hours of

		9:30am to 3:30pm and to consult with the City of Lancaster for other means to reduce truck route impacts.
City of Palmdale General Plan Circulation Element	**Policy C.1.7.3:** Designate truck routes which will serve commercial/industrial areas while minimizing adverse impacts of heavy truck traffic on these uses.	Yes. Condition of Certification **TRANS-**1 would require the project owner to implement and oversee a traffic control plan address minimizing truck traffic impacts.
City of Palmdale General Plan Circulation Element	**Policy C2.1.1:** Require Transportation Demand Management Plans from major employers, as defined by the Air Quality Management District and the Congestion Management Plan.	Yes. Condition of Certification **TRANS-1**, would require the project owner to coordinate with Caltrans, Antelope Valley Transit Authority and the cities of Palmdale and Lancaster to address potential LOS deterioration to regional and local serving roadways and to formulate a TDM as required by City policy.
Palmdale Municipal Code ZONING ORDINANCE Adopted December 14, 1994 Ordinance No. U-1060	**Article 63** Provides requirements for off-street parking, sidewalks and internal circulation.	Yes. Condition of Certification **TRANS-9** would require the project owner to submit a site plan to Palmdale Public Works and Planning Departments illustrating the provision of adequate parking, internal roadway geometrics, signage and traffic control, turning radius, sight distances, driveway spacing, emergency access etc. to meet county design criteria and standards. Condition of Certification **TRANS-5** requires the project owner to construct a sidewalk along the project's frontage on Avenue M.
Palmdale Municipal Code ZONING ORDINANCE Adopted December 14, 1994 Ordinance No. U-1060	**Article 87** Specific off-street parking requirements.	Yes. Condition of Certification **TRANS-9** would require the project owner to submit a site plan to Palmdale Public Works and Planning Departments illustrating the provision of the number and size of parking spaces.
Palmdale Municipal Code Zoning Ordinance Adopted December 14, 1994 Ordinance No. U-1060	**Article 101** Requirements for Transportation Demand Management (TDM)	Yes. Condition of Certification **TRANS-1** requires the approval of a traffic control plan to include TDM requirements.
City of Lancaster General Plan Plan for Physical Mobility	14.1.1(c) As part of the development review process, continue to analyze the potential impacts of traffic generated by projects and the effects on adjacent land uses and surrounding neighborhoods.	Undetermined. Informal comments were received from the city of Lancaster. The Final Staff Assessment (FSA) will ensure compliance with Lancaster LORS.

City of Lancaster General Plan Plan for Physical Mobility	14.1.1(d) As part of the development and environmental review process, ensure that new development meets the provisions of the Los Angeles County Congestion Management Program (CMP) by requiring preparation of Traffic Impact Analyses and provision of mitigation as outlined in the CMP.	Undetermined. Informal comments were received from the city of Lancaster. The FSA will assess compliance with Lancaster LORS.
City of Lancaster General Plan Plan for Physical Mobility	14.1.2(b) As a condition of approval for new development, require, at a minimum, that all internal roadways be constructed to the Transportation Master Plan requirements.	Undetermined. Informal comments were received from the city of Lancaster. The FSA will assess compliance with Lancaster LORS.
City of Lancaster General Plan Plan for Physical Mobility	14.1.3(a) Establish a procedure to determine road construction needs generated by a proposed development, to assign costs and to arrange for reimbursement by future developments.	Undetermined. Informal comments were received from the city of Lancaster. The FSA will assess compliance with Lancaster LORS.
City of Lancaster General Plan Plan for Physical Mobility	Policy 14.1.4: Encourage the design of roads and traffic controls to optimize safe traffic flow by minimizing turning movements, curb parking, uncontrolled access, and frequent stops.	Yes. Condition of Certification **TRANS-2**, would require the project owner to ensure improvements to roadways and intersections are completed prior to site grading.
City of Lancaster General Plan Plan for Physical Mobility	Policy 14.1.5: Provide adequate levels of maintenance for all components of the circulation system, such as roadways, sidewalks, bicycle facilities, roadway drainage systems, pedestrian, recreational trails, and similar facilities.	Yes. Condition of Certification **TRANS-5**, would require the project owner to ensure improvements to roadways and intersections, are completed.
City of Lancaster General Plan Plan for Physical Mobility	14.4.2(a) Through the development review process, ensure that new developments make adequate provision for bus stop and turnout areas as necessary for both public transit and school bus service, as well as park-and-ride facilities identified as necessary.	Yes. Condition of Certification **TRANS-1** requires the approval of a traffic control plan to include TDM requirements.
City of Lancaster General Plan Plan for Physical Mobility	Policy 14.4.4: Encourage commuters and employers to reduce vehicular trips byimplementing Transportation Demand Management strategies.	Yes. Condition of Certification **TRANS-1** requires the approval of a traffic control plan to include TDM requirements.
City of Lancaster General Plan Plan for Physical Mobility	Policy 14.5.1: Provide adequate roadways and a support system to accommodate both automobile and truck traffic.	Undetermined. Informal comments were received from the city of Lancaster. The FSA will assess compliance with Lancaster LORS.

CONCLUSIONS

Staff cannot conclude at this time that the Palmdale Hybrid Power Plant (PHPP) would be in compliance with applicable federal, state and local laws, ordinances, regulations, and standards (LORS) pertaining to traffic and transportation:

- The city of Palmdale Circulation Element requires the submittal and approval of a site plan that demonstrates the provision of parking, internal circulation and emergency access. The AFC did not provide sufficient information to determine if the project complies with requirements of the Circulation Element. The review of a site plan would ensure compliance with local LORS pertaining to parking, internal circulation and emergency access, as required.
- Avenue M and other proposed project access routes are located within both jurisdictions, Palmdale and Lancaster. City of Lancaster LORS are applicable to the proposed project.

Staff identified project-induced impacts and analyzed the impacts on the region's transportation system. Staff cannot conclude at this time that impacts induced by the Palmdale Hybrid Power Plant (PHPP) would be reduced to less than significant:

- Traffic data for Lancaster roadways is necessary for staff to assess environmental impacts.
- Improvements to Avenue M are not recommended by the applicant for staff to assess this route as a viable alternative.
- The applicant did not address Lancaster LORS or demonstrate that traffic data provided is consistent with Lancaster traffic counts. The Energy Commission recently received informal comments from the city of Lancaster. At the time of this publication, staff was not able to include the comments in the assessment of Lancaster LORS or traffic data due to scheduling constraints.
- The applicant states that 10th Street East and Avenue L intersection is un-signalized. This intersection is signalized. It is not demonstrated that the signalization at 10th Street East and Avenue L intersection operates at an acceptable level of service or would operate at an acceptable LOS with recommended improvements. The applicant does present data pertaining to volumes and capacity on10th Street East.

Staff cannot conclude at this time whether stack heights vertical velocity plumes and visible water vapor plumes would have an impact on military flight paths and patterns. If it is determined that the HRSG stack heights, vertical velocity plumes and visible water vapor plumes pose a hazard to flight paths and patterns, then staff would recommend that the project owner comply with safety measures as provided by the FAA and military. In addition, if the HRSG stack height poses a hazard to flight paths or patterns, then the staff would recommend that lighting and marking per FAA Advisory Circular 70/7460-1.

At the request of USAF Plant 42 officials, Energy Commission staff explained the siting process and discussed the traffic and transportation section of the AFC with them. USAF Plant 42 officials expressed some concerns regarding stack heights, vertical velocity plumes and visible water vapor plumes. It was explained to USAF Plant 42 officials that the PSA is preliminary and any comments received from USAF Plant 42 officials would be considered and included in the FSA, where appropriate. Energy Commission staff anticipates that the USAF will provide comments regarding this matter.

Once the PHPP is operational, traffic volumes generated by the project would be minimal and insignificant on the transportation system but conditions of certification may be required to address project-induced vertical velocity plume and visible water vapor plume impacts. Construction and some operational impacts induced by the project would be reduced to less than significant with the implementation of recommended Conditions of Certification TRANS-1 through TRANS-9.

Staff has analyzed potential construction and operational impacts by the proposed PHPP related to the regional/local traffic and transportation system and concluded the following:

- Construction related traffic would generate volumes during construction that potentially exceeds capacity on SR-14. City policy requires Transportation Demand Management programs for major employers, which would reduce impacts to roadways and intersections. Condition of Certification **TRANS-1** requires the project owner to prepare a traffic control plan (TCP), which would include a TDM to reduce project generated traffic.
- Construction related traffic would exceed thresholds at roadway intersections. The applicant recommended physical improvements to reduce impacts to intersections. **TRANS-2** would require the project owner to work with the cities of Palmdale and Lancaster to get improvements installed prior to construction and provide documentation that improvements to roadways and intersections have been completed.
- Construction and operations traffic would require overweight and oversized vehicles, which would be used to construct the project, transport very large and heavy equipment and materials, deliver hazardous materials and present potential damage to roadways and safety hazards. There are federal, state and local regulations that require permits, training, certification and warning devices or systems. Condition of Certification TRANS-3 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. The project owner must also obtain state and local permits for all project-related overweight and oversize vehicles and use trailing warning and police control, if necessary.
- Condition of Certification **TRANS-4** requires the project owner to repair damage to roadways caused by the construction of the project.
- Construction and operations related traffic could pose a hazardous or safety concern related to rapidly moving vehicles on Avenue M without improving Avenue M with turn lanes and acceleration and deceleration lanes at the projects entry. Condition of Certification **TRANS-5** requires the project owner to improve Avenue M along the project's frontage according to the Palmdale Circulation Element's regional arterial cross section and is to include turn lanes, acceleration and deceleration lanes, a sidewalk and Class II bike route.
- Ground fogging plumes may impact motorists traveling on Avenue M and 15th Street East. Condition of Certification **TRANS-6** requires the project owner to take appropriate measures to alert drivers of the potential hazard when it is likely that

atmospheric conditions combined with the cooling towers exhaust would create ground fogging plume that may affect motorists on Avenue M and 15th Street East.

