Preliminary Staff Assessment

VICTORVILLE 2 HYBRID POWER PROJECT

Application For Certification (07-AFC-1)
San Bernardino County

CALIFORNIA
ENERGY
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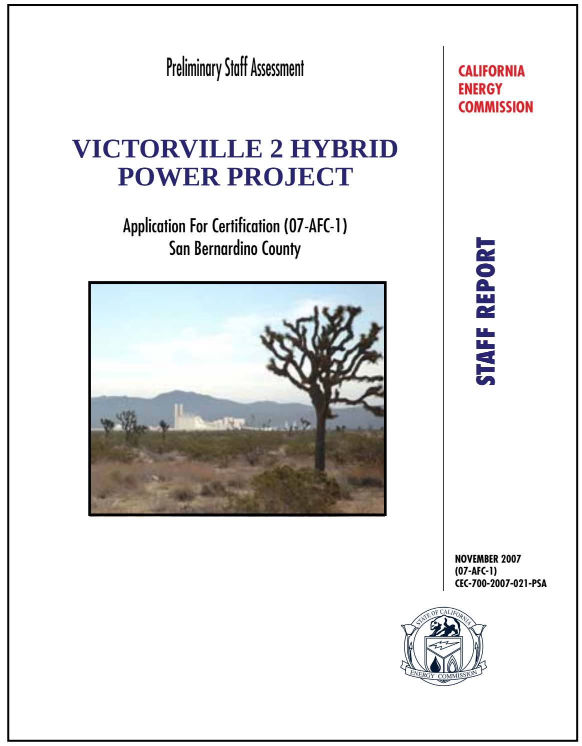

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CALIFORNIA ENERGY COMMISSION

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VICTORVILLE 2 HYBRID POWER PROJECT
(07-AFC-1)
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EXECUTIVE SUMMARY

John S. Kessler

INTRODUCTION

This Preliminary Staff Assessment (PSA) contains the California Energy Commission staff's independent evaluation of the Victorville 2 Hybrid Power Project (Victorville 2) Application for Certification (07-AFC-1). The PSA examines engineering, environmental, public health and safety aspects of the Victorville 2 project, based on the information provided by the applicant (city of Victorville) 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 state 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 to 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 Victorville 2 project is located in the northeastern corner of the city of Victorville, in San Bernardino County. The project site is approximately 3.5 miles east of Highway 395 and approximately 0.5 mile west of the Mojave River, immediately northeast of the intersection of Colusa and Helendale Roads. The city of Victorville is located within the Mojave River Region of the southwestern Mojave Desert, known as Victor Valley and is surrounded by the cities of Adelanto and Hesperia and the town of Apple Valley. With a population of approximately 95,000, Victorville is a growing urban area situated along a primary transportation route between the Los Angeles Basin and Las Vegas. **Project Description Figures 1 and 2** shows the regional and local settings for the proposed project respectively.

The power plant site is currently zoned industrial, and is within the jurisdiction of the city of Victorville, San Bernardino County and the Southern California Logistics Airport (SCLA) planning area. All lands adjacent to the power plant site are currently vacant. There is currently one residence within the power plant site, which city of Victorville is seeking to acquire. The next nearest residence is a horse ranch located approximately one mile west of the power plant boundary on Colusa Road. There are no sensitive receptors consisting of schools, childcare, hospital, or medical facilities; or residences that would remain following construction of the project within a one-mile radius of the Victorville 2 project site. No agricultural production would be displaced by any elements of the project. There are no natural drainage features running through the power plant site, and those crossing through the transmission line alignment would be avoided by placing poles or towers outside of drainages and spanning conductor across them.

Victorville 2 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 within the Power Block would include two natural gas-fired combustion turbine-generators (CTGs) rated at 154 megawatts (MW) each, two duct fired heat recovery steam generators (HRSGs), and one steam turbine-generator (STG) rated at 268 MW arranged in a two-on-one combined cycle train. The project would also include evaporative (wet) cooling towers for steam condensation and evaporative inlet air cooling for the CTGs, the electrical switchyard and auxiliary 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 solar-thermal collectors would contribute up to 50 MW of the STG's 268 MW output, and with plant auxiliary loads of about 13 MW, Victorville 2's net output would be 563 MW. With the hybridization of combined-cycle and solar-thermal technologies, the project would be capable of operating at a full-load efficiency of 59%, which exceeds the efficiency of a typical combined-cycle power plant (without solar energy input) by as much as 5%.

The proposed Victorville 2 facility would connect via a single-circuit three-phase 230-kV transmission line to the power grid through Southern California Edison's (SCE's) existing Victor Substation, located approximately 10 miles south-southwest of the proposed Victorville 2 Project site. Segment 1 of the overhead line, consisting of new steel poles and conductor, would run approximately 4.3 miles in a new right-of-way beginning at the southern boundary of the proposed Victorville 2 plant site and extending southeastward to a point along SCE's existing High Desert Power Project - Victor right-of-way. Segment 2 extends from this point for 5.7 miles to SCE's existing Victor Substation, and would primarily consist of installing conductors on existing towers having space available for a second circuit, except for three locations where new towers would be needed to cross under existing SCE transmission lines. To accommodate the proposed Victorville 2 facility, Segment 3 involves increasing the capacity of the existing SCE system between SCE's Victor and Lugo Substations, for a distance of approximately 11 miles south of the Victor Substation. This would require the relocation of 6.6 miles of an existing 115 kV transmission line within the same right-of-way, and installing new steel poles or lattice towers and conductors for 11 miles associated with Segment 3 of the total proposed 21-mile long 230-kV Victorville 2 project transmission line.

Natural gas would be delivered to the project through the Kern River-High Desert Power Project Lateral pipeline. The existing 24-inch natural gas pipeline runs adjacent to the southwestern corner of the proposed Victorville 2 site. The project would install a new 12-inch natural gas line to connect with the existing 24-inch line at a point adjacent to the southwest corner of the proposed site and extending approximately 450 feet beyond the project boundary.