- Glare from the solar arrays may impact low flying aircraft. Condition of Certification **TRANS-7** would require the project owner to face inoperable solar arrays downward and the implementation of a pilot complaint procedure would reduce the potential for impact.
- Emergency access requires a minimum 26 foot paved access per City policy. Condition of Certification **TRANS-8** would require the project owner to work with the Los Angeles County Fire Department and Palmdale Public Works to ensure adequate emergency access is provided.
- Parking for the project is proposed to be located on 10 acres and would be adequate for plant construction. Parking requirements for the construction of linear facilities would be included in the traffic control plan. Condition of Certification **TRANS-9** would require the project owner to provide a site plan to the Palmdale Department of Public Works to ensure proper internal circulation.
- The nearest bus stop is not readily accessible to the proposed project by a pedestrian pathway. Pursuant to City policy, a pedestrian pathway is required to be constructed along the project's roadway frontage on Avenue M. Condition of Certification **TRANS-5** requires the project owner to improve Avenue M along the project's frontage according to the Palmdale Circulation Element's regional arterial cross section and is to include a sidewalk and Class II bike route. The construction of transmission lines would require the acquisition of easements and rights-of-way.

The construction and operation of PHPP as proposed with the effective implementation of staff's recommended Conditions of Certification **TRANS-1** through **TRANS-9** would ensure that the project's direct adverse traffic and transportation impacts are less than significant. Staff recommends that the Energy Commission adopt the following conditions of certification:

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall submit to the cities of Palmdale and Lancaster a construction traffic control plan and implementation program. The traffic control plan must be prepared in accordance with Caltrans Manual on Uniform Traffic Control Devices and the WATCH Manual and 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 east on Avenue L to south on 10th Street East).
- Establish a TDM program in conjunction with AVTA and the cities of Palmdale and Lancaster.
- Limit heavy equipment and building materials deliveries to between 9:30am and 3:30pm, per Palmdale Circulation Element policy, to minimize impacts (Policy C.1.7.3) and route truck traffic around residential development (Policy C.1.7.2).

- Provide signing, lighting, and traffic control device placement during construction impacting regional and local roadways;
- Alternate construction work hours and arrival/departure times outside peak 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;
- 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.
- Use flagging, flag men, signage and cover open trenches.

Verification: At least 90 day prior to the start of site mobilization, the project owner shall submit a traffic control plan that outlines each component above to the cities of Palmdale and Lancaster for review and comment and submit the construction traffic control plan to the Compliance Project Manager (CPM) and Chief Building Official (CBO) for review. The CPM and CBO will consider comments received by the cities and include such comments where appropriate.

TRANS-2 The project owner shall work with the cities of Palmdale and Lancaster to get improvements installed prior to construction and provide documentation that improvements to roadways and intersections have been completed.

Verification: At least 120 day prior to the start of site grading, the project owner shall obtain the necessary public rights-of-way from the cities of Lancaster and Palmdale, for the purposes of constructing necessary road improvements and installing traffic controls, or, the project owner shall agree to funding improvements for the purposes of constructing necessary road improvements and installing traffic controls. At least 30 days prior to site grading, the project owner shall notify the CBO and CPM that the improvements are completed and ready for inspection.

TRANS-3 The project owner shall comply with US DOT, Caltrans, Los Angeles County and the cities of Palmdale and Lancaster and any other relevant jurisdictional limitations on vehicle sizes, weights, and travel routes and ensure that drivers and handlers are trained and certified in the delivery of hazardous materials. In addition, the project owner shall obtain all necessary transportation permits from Caltrans, Los Angeles County and the cities of Palmdale and Lancaster for roadway use and delivery of hazardous materials.

Verification: The project owner shall retain copies of any permits and supporting documentation in its compliance file received for a period of 6 months.

TRANS-4 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. 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 before 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 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-5 The project owner shall improve Avenue M, including sidewalk, and provide a Class II, as illustrated in the Palmdale Circulation Element for Regional Arterials, along its frontage on Avenue M and pursuant to the Palmdale Circulation Element Policy C1.4.3, Zoning Ordinance Article 63, the Master Planned Bike Routes Map and city of Palmdale Public Works design criteria and standards.

Verification: At least 90 days prior to the start of operations, the project owner shall submit evidence that the road improvements to Avenue M including sidewalk and Class II bike route have been constructed to CPM and CBO. The CPM and CBO will consider the comments and include or act on such comments where appropriate. In addition, such improvements must be operational prior to the start of project operations.

TRANS-6 The project owner shall provide warning flagging, flag men or devices to alert motorists of ground fogging plume hazards when atmospheric conditions have the potential to create ground fogging plumes.

Verification: The project owner shall establish a plan to monitor atmospheric conditions and the potential for ground fogging plume and planned actions to alert motorists of the hazard. When it is likely that ground fogging plume may pose visibility problems for motorists on Avenue M and 15th Street East, the project owner shall provide flag men or other warning device to alert motorists of the hazard. In the MCR the applicant must report the days on which ground fogging plume occurred and the action taken to alert motorist of the hazard.

TRANS-7 The project owner shall develop and implement a plan prior to operation to monitor the parabolic arrays to ensure that they are tracking the sun's movement as accurately as possible to minimize glare. The plan shall also include a discussion of the measures that will be implemented to ensure the appropriate position for arrays that are not in use, or operating correctly so as to minimize the potential for glare. If the project owner receives a complaint about glare, a complaint resolution form and proposal to resolve the complaint shall be filed with the CPM.

Verification: At least 90 days prior to the start of operations of the solar thermal portion of the project, the project owner shall provide a copy of the plan to monitor the parabolic arrays and how they would be configured when not in use to the CPM for review and approval. In the annual compliance report, the project owner shall report on activities conducted during the previous year to comply with this condition. Within ten days of receiving a glare 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 reform report shall be submitted to the CPM within thirty days of complaint resolution.

TRANS-8 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 must be provided prior to the start of project operations.

TRANS-9 The project owner shall provide internal circulation and immediate external circulation consistent with the city of Palmdale Municipal Code Zoning Ordinance No. U-1060. The project owner shall provide a site plan that illustrates the provision of adequate parking, roadway geometrics, signage and traffic control, turning radius, sight distances, driveway spacing, emergency access, etc. to meet City design criteria and standards.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit a site plan to the city of Palmdale for review and comment, and the CPM an CBO for review and approval, on the internal circulation and parking. The project owner shall provide the CPM with any comments received from the city of Palmdale. Adequate internal circulation must be provided prior to the start of project operations.

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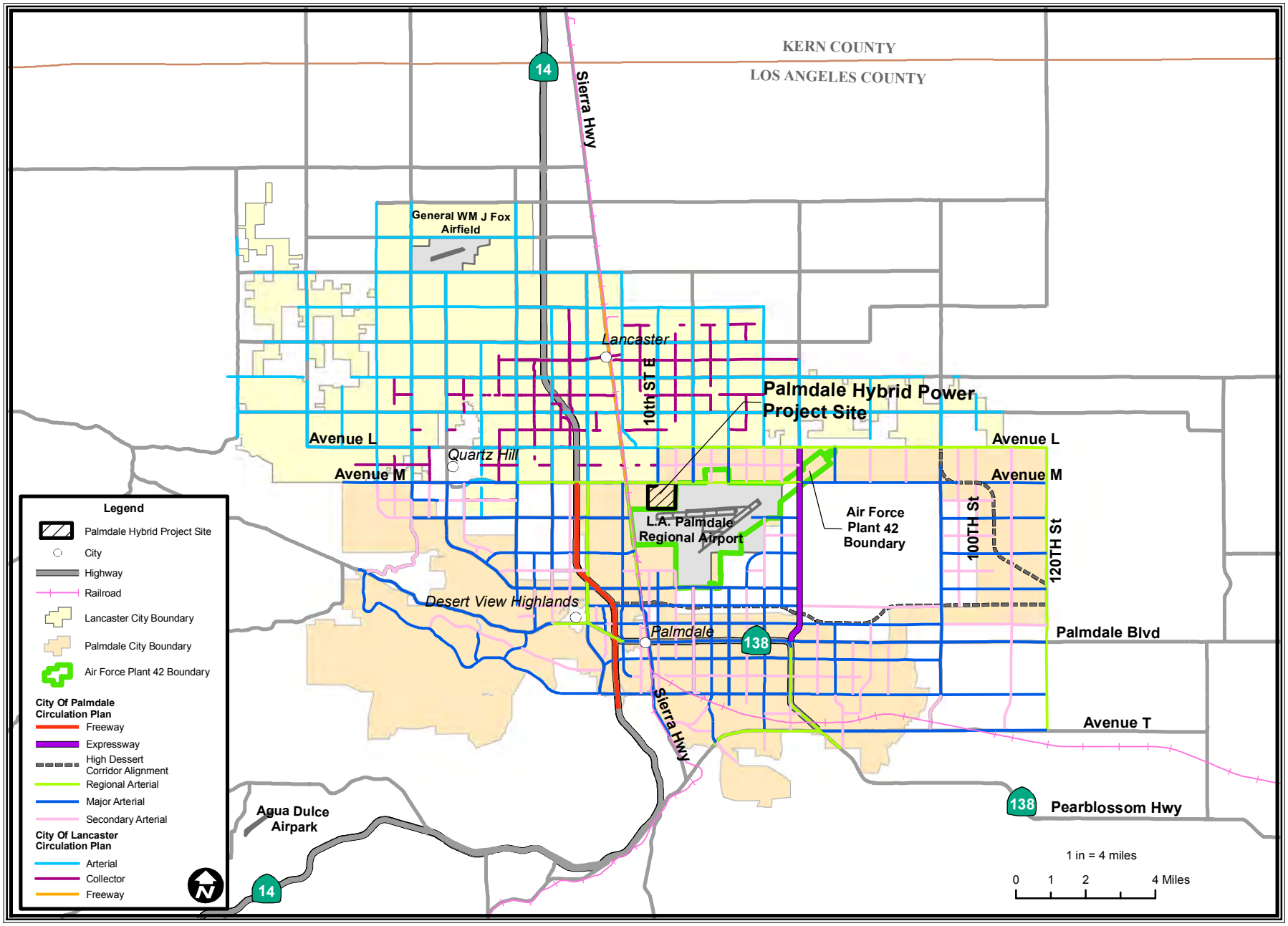
TRAFFIC AND TRANSPORTATION - FIGURE 1

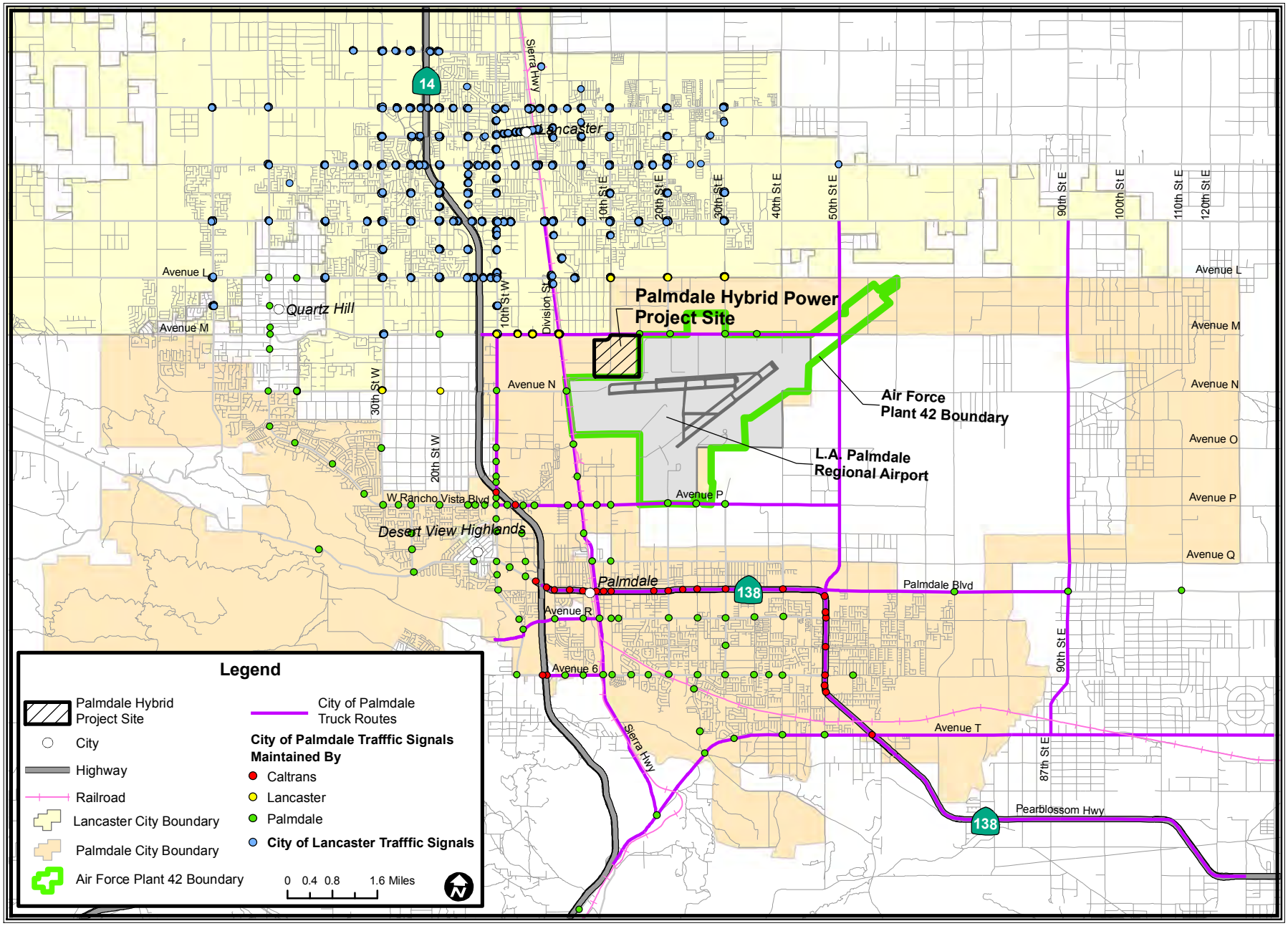
Palmdale Hybrid Power Project - Regional Transportation Network



SOURCE: Tele Atlas & City of Palmdale, City of Lancaster

TRAFFIC AND TRANSPORTATION - FIGURE 2

Palmdale Hybrid Power Project - Palmdale Truckroutes and Lancaster/Palmdale Traffic Signals