Process water needs would be met by the use of reclaimed water supplied by the Victor Valley Wastewater Reclamation Authority (VVWRA) via a new 1.5-mile, 14-inch pipeline extending from the reclaimed water production system at the VVWRA treatment plant located southeast of the proposed site. On an annual basis during operations, the proposed Victorville 2 project would consume a maximum of about 3,150 acre-feet/year of reclaimed water for power plant processes, primarily serving cooling demand using an evaporative (wet) cooling tower and including about 46 acre-feet/year needed for parabolic mirror washing in the solar field. Construction activities during grading would require up to 650,000 gallons per day (up to two acre-feet per day) of reclaimed water. Potable water and backup process water would be supplied to the proposed project from the City of Victorville's (Victorville Water's) municipal supply of groundwater via a 3-mile long pipeline along Perimeter Road. Potable water would serve drinking, sanitary and other washing needs, and require up to 3.6 acre-feet/year.

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 converted into solids for landfill disposal. Wastewater from plant drains would be conveyed for reuse to the cooling tower. Sanitary waste would be sent to the VVWRA treatment plant in a new 1.25-mile sanitary wastewater line.

PUBLIC AND AGENCY COORDINATION

On March 8, 2007, the Energy Commission staff provided the Victorville 2 project description to a comprehensive list of libraries, agencies, organizations and residences/business within 1,000 feet of the proposed project and 500 feet of the linear facilities. The Commission staff's notification letter requested public and agency review, comment, and continued participation in the Energy Commission's certification process.

On June 8, 2007, an Information Hearing and a Site Visit for the Victorville 2 project were conducted at the SCLA in the city of Victorville. On August 8, 2007, staff conducted a publicly noticed Data Response and Issue Resolution staff workshop in the city of Victorville and discussed the topics of Air Quality, Cultural Resources, and Soil and Water Resources. Participating agencies in the workshop included the applicant, city of Victorville, Victorville Water, Mojave Water Agency, Victor Valley Water Reclamation Authority, California Department of Fish and Game (CDFG) and Lahontan Regional Water Quality Control Board. 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 the city of Hesperia, San Bernardino

County, CalTrans, Mojave Desert Air Quality Management District (MDAQMD), U.S. Fish and Wildlife Service (USFWS), 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

The steps recommended by the U.S. EPA's guidance documents to assure compliance with the Executive Order 12898 regarding environmental justice are: (1) outreach and involvement; (2) a screening-level analysis to determine the existence of a minority or low-income population; and (3) if warranted, a detailed examination of the distribution of impacts on segments of the population. Though the Federal Executive Order and guidance are not binding on the Energy Commission, staff finds these recommendations helpful for implementing this environmental justice analysis. Staff has followed each of the above steps for the following 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, significance, and whether there would be a disproportionate impact on an environmental justice population.

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

- The minority population of the affected area is greater than 50% of the affected area's general population; or
- The minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

A greater than 50% minority population has been identified within a six-mile radius of the Victorville 2 site. However, staff has not identified significant direct, indirect or cumulative adverse impacts in any of the 11 sections of the PSA evaluated for environmental justice screening. Therefore, the construction and operation of the Victorville 2 project is not considered to have a disproportional impact on an environmental justice population. Staff has worked closely with the city of Victorville and the residents of the area to identify local mitigation measures designed to reduce to the greatest extent possible any impact that will occur in the community surrounding the proposed project. Staff's environmental justice outreach has been incorporated into its overall outreach activity facilitated by the Energy Commission's Public Advisor's Office. This activity is summarized in the **INTRODUCTION** to the PSA.

STAFF'S ASSESSMENT

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

With the exception of the five technical areas identified below, staff believes that as currently proposed, including the applicant's and the staff's proposed mitigation measures and the staff's proposed conditions of certification, the Victorville 2 project would 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 any of the technical areas, although five 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	Yes	**Undetermined**
Biological Resources	Yes	**Undetermined**
Cultural Resources	Yes	**Undetermined**
Efficiency	Not Applicable	Not Applicable
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes
Hazardous Materials	Yes	Yes
Land Use	Yes	Yes
Noise	Yes	Yes
Public Health	Yes	Yes
Reliability	Not Applicable	Not Applicable
Socioeconomic Resources	Yes	Yes
Soil & Water Resources	Yes	**Undetermined**
Traffic & Transportation	Yes	**Undetermined**
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	Yes	Yes
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

AIR QUALITY

Victorville 2 Hybrid Power Project (Victorville 2) would be located in the Mojave Desert Air Quality Management District (MDAQMD). The applicant proposes to use volatile organic compounds (VOC) Priority Reserve Credits from the upwind South Coast Air Basin to mitigate the project's ozone precursor (VOC and oxides of nitrogen - NOx) emissions. Because both VOC and NOx contribute to ozone formation, the proposed interpollutant trading of VOC to mitigate NOx emissions has merit. Although the South Coast Air Quality Management District has recently revised its rules governing the Priority Reserve and enabling Victorville 2 access to the program, the rules are the subject of a current legal challenge. The applicant also proposes to mitigate PM10/PM2.5 (particulate matter less than 10 and 2.5 microns respectively) emissions and PM10/PM2.5 precursor emissions of oxides of sulfur (SOx) by paving local roads. The MDAQMD road paving rule is also undergoing legal challenge.

Staff believes that the Victorville 2 emission impacts can be mitigated to a level of insignificance with the emission reduction and priority reserve credits defined by the current rules. However, the legal challenges to the rules underlying both emission reduction and priority reserve credits may change the mitigation available to the Victorville 2 project. Staff will consider ongoing rule litigation and mitigation changes in the Final Staff Assessment.

BIOLOGY

The Victorville 2 Hybrid Power Project (Victorville 2) would impact the following plant communities: Mojave desert scrub, desert saltbush scrub, Mojavean juniper woodland and scrub, non-native grassland, and developed/disturbed areas, which provide habitat to common plants and animals. In addition, Victorville 2 would impact special-status plant and animal species known to occur on site or in the project vicinity. Compliance with the federal and state Endangered Species Acts (ESA), biological resources Conditions of Certification, and other laws, ordinances, regulations, and standards (LORS) discussed in the staff assessment would likely mitigate Victorville 2's impacts to biological resources from Victorville 2. However, staff is awaiting additional information on likely mitigation details related to desert tortoise and Mohave ground squirrel as will be determined when the federal Biological Opinion, and state Incidental Take Permit are completed and accepted by USFWS and CDFG respectively. Therefore, additional measures may be required to ensure that impacts to biological resources are mitigated to less than significant levels.