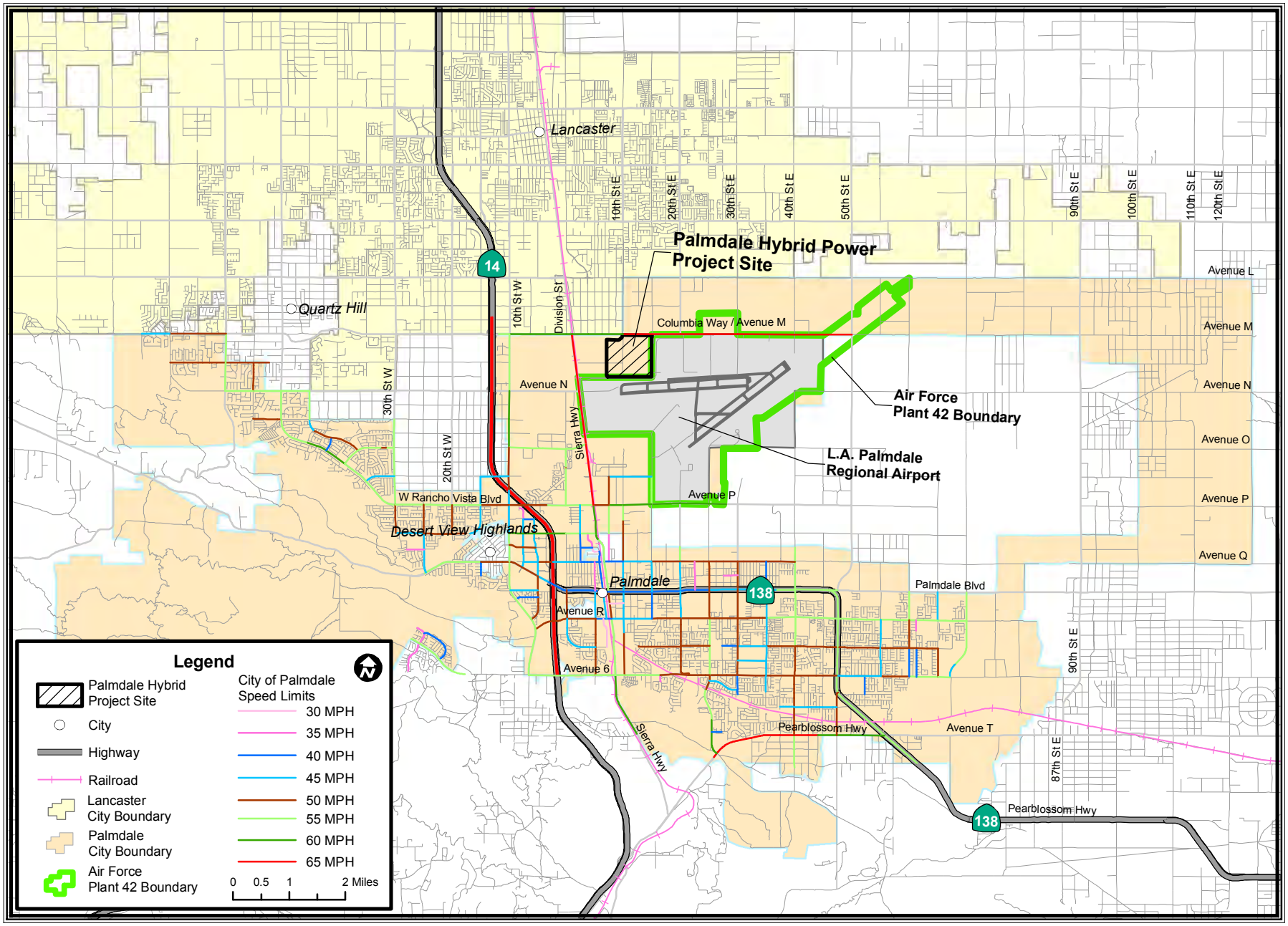


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, FEBRUARY 2010

SOURCE: Tele Atlas & City of Palmdale, City of Lancaster

TRAFFIC AND TRANSPORTATION - FIGURE 3

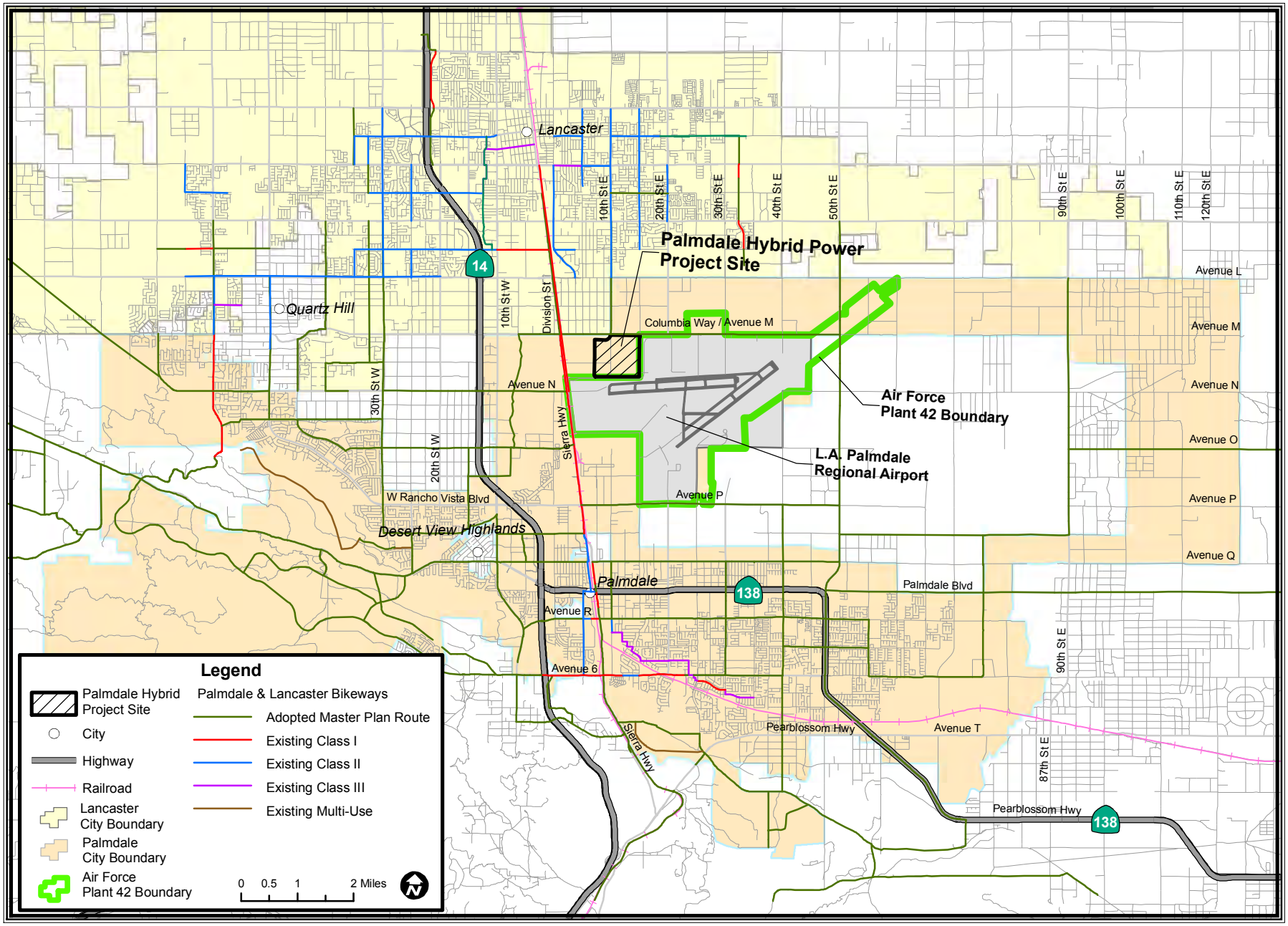
Palmdale Hybrid Power Project - City of Palmdale Speed Limits



SOURCE: Tele Atlas & City of Palmdale

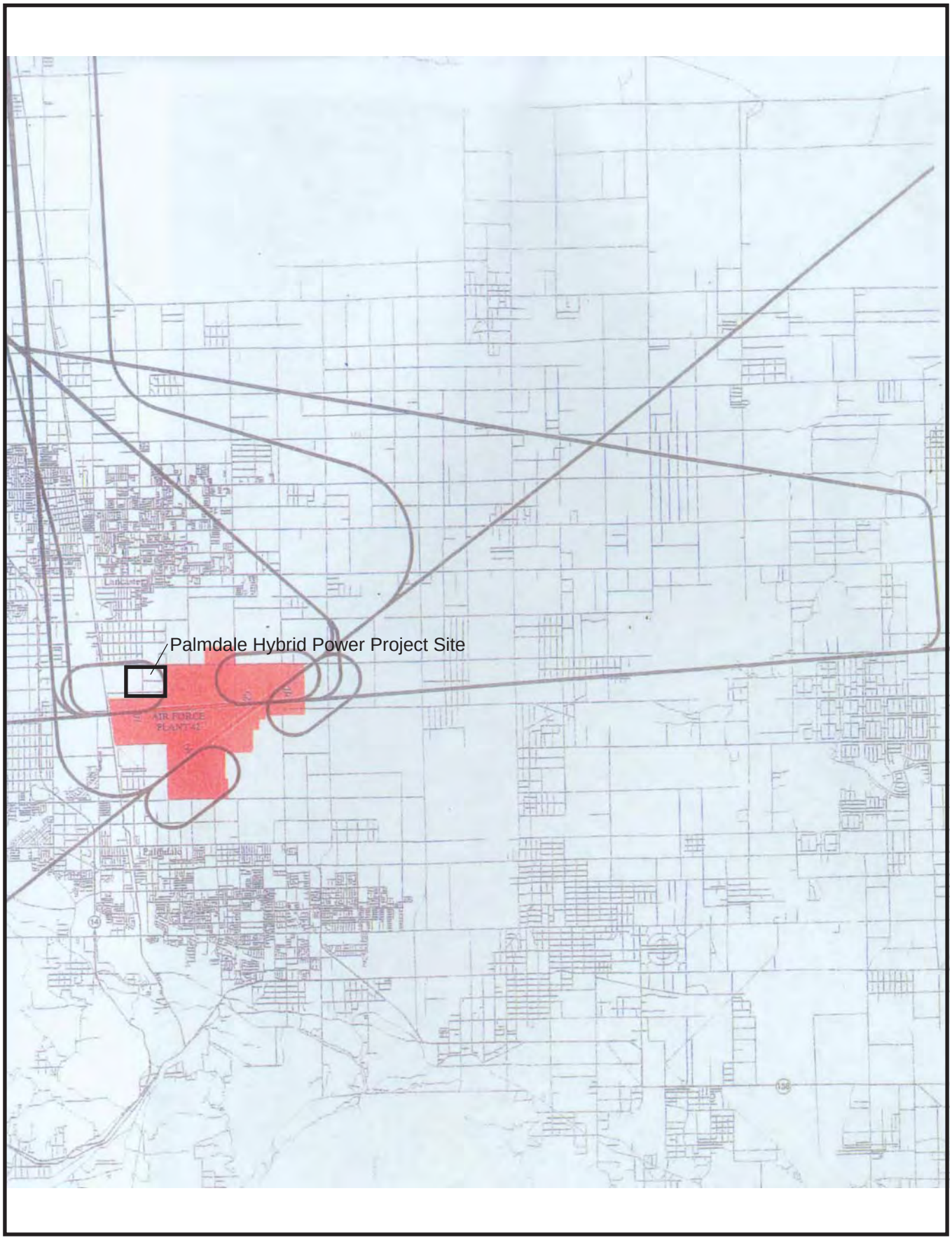
TRAFFIC AND TRANSPORTATION - FIGURE 4

Palmdale Hybrid Power Project - City of Palmdale & Lancaster Bikeway and Multi Purpose Trail Plan



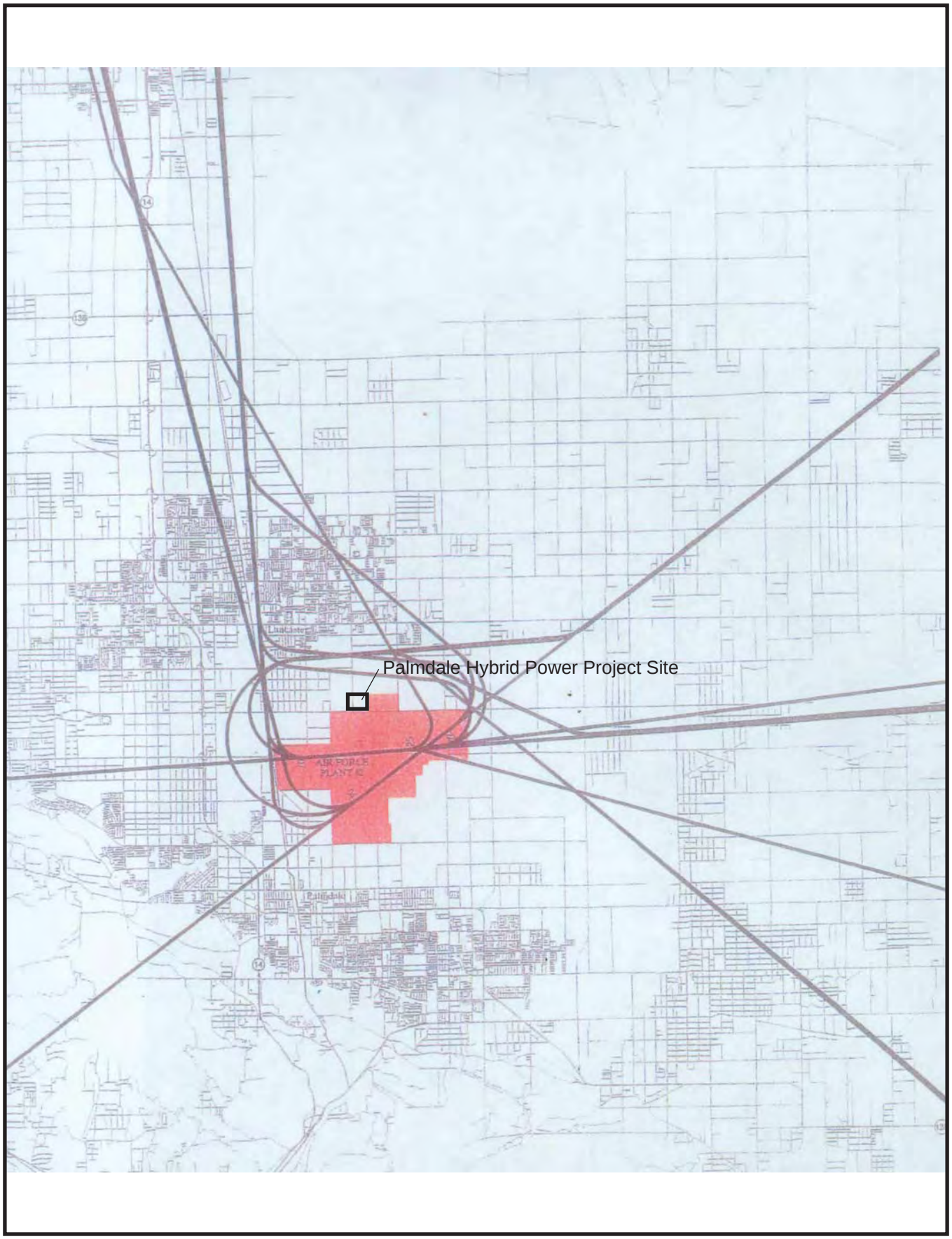
SOURCE: Tele Atlas & City of Palmdale, City of Lancaster

TRAFFIC AND TRANSPORTATION - FIGURE 5
Palmdale Hybrid Power Project - Arrival Flight Tracks



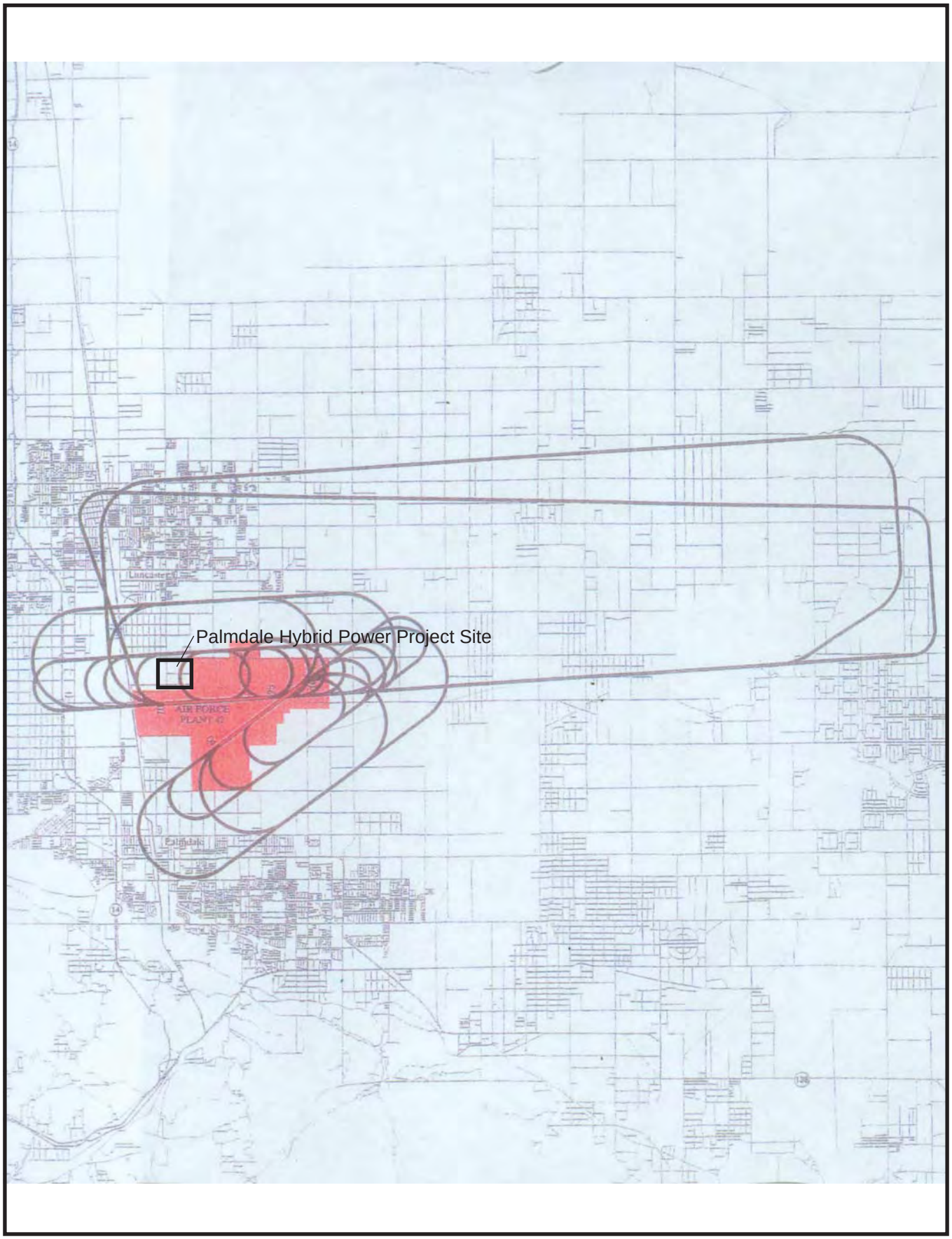
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, FEBRUARY 2010
SOURCE: AICUZ, 2002

TRAFFIC AND TRANSPORTATION - FIGURE 6
Palmdale Hybrid Power Project - Departure Flight Tracks



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, FEBRUARY 2010
SOURCE: AICUZ, 2002