In summary, outstanding items needed for the Final Staff Assessment include likely mitigation details and habitat compensation ratios, which were not included in the Biological Assessment, but would be included in the Biological Opinion and Incidental Take Permit; agency input regarding the need for tortoise exclusion fencing along Colusa Road, Helendale Road, and Adelanto Road; and details on the applicant's proposed agency-approved desert plant relocation areas and plant adoption centers/programs. With the exception of agency input on fencing that staff requested earlier, staff intends to address these items in the Preliminary Staff Assessment workshop. Limited availability of sufficient, suitable, and contiguous mitigation land is likely to pose significant challenges to mitigating cumulative impacts to biological resources in the region.

CULTURAL RESOURCES

Staff has independently reviewed the cultural resources inventory of 60 prehistoric and historic archaeological sites and standing structures that could be potentially affected by the project. Of these 60 sites, 1 significant prehistoric site and two potentially significant historic standing structures (transmission lines) could be impacted by the proposed project, and that impact would reach the level of significance for only one of the transmission lines, the Kramer-to-Victor 115-kV transmission line (CA-SBR-10316H).

In order to complete its analysis, staff has identified the need to conduct additional cultural resources surveys on part of Segment 3 of the transmission line and along the route of the potable/back-up process water pipeline. Because additional cultural resources may be found as a result of these surveys, staff cannot reach final conclusions about impacts to cultural resources. The applicant has indicated that reports on all of the additional field work will be provided early in December, 2007. Assuming that the new information does not indicate that the project would have significant impacts on cultural resources, staff expects to conclude as follows:

Staff has determined that the Victorville 2 project would not have a significant impact on known significant archaeological or ethnographic resources. With the adoption and implementation of the proposed Conditions of Certification **CUL-1** through **CUL-7**, the

Victorville 2 project would not have a significant impact on potentially significant archaeological resources that may be discovered during construction. With the adoption and implementation of proposed Conditions of Certification **CUL-8** and **CUL-9**, the project's adverse impacts on a known significant standing structure (CA-SBR-10316H) would be mitigated to a level less than significant.

SOIL AND WATER

From the preliminary analysis completed to date for the Victorville 2 project, staff has not identified any unmitigable significant impacts to Soil and Water Resources provided the proposed conditions of certification are met and outstanding stormwater management issues are resolved.

Staff has identified three issues to be resolved regarding plans for stormwater management during project operations: 1) revisions are needed to pre- and post-development runoff calculations using the correct precipitation associated with the design criteria for the entire project site; 2) the post-development runoff estimates need to account for the reduction in soil permeability in the Solar Field; and 3) a preliminary design for a Sediment/Stormwater Retention Facility needs to be developed for the Solar Field. These are key elements in avoiding significant adverse impacts. The applicant has indicated that it will address these issues before the Final Staff Assessment (FSA). Also, given staff's conclusion that the overdraft in the Mojave Groundwater Basin is not cured, we remain concerned about the use of reclaimed water that is currently providing recharge to the Mojave River and the Centro and Baja subareas. We will continue to address this issue by discussing it with the parties and interested agencies and members of the public in the PSA workshop. Staff is interested in exploring options that would ensure that the project's water use will not interfere with recharge that is currently occurring.

TRAFFIC AND TRANSPORTATION

Staff is exploring a potential impact to aviation traffic and safety. During the operational phase, the project could adversely affect aviation operations at the SCLA due to glare from the solar collector thermal arrays. In evaluating the potential for glare to distract or cause temporary vision impairment to pilots, staff has explored this issue on several fronts including review of an engineering analysis provided by the applicant, and conducting a flyover to evaluate glare from the existing Solar Energy Generating Station facility located near Kramer Junction, California. The staff also discussed the issue with Federal Aviation Administration and Caltrans Aeronautics representatives, and a researcher for the National Renewable Energy Laboratory, a division of the U.S. Department of Energy. Staff continues to investigate this issue and will provide a complete analysis in the Final Staff Assessment (FSA).

Aviation operations at SCLA could be impacted by the thermal plumes from the project exhaust stacks and the ten-cell cooling tower. Staff has predicted that turbine and cooling tower plumes at or exceeding the 4.3 meters per second threshold could extend to about 1,000 feet and 900 feet above ground level (AGL), respectively. The turbulence caused by these plumes would not affect cargo jet aircraft on approach because heavier planes are not affected as easily, their pattern altitude at 1.5 miles is 1,500 feet AGL, and the aircraft would not fly over the Victorville 2 project power block. Staff has been advised that the only aircraft that fly over the project area where the power block would be located, and could be impacted by the Victorville 2 thermal plumes, are Army helicopters departing the traffic pattern to the north at about 1,000 feet AGL. Staff has requested that the SCLA Manager work with the U.S. Army to change the helicopter departure or arrival route to avoid overflight of the project power block. This will be discussed at the PSA workshop and addressed more fully in the FSA.

ALTERNATIVES SUMMARY

The “Guidelines for Implementation of the California Environmental Quality Act,” Title 14, California Code of Regulation, Section15126.6(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)).

In the analysis of the Victorville 2 Hybrid Power Project (Victorville 2), three alternative project sites were examined, as well as several alternative energy producing technologies which do not burn fossil fuels. Lacking a significant environmental impact associated with the proposed project, the alternative sites and generation technologies would not result in an environmentally superior 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). None of the alternative sites are considered to be superior to the applicant’s proposed site. While all three alternative sites are in land use areas zoned industrial, the alternative sites have greater disadvantages than advantages when compared to the proposed project. Alternative Site A is less desirable because it is closer to aircraft approach and takeoff activities of Southern California Logistics Airport (SCLA) where the project’s structures (i.e. stacks and solar thermal collector arrays) could be considered a distraction to air traffic. Alternative Site B is less desirable because it is in closer proximity to residential development. Alternative Site C is not located within either the city of Victorville or the planning area addressed under the SCLA Specific Plan, and therefore would not meet the project objective to locate Victorville 2 within the boundaries of city of Victorville.