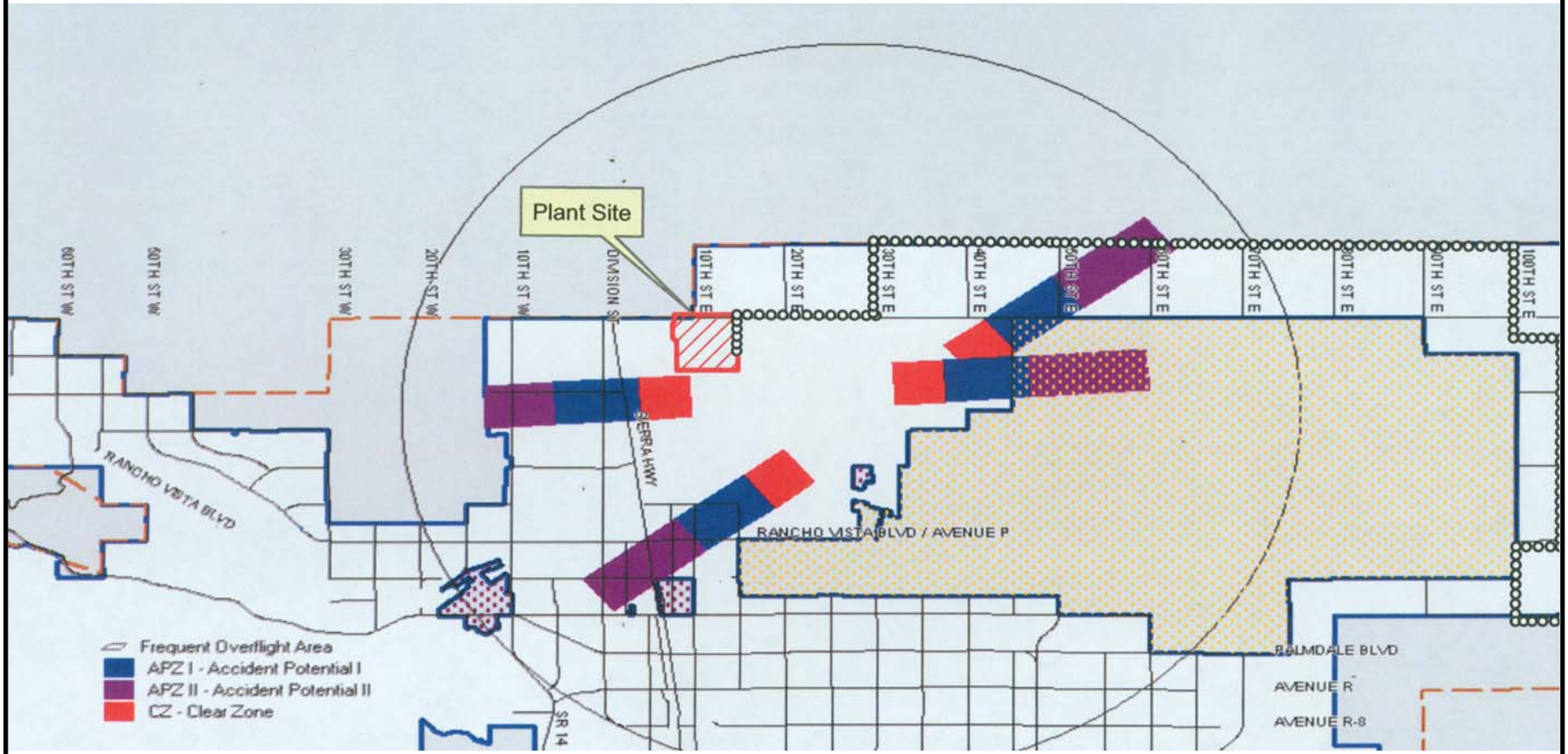
TRAFFIC AND TRANSPORTATION - FIGURE 7
Palmdale Hybrid Power Project - Closed Flight Tracks



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, FEBRUARY 2010
SOURCE: AICUZ, 2002

TRAFFIC AND TRANSPORTATION - FIGURE 8

Palmdale Hybrid Power Project - Clear Zones and Accidental Potential Zones



SOURCE: AICUZ, 2002

VISUAL RESOURCES

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 direct or cumulative adverse visual resource impact, and would comply with applicable laws, ordinances, regulations, and standards (LORS) pertaining to visual resources for viewers at KOP 2 and 3. However, an additional simulation from KOP 1 will be needed to confirm the project's LORS consistency and there may be a need for an existing view photograph and simulation from a new KOP 4. These issues will be discussed at the PSA workshop and staff's final conclusions will be contained in the FSA.

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 an adverse visual impact 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 42 Airport 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 adjacent to the south side of East M Street. 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 M Street 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 68-foot tall cooling tower, 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) [Ibid, 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 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 (Ibid, 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 2009 CEQA Guidelines Appendix G Environmental Checklist pertaining to "Aesthetics." The checklist questions include the following:

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 reviews 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 three 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 three KOPs are:

- KOP 1 – Looking west on East M Street; 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 M Street.
- 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.

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?"

A scenic vista for the purpose of this analysis is defined as a distant view through and along a corridor or opening that exhibits a high degree of pictorial quality. There are no scenic vistas in the selected KOPs viewshed though there are moderate scenic views of the San Gabriel Mountains. Based on staff's field reconnaissance, review of topographical maps, and review of the city of Palmdale General Plan documents, the proposed project would not cause a significant visual impact to a scenic vista.

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 in discussions with biological resources staff (see the **Biological Resources** section of this PSA for more information), Energy Commission staff believes additional mitigation involving transplanting Joshua trees and other vegetation along the south side of East M Avenue along the northern border of the project is also needed (see additional discussion below regarding KOP-1).

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, 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 M Street. Motorists on East M Street currently see a desert landscape with Joshua trees and other vegetation at the proposed site. 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 adverse 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.

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 M Street (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 M Street just east of the intersection of East M Street and Site 1 Road, and several 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 M Street 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 42 Airport 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 power lines, poles, and street lights,

Both Sierra Highway and East M Avenue 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 M Street 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 moderately high 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 location of the proposed berm and landscaping (Joshua trees and other desert vegetation) from an earlier simulation contained in the applicant's data responses, which had been proposed to parallel East M Street on the south side of the street. Originally, this KOP was in a different location (further west on East M Street) and no landscaping was proposed. Energy Commission staff requested moving the KOP to the existing location and simulating the presence of landscaping. The applicant decided to include a proposed berm as well.

The new KOP-1 simulation also shows the berm heading south along the west side of the Site 1 Road adjacent to Air Force Plant 42. This change in the location of the berm would partially obstruct the view from the military installation. This is inappropriate given the fact that the applicant has informed staff that the military, for reasons of national security, requires a clear, unobstructed view from the facility to the power plant site. In addition, the simulated berm and landscaping along the access road would block a view of some of the project structures that could be seen from this KOP. Therefore, the simulation is not an accurate depiction of what motorists would see from KOP 1 and staff cannot complete its visual analysis. These issues will be discussed at the PSA workshop.

KOP 2 – Looking South on 30th Street toward East M Street and PHPP Site - Existing View

KOP 2 **(VISUAL RESOURCES Figure 4A)** was chosen to represent views by travelers heading south on 30th Street toward East M Street, approximately 0.5 miles north 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. 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 will reduce their visual contrast with the background view (CPO 2008a, pg. 5.15-13). Staff believes that the visual impacts from these project structures would be less than significant with mitigation such as painting and texturing/finishing (see staff's proposed Condition of Certification **VIS-1**).

KOP 3 – Looking Northwest From Pearlblossom Highway Toward the Proposed Transmission Line Route Crossing the Highway – Existing Condition

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. However, Pearlblossom Highway is considered a scenic highway by the city of Palmdale. Viewer concern is 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 (taller transmission towers), the degree of view disruption and blockage introduced by the structures is low. 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. However, this section of Pearlblossom Highway is considered a scenic highway by the city of Palmdale. Staff concludes the introduction of the PHPP transmission lines and towers project would not significantly degrade the existing viewshed at KOP 3. The visual impacts are less than significant with mitigation requiring painting, texturing/finishing, and implementing special design standards (i.e. height limits) pursuant to the city of Palmdale General Plan's Environmental Resources Policy (see staff's proposed Condition of Certification **VIS 1**).

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) percent 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). The 20th percentile plume dimensions for the project's cooling tower plumes are predicted to be co-dominant when compared to other elements in the view from KOP 1. The 20th percentile plumes dimensions would be substantial and could block small portions of the sky and the mountain range in the backdrop. As noted earlier, motorists from this KOP have a moderate overall visual sensitivity.

The applicant noted that visible plumes would be generated by the cooling towers. Their maximum predicted cooling tower plume length is 9,790 meters (approximately 32,000 feet) and is predicted to occur 14 hours per year. The applicant believes a more reasonable worst-case plume visibility analysis uses the 90th percentile plume length of 44 meters (about 145 feet) which is predicted to occur about 445 hours per year. Although infrequent, the need for a plume-abated cooling tower is still being considered due to the predicted presence of plumes (COP 2008a, pg. 5.15-15). Staff has identified some modeling errors that caused the applicant's plume analysis to underestimate the size and frequency of the estimated cooling tower plumes. This issue will be discussed at the PSA workshop and addressed in the FSA.

Given the fact that the project site is located adjacent to the U.S. Air Force 42 Airport (see the **Traffic and Transportation** section of this PSA for more information), the potential size of the plumes is large, there are no plumes currently in the area, and the overall visual sensitivity at KOP 1 is moderate, staff believes a plume-abated cooling tower may be appropriate. However, a determination cannot be made without the benefit of having a simulation depicting predicted plumes in the project viewshed. Staff is proposing that a new simulation from KOP 1 could depict the 20th percentile plume. However, if the plume-generating structures are planned to be built too far south of East M Street they may not be visible in the new simulation. Staff may propose an existing photograph and simulation for new KOP 4 that would be located on East M Street just

east of Sierra Highway, and near the applicant's original KOP 2. These issues will be discussed at the PSA workshop, and a determination of significance and the need for any mitigation (plume abatement) will be provided in the FSA.

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 OR GLARE

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-2** and **VIS-3**, 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-2** limits lighting during construction, and **VIS-3** 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 42 Airport. 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 68-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 Preliminary Staff Assessment.

The red aviation warning lights would be visible to varying degrees to travelers on Sierra Highway and East M Street. 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, KOP 2, and KOP 3 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.

The solar field comprises many parallel rows of solar collectors, normally aligned on a north-south horizontal axis. 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 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). See the **TRAFFIC AND TRANSPORTATION** section of this PSA for further glare discussion. In total, the solar thermal collection field will consist of approximately 250 acres and is shown in **VISUAL RESOURCES Figure 3B**. The height of the solar array support structures are approximately nine feet in height with the array system approximately 20 feet in height.

The photo simulations (KOPs 2 & 3) of the transmission line and poles provided by the applicant show the use of a surface treatment consisting of a neutral grayish white color with a flat finish. This finish would limit excessive glare. Staff concurs with the applicant's proposed surface treatment. With effective implementation of the applicant's proposed surface treatment, project structures would not be a source of substantial glare that could adversely affect existing daytime views. Staff has proposed Condition of Certification **VIS-1** 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 (California Code of Regulations, Title 14), 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, or KOP 3 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. Light and glare impacts generated by these projects are not anticipated to be cumulatively considerable if the project's impacts are mitigated according to the conditions of certification.

The PHPP would introduce to the KOPs 1 through 3 viewsheds publicly visible structures 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 the Palmdale Director of Public Works has advised Energy Commission staff that he will provide updated information about projects currently being developed or anticipated to be developed within the next eighteen months to two years (COP 2009b). Please see the **LAND USE** section for future growth discussion. The view of the visible power plant structures and transmission lines would be visually noticeable but would not be so great as to constitute a substantial degradation of the existing visual setting.

Staff has reviewed Census 2000 information (maps) that shows a minority population greater than 50% 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 Condition 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 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.
	Consistency: 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.
	Consistency: 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 adverse visual impacts for viewers at KOP 2 & 3 and would generally be consistent with the applicable city of Palmdale LORS. However, a determination cannot be made without the benefit of having a simulation depicting predicted plumes in the project viewshed for KOP 1. Staff believes an additional simulation from KOP 1 will be needed to confirm the project's LORS consistency. However, if the plume-generating structures are planned to be built too far south of East M Street they may not be visible in the new simulation. Therefore, staff may propose an existing photograph and simulation for a new KOP 4 that would be located on East M Street just east of Sierra Highway, and near the applicant's original KOP 2.

1. The proposed PHPP is to be built in an area designated “Industrial” by the city of Palmdale General Plan. Land uses surrounding the project site are visually described as industrial which includes 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. The introduction of proposed PHPP structures including the associated linear facilities would generate a less than significant visual impact at KOPs 2 &3; a significance determination at KOP 1 cannot be made at this time until an additional simulation is generated.

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. See **TRAFFIC AND TRANSPORTATION** section for further glare discussion for pilots.

5. The PHPP’s visible water vapor plumes may substantially degrade the existing visual setting. The 20th percentile plumes dimensions are substantial and could block small portions of the sky and the mountain range in the backdrop. Staff is proposing a new simulation from KOP 1 that would depict the 20th percentile plume.

6. The proposed project’s publicly visible project structures may potentially be seen by an identified minority population of greater than 50%. Staff has determined that all significant direct or cumulative impacts specific to visual resources resulting from the operation of the project will be mitigated. Therefore, the proposed project does not introduce a significant visual resource related environmental justice issue.

7. With mitigation, the construction and operation of the PHPP would not cause any significant visual impacts, or contribute considerably to a cumulative visual impact.

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 and 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 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 (i.e. height limits) 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 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 comply with the city of Palmdale municipal code requirements stipulated in section 18-60.140 Landscape Development.

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 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, that the landscaping is ready for inspection.

REFERENCES

AECOM 2009r – AECOM/ S. Head (tn: 48300). Supplemental. Volume 3 for Data Adequacy. Dated 10/1/08. Submitted to CEC/Docket Unit on 10/1/08.

Aspen 2009 - Visible Plume Modeling Analysis by William Walters, sent via e-mail on 5/21/09.

CEC 2009r – CEC/ F. Miller. Socioeconomics Figure 1 – Census 2000 Minority Population by Census Block. Dated on 9/08.

COP – 1993 City of Palmdale General Plan, dated January 25, 1993.

COP 1994 – City of Palmdale Zoning Ordinance, dated 12/14/94.

COP 2004 – City of Palmdale, Traffic Volume Map. Accessed on the City's website on 11/18/09.

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.

COP 2009a – City of Palmdale Municipal Code. 9/2/09.

COP 2009b – Report of Conversation between Michael Mischell, City of Palmdale Director of Public Works, and James Adams, California Energy Commission, on 10/21/09.

L&W2009i – Latham & Watkins/ P. Kihm (tn: 52220). Applicants Responses to CEC Staff Status Report 4. Dated 6/30/09. Submitted to CEC/ Docket Unit on 6/30/09.

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) percent 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.

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.

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.

Visible Plume Table 1

[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.

Cooling Tower Operating and Exhaust Parameters

Parameter		Cooling Tower Design Parameters		
Number of Cells		10 Cells		
Cell Height		46.84 feet (14.28 meters)		
Cell Stack Diameter		48.67 feet (14.23 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	457	61,348	69.4
2	64°F, 40% RH	449	59,329	84.1
3	98°F, 17% RH	445	58,155	92.5
Full Load Duct Firing No Solar				
1	23°F, 92% RH	465	61,254	70.1
2	64°F, 40% RH	463	59,211	84.9
3	98°F, 17% RH	468.2	57,998	93.5
Full Load Duct Firing and Solar				
1	23°F, 92% RH	495	60,962	72.2
2	64°F, 40% RH	488	59,033	86.2
3	98°F, 17% RH	485	57,894	94.2

Source: AECOM 2009h

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.

Cooling Tower Visible Plume Modeling Results

Visible Plume Table 2 provides the CSVP model visible plume frequency results for the three separate full load operating scenarios.

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		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	9,219	36.20%	9,556	37.52%	10,236	40.19%
Daylight Hours	12,897	3,171	24.59%	3,344	25.93%	3,690	28.61%
Daylight Clear Hours	11,808	2,422	20.51%	2,571	21.77%	2,875	24.35%
Seasonal Daylight Clear Hours*	5,025	2,137	42.53%	2,244	44.66%	2,473	49.21%

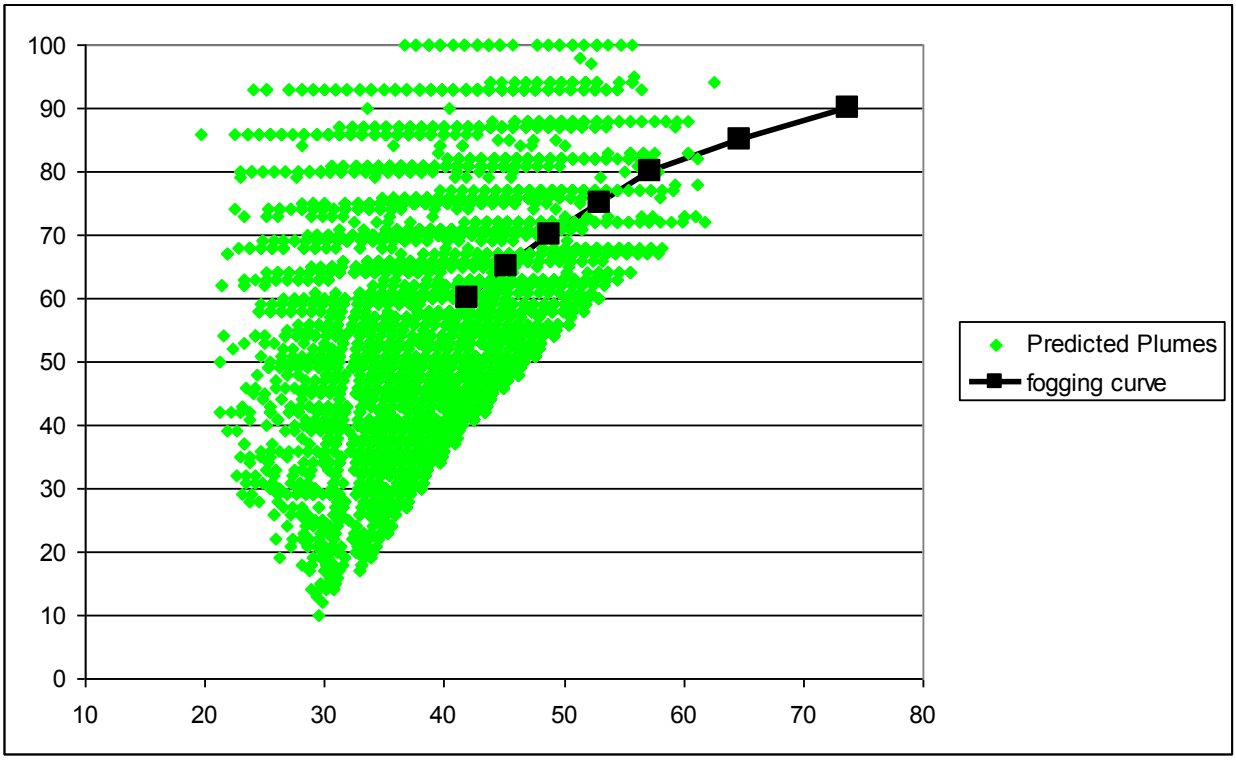
*Seasonal conditions occur from November through April.

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.