Alternative technologies (i.e., geothermal, wind, biomass, and hydroelectric) were examined as possible alternatives to the project. Geothermal and hydroelectric alternatives were determined not to be a viable option, as there are no adequate geothermal or hydrological resources located near the city of Victorville. Wind power is not considered a feasible alternative as the area around city of Victorville is not identified as a productive area for development of commercial wind power. Feedstock for biomass power would likely have to be transported over long distances from agricultural residues in the Central Valley of the state, and lacking sufficient feedstock in the greater Victorville area, biomass is not a practical alternative. While an all solar energy project would utilize an available renewable natural resource within a region of California where its potential for power production is among the highest in the state, an all solar energy project would not fully meet the objectives of the project to provide a reliable source of power generation that would supply electrical energy night and day. Since an objective of the project is to provide 563 MW of electricity with minimal impacts to the environment and provide the public with an efficient, reliable source of electrical power, staff concludes the alternative technologies examined are not feasible.

Staff also believes that the “No Project Alternative” is not superior to the proposed project. The No Project scenario would likely delay development of reliable electrical resources required for the region and could impact electrical supply reliability throughout California.

Therefore, staff does not recommend alternative generation technologies or alternative sites over the technology and site proposed by the city of Victorville.

NOTEWORTHY PUBLIC BENEFITS

Victorville 2 offers the benefit of providing base and peak load, and ancillary services for meeting local and regional power demands. The proposed combustion turbines would be configured with a Rapid Start Process offered by General Electric Power Systems that reduces the startup and power ramp-up time by about half that of conventional gas turbines. Besides providing more rapid response to energy demands, this feature also reduces air emissions from the combustion turbines.

As stated in the AFC, the following benefits are identified in association with the Victorville 2 project.

- Provide an efficient, reliable, and environmentally sound power generating facility to meet future electrical power needs of the rapidly growing city of Victorville and surrounding area, as well as provide additional generating capacity for the state and region as a whole;
- Locate the facility within the boundaries of the city of Victorville and under city ownership and control, so that the city can increase its level of assurance that the future electrical power needs of residential, commercial and industrial users in the city can be met, while at the same time supplying power to the regional grid;
- Use solar technology to generate a portion of the facility’s power output and thereby support the State of California’s goal of increasing the percentage of renewable energy in the state’s electricity mix;
- Integrate the solar component of the project and its combined-cycle component in a way that maximizes the synergies between the two technologies to increase project efficiency; and
- Site the facility within the SCLA Specific Plan Area, a location zoned and planned for industrial use in an already established industrial area and with ready access both to adequate supplies of non-potable water to meet the facility’s process water needs and to a natural gas pipeline that can supply the project without requiring significant modifications to the regional gas supply system.

Staff has identified additional noteworthy public benefits as listed below.

SOCIOECONOMICS

Important public benefits discussed under the fiscal and non-fiscal effects section are: capital expenditures, construction payroll, and annual property and sales tax.

RECOMMENDATIONS AND SCHEDULE

For a more detailed review of potential impacts, see staff's technical analyses in the PSA. Staff has listed the outstanding issues as applicable in the technical sections of the PSA. To resolve these issues, staff requires either additional data, further discussion and analysis, or is awaiting conditions from a permitting agency prescribing mitigation.

Absent any non-compliance with LORS or significant indirect environmental impacts, staff concludes there will not be a disproportionately high and adverse human health or environmental effect on a minority and/or low-income population, and thus, no disproportional impact to an environmental justice population.

In conclusion, based on the information available at this time, staff will work to resolve the outstanding issues and to update our preliminary conclusions for the FSA. The project is being reviewed under the 12-month AFC process. Staff will conduct public workshops on the PSA within 30 days of its publication during a date to be determined in December 2007. Staff anticipates publication of the Final Staff Assessment (FSA) in either January or February 2008, which will address all comments on the PSA.

INTRODUCTION

John S. Kessler

PURPOSE OF THIS REPORT

The Preliminary Staff Assessment (PSA) presents the California Energy Commission (Energy Commission) staff's independent analysis of the Victorville 2 Hybrid Power Project (Victorville 2) Application for Certification (AFC). This PSA is a staff document. It is neither a Committee document, nor a draft decision. The PSA describes the following:

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

The analyses contained in this PSA are based upon information from: 1) the AFC; 2) subsequent submittals; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; and 6) independent field studies and research. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification." The verification is not part of the proposed condition, but is the owner's and Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted conditions of certification.

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

ORGANIZATION OF THE STAFF ASSESSMENT

The PSA contains an Executive Summary, Introduction, Project Description, and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in a discussion of 19 technical areas. Each technical area is addressed in a separate chapter. They include the following: air quality, public health, worker safety and fire protection, transmission line safety and nuisance, hazardous material management, waste management, land use, traffic and transportation, noise, visual resources, cultural resources, socioeconomics, biological resources, soil and water resources, geological and paleontological resources, facility design, power plant reliability, power plant efficiency, and transmission system engineering. These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report.

Each of the 19 technical area assessments includes a discussion of:

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

ENERGY COMMISSION SITING PROCESS

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

The Energy Commission’s siting regulations require staff to independently review the AFC and assess whether the list of environmental impacts it contains is complete, and whether additional or more effective mitigation measures are necessary, feasible and available (Cal. Code Regs., tit. 20, §§ 1742 and 1742.5(a)). Staff’s independent review is presented in this report (Cal. Code Regs., tit. 20, §1742.5).

In addition, staff must assess the completeness and adequacy of the health and safety standards, and the reliability of power plant operations (Cal. Code Regs., tit. 20, § 1743(b)). Staff is required to coordinate with other agencies to ensure that applicable laws, ordinances, regulations and standards are met (Cal. Code Regs., tit. 20, § 1744(b)).

Staff conducts its environmental analysis in accordance with the requirements of the California Environmental Quality Act. No Environmental Impact Report (EIR) is required because the Energy Commission's site certification program has been certified by the Resources Agency (Pub. Resources Code, §21080.5 and Cal. Code Regs., tit. 14, §15251 (k)). The Energy Commission is the CEQA lead agency and is subject to all portions of CEQA applicable to certified regulatory activities.

Staff typically prepares both a preliminary and final staff assessment. The Preliminary Staff Assessment (PSA) presents for the applicant, intervenors, agencies, other interested parties and members of the public, the staff's preliminary analysis, conclusions, and recommendations.

Staff uses the PSA to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During the period between publishing the PSA and the Final Staff Assessment (FSA), staff will conduct one or more workshops to discuss their findings, proposed mitigation, and proposed compliance monitoring requirements. Based on the workshops and written comments, staff will refine their analysis, correct errors, and finalize conditions of certification to reflect areas where staff has reached agreement with the parties. This refined analysis, along with responses to comments on the PSA, will be published in the FSA. The FSA serves as staff's testimony.

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

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

A Compliance Monitoring Plan and General Conditions will be assembled from conditions contained in the FSA and other evidence presented at the hearings. The Compliance Monitoring Plan and General Conditions will be presented in the PMPD. Commission staff's implementation of the plan ensures that a certified facility is constructed, operated, and closed in compliance with the conditions adopted by the

Energy Commission. Staff's proposed description of the contents of the Compliance Monitoring Plan and proposed General Conditions are included in the **General Conditions** section of this PSA.

AGENCY COORDINATION

As noted above, the Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). However, the Commission typically seeks comments from and works closely with other regulatory agencies that administer LORS that may be applicable to proposed projects. These agencies include the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, California Coastal Commission, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, and the California Air Resources Board.

PROJECT DESCRIPTION

John S. Kessler

INTRODUCTION

On February 28, 2007, the city of Victorville submitted an Application for Certification (AFC) – Volumes I and II to construct and operate the Victorville 2 Hybrid Power Project (Victorville 2), a hybrid of natural gas-fired combined cycle generating equipment integrated with solar thermal generating equipment, in the city of Victorville, San Bernardino County. On April 10, 2007, the city of Victorville provided a Volume III Data Adequacy Supplement to the AFC to satisfy the Energy Commission's informational requirements. On April 11, 2007, 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 563-MW nominal capacity Victorville 2 would provide base and peak load and ancillary power services designed to meet electric generation demand and reliability requirements in the city of Victorville and surrounding local areas, and to provide additional generating capacity for the region and state. The city of Victorville is rapidly growing and wants to assure that future electrical power needs of residential, commercial and industrial users in the city can be met. As the city works to recover economically from the 1992 closure of George Air Force Base, it seeks to draw a diverse mix of new businesses and industries to their community that will enable residents to work where they live. Establishing reliable and affordable energy is one of the key factors that the city believes is necessary for their success. In addition, the project would develop more renewable energy resources in the state as would be contributed by its solar thermal component.

PROJECT LOCATION

The proposed site for the Victorville 2 project is located in the northeastern corner of the city of Victorville, in San Bernardino County. The project site is approximately 3.5 miles east of Highway 395 and approximately 0.5 mile west of the Mojave River, immediately northeast of the intersection of Colusa and Helendale Roads. The city of Victorville is located within the Mojave River Region of the southwestern Mojave Desert, known as Victor Valley and is surrounded by the cities of Adelanto and Hesperia and the town of Apple Valley. With a population of approximately 95,000, Victorville is a growing urban area situated along a primary transportation route between the Los Angeles Basin and Las Vegas.

Construction of the proposed Victorville 2 facility would require three areas that total 388 acres, located 0.75 miles north of the Southern California Logistics Airport (SCLA) which is the site of the former George Air Force Base. Including the land required for the solar collectors, the footprint of the power plant would require grading of approximately 338 acres in order to provide a usable area of 275 acres for the Power Block and Solar

Field. Construction laydown would require temporary use of two separate areas consisting of 20 and 30 acres each located south and west of the project site respectively.

All lands adjacent to the power plant site are currently vacant. There is currently one residence within the power plant site, which city of Victorville is seeking to acquire. The next nearest residence is a horse ranch located approximately one mile west of the power plant boundary on Colusa Road. There are no sensitive receptors consisting of schools, childcare, hospital, or medical facilities; or residences that would remain following construction of the project within a one-mile radius of the Victorville 2 project site. No agricultural production would be displaced by any elements of the project. There are no natural drainage features running through the power plant site, and those crossing through the transmission line alignment would be avoided by placing poles or towers outside of drainages and spanning conductor across them. **Project Description Figure 1** shows the regional setting, and **Project Description Figure 2** provides the local setting for the proposed project.

The power plant site is currently zoned industrial, and is within the jurisdiction of city of Victorville, San Bernardino County and the SCLA planning area. Segment 1 of the transmission line from the site to the interconnection near the High Desert Power Plant and other linear facilities fall within these same jurisdictions in the city of Victorville's boundaries. South of the city of Victorville, the transmission line falls solely under San Bernardino County's jurisdiction, and jointly the county's and city of Hesperia's jurisdiction for the last five-mile section of transmission line to Lugo Substation. Other than the northern Segment 1 portion of the transmission line which would be a new facility and within a new right of way, Segments 2 and 3 of the transmission line would be constructed within existing rights of way.

POWER PLANT EQUIPMENT AND LINEAR FACILITIES

Victorville 2 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 within the Power Block would include two natural gas-fired combustion turbine-generators (CTGs) rated at 154 MW each, two heat recovery steam generators (HRSGs) with duct burners, and one steam turbine-generator (STG) rated at 268 MW arranged in a two-on-one combined cycle train. The project would also include evaporative (wet) cooling towers for steam condensation and evaporative inlet air cooling for the CTGs, the electrical switchyard and auxiliary 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 solar-thermal collectors would contribute up to 50 MW of the STG's 268 MW output, and with plant auxiliary loads of about 13 MW, Victorville 2's net output would be 563 MW. With the hybridization of combined-cycle and solar-thermal technologies, the project would be capable of operating at a full-load efficiency of 59%, which exceeds the efficiency of a typical combined-cycle power plant (without solar energy input) by as much as 5%.

Victorville 2 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, Victorville 2 will be able to start-up in about half the time of other similar technologies as a result of General Electric Power System's 'Rapid Start Process'. The solar collectors are designed to pivot and follow 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 (Victorville 2007a, Section 2.4.2).

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 CTGs stack emissions would be controlled by dry low-NOx combustors followed by a selective catalytic and aqueous ammonia 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 3** shows the general arrangement and **Project Description Figure 4** provides an artist rendering of the proposed project.