Staff attempted to match the fogging frequency curve provided by the applicant (AECOM 2009h) with the CSVP modeling results and found that there was a major

discrepancy in the number of determined visible plume hours. A visual representation of is provided in **Visible Plume Figure 1**.

Visible Plume Figure 1 – Predicted Hours with Cooling Tower Steam Plumes vs. the Cooling Tower Fogging Frequency Curve



As the figure shows the cooling tower exhaust data supplied by the applicant is providing plume results that don't match the cooling tower fogging frequency curve. Therefore, staff believes that the analysis provided based on the applicant's data is overly conservative, so staff is also presenting the cooling tower modeling results from the nearly identical Victorville 2 siting case for comparison.

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**
1%	408 (1,337)	835 (2,738)	154 (506)
5%	202 (661)	441 (1,446)	95 (312)
10%	103 (337)	295 (969)	64 (209)
15%	71 (233)	211 (693)	52 (172)
20%	52 (172)	154 (504)	45 (147)
25%	41 (136)	107 (350)	40 (132)
30%	35 (114)	76 (250)	38 (123)
35%	26 (85)	50 (163)	34 (113)
40%	13 (43)	32 (105)	28 (91)
Full Load, No Solar/ Duct Firing			
	Cooling Tower Seasonal "Clear" Hours Plume Dimensions Meters (Feet)		
Percentile	**Length**	**Height**	**Width**
1%	395 (1,297)	783 (2,569)	150 (494)
5%	236 (774)	409 (1,341)	98 (321)
10%	207 (679)	292 (959)	73 (238)
15%	148 (487)	239 (784)	60 (197)
20%	68 (225)	175 (574)	49 (161)
25%	50 (163)	128 (418)	43 (142)
30%	34 (140)	91 (297)	41 (134)
35%	35 (115)	60 (198)	38 (126)
40%	22 (74)	40 (132)	34 (111)
Full Load Solar and Duct Firing			
	Cooling Tower Seasonal "Clear" Hours Plume Dimensions Meters (Feet)		
Percentile	**Length**	**Height**	**Width**
1%	465 (1,524)	908 (2,979)	172 (565)
5%	233 (766)	486 (1,593)	107 (350)
10%	124 (406)	335 (1,099)	72 (237)
15%	87 (284)	247 (810)	59 (194)
20%	66 (218)	185 (607)	51 (166)
25%	53 (172)	138 (452)	45 (148)
30%	43 (141)	103 (339)	41 (135)
35%	38 (125)	74 (244)	39 (128)
40%	30 (100)	53 (172)	37 (122)
45%	20 (67)	38 (123)	33 (109)

Results include the cooling tower stack height of 19 meters, see **VISIBLE PLUME Table 1**.

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.

As noted staff believes the results determined from the applicant's cooling tower exhaust data are overly conservative, so the Victorville 2 cooling tower CSVP modeling results are presented in **Visible Plume Table 4** for comparison.

Visible Plume Table 4
Predicted Cooling Tower Visible Plume Dimensions
Full Load No Duct Firing Case

	Cooling Tower Seasonal "Clear" Hours Plume Dimensions Meter (Feet)		
Percentile	**Length**	**Height**	**Width**
5%	106 (348)	831 (253)	204 (62)
10%	150 (46)	503 (153)	139 (42)
20%	**71 (22)**	**224 (68)**	**103(31)**
30%	32 (10)	101 (31)	79 (24)

Results include the cooling tower stack height of 19 meters

The Victorville 2 results were based on a worst case operating profile of full load no duct firing no solar[4] for seasonal hours up to 10 am daily with full load solar and duct firing occurring the rest of the day. Staff believes that these results are more representative for the Palmdale project as long as the cooling tower is required to meet the same design specifications as the Victorville 2 cooling tower.

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.

[4] Note this specific operating case is not included in **Visible Plume Table 3**.

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 5**.

Visible Plume Table 5
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 2009

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 6** 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 6 – 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.

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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.

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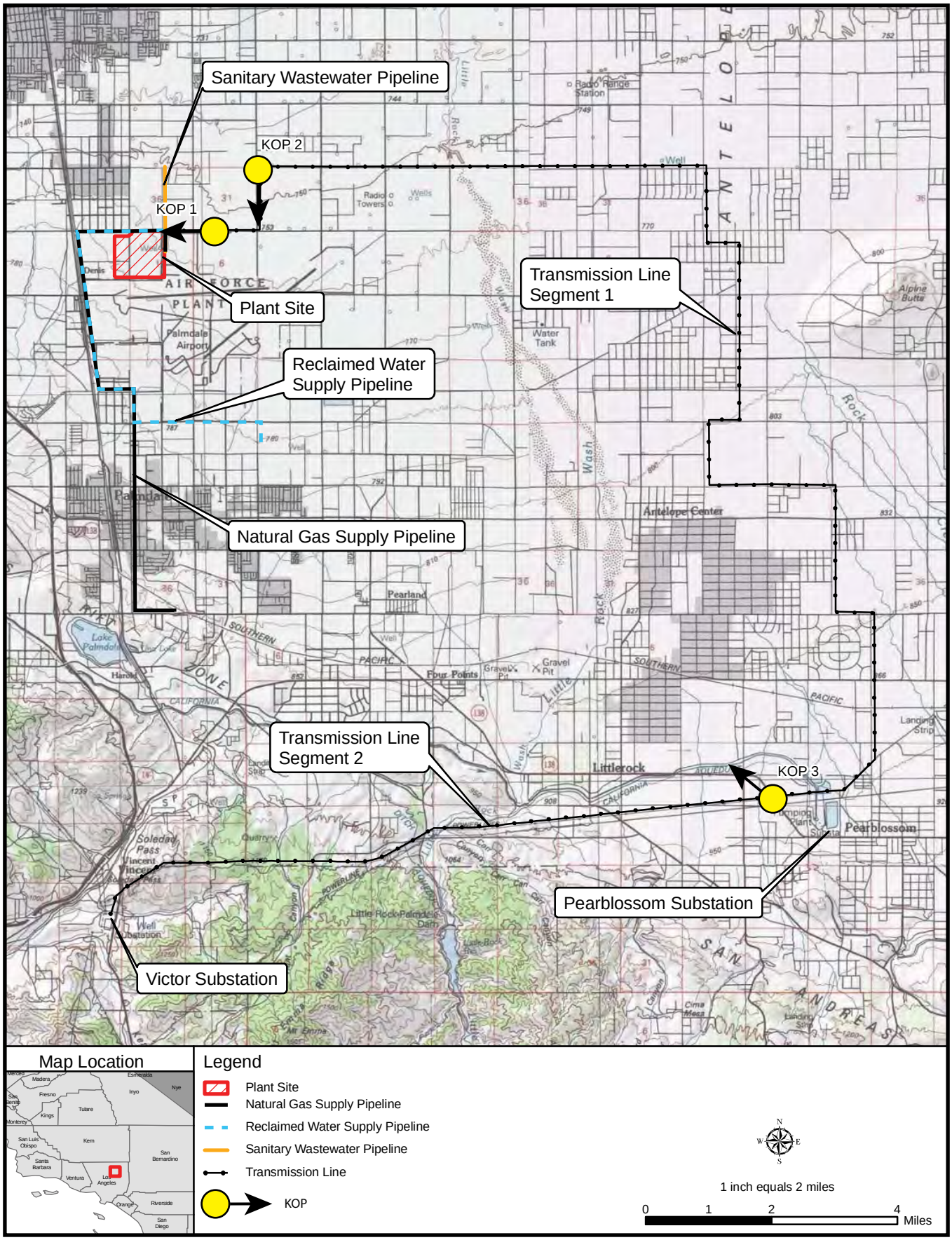
VISUAL RESOURCES - FIGURE 1

Palmdale Hybrid Power Project - Existing Condition

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, FEBRUARY 2010

SOURCE: AFC Figure 5.15-3

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

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

SOURCE: CEC Staff Photo

VISUAL RESOURCES - FIGURE 4A

Palmdale Hybrid Power Project - KOP2 - Looking South on 30th Street Toward East M Street - Existing Condition

SOURCE: CEC Staff Photo

VISUAL RESOURCES - FIGURE 4B

Palmdale Hybrid Power Project - KOP2 - Looking South on 30th Street Toward East M Street - Simulated Condition

SOURCE: CEC Staff Photo

VISUAL RESOURCES - FIGURE 5A

Palmdale Hybrid Power Project - View from KOP-3 Looking North Along Pearlblossom Highway - Existing Condition

SOURCE: Applicants Visual Resource Consultant

VISUAL RESOURCES - FIGURE 5B

Palmdale Hybrid Power Project - View from KOP-3 Looking North Along Pearlblossom Highway - Simulated Condition

SOURCE: Supplemental Filing - July 16, 2009

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PALMDALE HYBRID POWER PROJECT
VOLUME 2
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APPLICATION FOR CERTIFICATION
For the *PALMDALE HYBRID POWER PROJECT*

Docket No. 08-AFC-9

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(Revised 2/4/2010)

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DECLARATION OF SERVICE

I, Hilarie Anderson, declare that on, February 9, 2010, I served and filed copies of the attached Preliminary Staff Assessment Volume 2. 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:

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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.

Original Signature in Dockets
Hilarie Anderson

*indicates change