ELECTRIC TRANSMISSION

The proposed Victorville 2 facility would connect via a single-circuit three-phase 230-kV transmission line to the power grid through Southern California Edison's (SCE's) existing Victor Substation, located approximately 10 miles south-southwest of the proposed Victorville 2 Project site. Segment 1 of the overhead line, consisting of new steel poles and conductor, would run approximately 4.3 miles in a new right-of-way beginning at the southern boundary of the proposed Victorville 2 plant site and extending southeastward to a point along SCE's existing High Desert Power Project - Victor right-of-way. Segment 2 extends from this point for 5.7 miles to SCE's existing Victor Substation, and would primarily consist of installing conductors on existing towers having space available for a second circuit, except for three locations where new towers would be needed to cross under existing SCE transmission lines. To accommodate the proposed Victorville 2 facility, Segment 3 involves increasing the capacity of the existing SCE system between SCE's Victor Substation and Lugo Substation, for a distance of approximately 11 miles south of the Victor Substation. This would require the relocation of 6.6 miles of an existing 115 kV transmission line within the same right-of-way, and installing new steel poles or lattice towers and conductors for 11 miles associated with Segment 3 of the total proposed 21-mile long 230-kV Victorville 2 project transmission line.

NATURAL GAS SUPPLY

Natural gas would be delivered to the project through the Kern River-High Desert Power Project Lateral. The existing 24-inch natural gas pipeline runs adjacent to the southwestern corner of the proposed Victorville 2 site. The project would install a new 12-inch natural gas line to connect with the existing 24-inch line at a point adjacent to the southwest corner of the proposed site and extending approximately 450 feet in from the project boundary.

WATER SUPPLY

Process and irrigation water needs would be met by the use of reclaimed water supplied by the Victor Valley Wastewater Reclamation Authority (VVWRA) via a new 1.5-mile, 14-inch pipeline extending from the reclaimed water production system at the VVWRA treatment plant located southeast of the proposed site. On an annual basis, the proposed Victorville 2 project would consume a maximum of about 3,150 acre-feet/year of reclaimed water for power plant processes, primarily serving cooling demand using an evaporative (wet) cooling tower and including about 46 acre-feet/year needed for parabolic mirror washing in the solar field. Potable water and backup process water would be supplied to the proposed project from the city of Victorville's (Victorville Water's) municipal supply of groundwater via a 3-mile long pipeline along Perimeter Road. Potable water would serve drinking, sanitary and other washing needs, and require up to 3.6 acre-feet/year. During construction, reclaimed water would be used during grading for compaction and dust control up to a minimum of 65,000 gallons per day for the power block and up to 650,000 gallons per day for the solar field.

WASTEWATER DISCHARGE

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 converted into solids for landfill disposal. Wastewater from plant drains would be conveyed for reuse to the cooling tower. Sanitary waste would be sent to the VVWRA treatment plant in a new 1.25-mile sanitary wastewater line. Stormwater for the power plant site would be collected and routed using two separate systems, separating the 25-acre Power Block from the 250-acre Solar Field. Both systems would provide retention of stormwater to account for higher runoff rates associated with a reduction in soil permeability, in order to maintain discharges from the site to less than or equal to pre-developed flow rates. Stormwater discharges from the site would drain overland to the Mojave River.

PROJECT CONSTRUCTION AND OPERATION

If approved by the Energy Commission, the city of Victorville proposes to initiate construction of Victorville 2 in summer 2008. The project is expected to take about 27 months for construction and startup testing, and could begin commercial operation by late summer of 2010, if there are no delays. The construction workforce would average 367 workers per month and would peak during the 12th month with up to 767 workers onsite. Construction costs are estimated to be between $385-445 million.

In order to construct Victorville 2, it would be necessary to perform grading of about 338 acres involving the cut and fill of approximately 1.5 million cubic yards of soil in order to provide the finished 275-acre footprint for the Power Block and Solar Field. In general, soil from the west portion of the site would be cut to fill area on the east portion of the site, resulting in gently sloping ground draining to the east within the Power Block, and to the north within the Solar Field.

Primary construction access would be from I-15 via D Street, Air Expressway, and Adelanto, Colusa and Helendale roads to the Victorville 2 project site. Storage of construction materials and equipment would occur within the proposed Power Block and Solar Field areas, and within the staging areas located west and south of the project site. Construction worker parking would also occur within these same project areas.

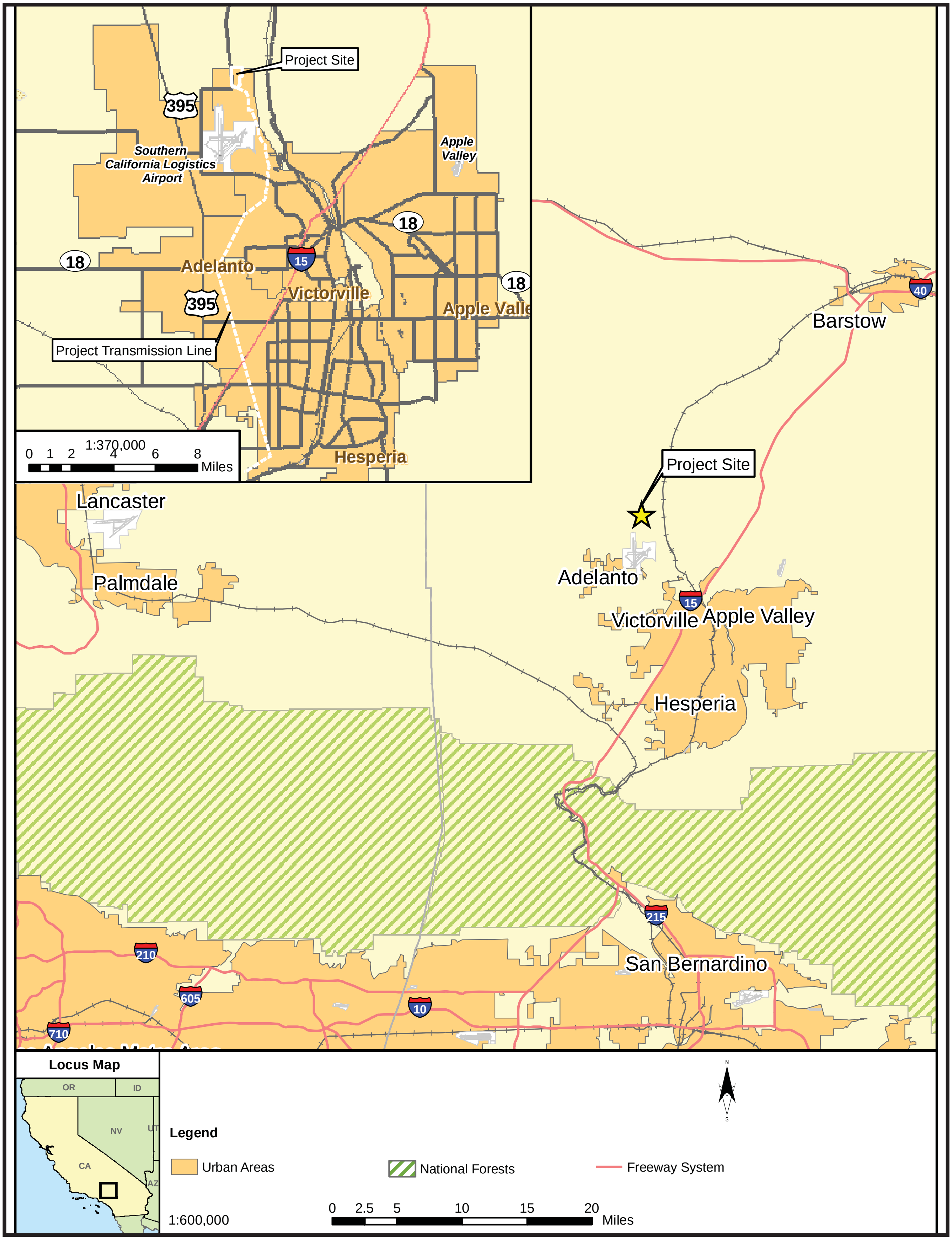
FACILITY CLOSURE

Victorville 2 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 such a way that public health and safety and the environment are protected from adverse impacts.

Although the setting for this project does not appear to present any special or unusual closure problems, it is impossible to foresee what the situation would be in 30 years or more when the project ceases operation. Therefore, provisions must be made which provide the flexibility to deal with the specific situation and project setting at the time of closure. LORS pertaining to facility closure are identified in the technical sections of this assessment. Facility closure would be consistent with laws, ordinances, regulations and standards in effect at the time of closure.

PROJECT DESCRIPTION - FIGURE 1

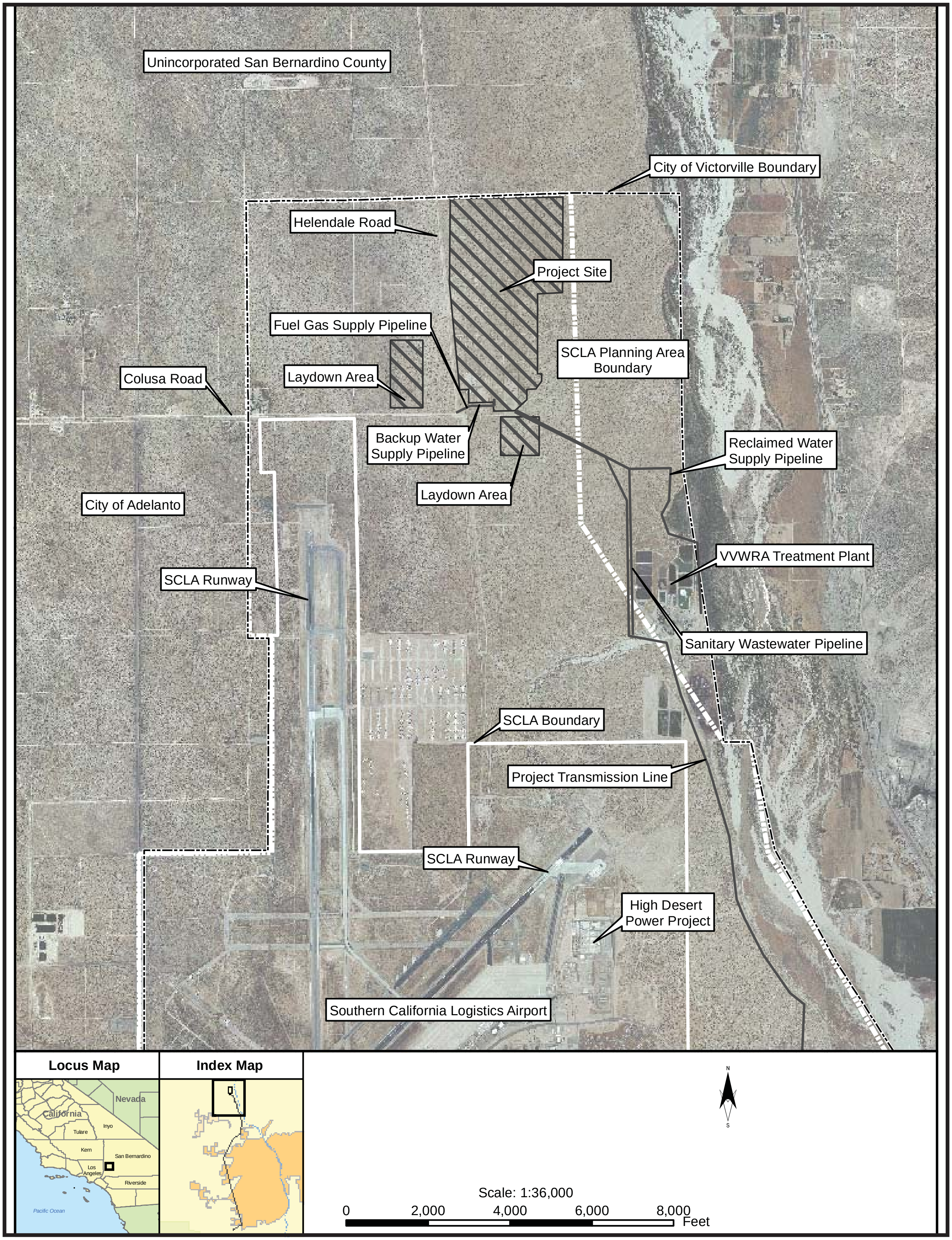
Victorville 2 Hybrid Power Project - Regional Setting



CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION
SOURCE: AFC Figure 1-1

PROJECT DESCRIPTION - FIGURE 2

Victorville 2 Hybrid Power Project - Local Setting

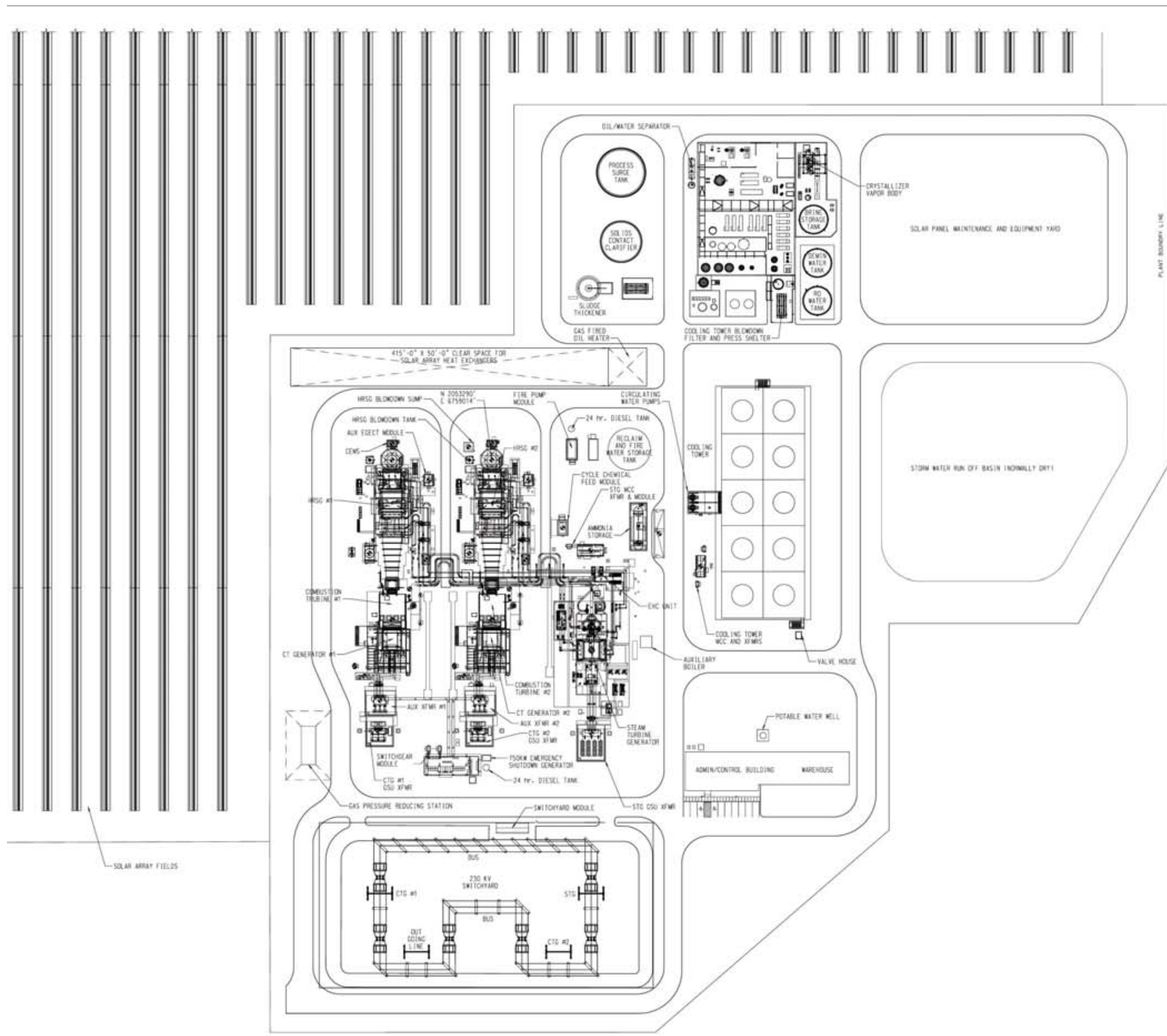


CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION

SOURCE: AFC Figure 1-2

PROJECT DESCRIPTION - FIGURE 3

Victorville 2 Hybrid Power Project - General Arrangement of Project



CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION

SOURCE: AFC Figure 2-5

PROJECT DESCRIPTION - FIGURE 4

Victorville 2 Hybrid Power Project - Artist Rendering of Proposed Project

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION

SOURCE: AFC Figure 2-3b

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Tuan Ngo, P.E.

SUMMARY OF CONCLUSIONS

Staff finds that with the adoption of the attached conditions of certification the proposed Victorville 2 Hybrid Power Project (Victorville 2) would comply with all applicable laws, ordinances, regulations, and standards (LORS) and would not result in any significant air quality-related impacts. Staff also finds that:

- The project ozone precursor emissions (oxides of nitrogen (NOx) and precursor organic compounds (POC)) would be mitigated to a level that is less than significant by the purchase of valid emission reduction credits (ERCs or offsets) from the South Coast Air Quality Management District' priority reserve;
- The project would comply with the Mojave Desert Air Quality Management District (District) Rules and Regulations, including the New Source Review requirements;
- The project would not cause new violations of any nitrogen dioxide (NO_2), sulfur dioxide (SO_2), or carbon monoxide (CO) ambient air quality standards, and therefore, its emission impacts are not significant for those pollutants; and
- The project's particulate matter less than 10 and 2.5 microns (PM10/PM2.5) emissions contribution would be mitigated to a level that is less than significant by surrender of valid emission reduction credits generated by the paving of local roads.

INTRODUCTION

On February 28, 2007, the city of Victorville (city) submitted an Application for Certification (AFC) to construct and operate Victorville 2 in the city of Victorville, San Bernardino County. The facility site includes 388 acres located immediately north of the Southern California Logistics Airport (SCLA), which is the site of the former George Air Force Base. The project site is situated approximately 3.5 miles east of Highway 395 and approximately 0.5 mile west of the Mojave River.

The proposed Victorville 2 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 (LORS)

Air Quality Table 1 summarizes the applicable LORS. The District issued its Preliminary Determination of Compliance (PDOC) (MDAQMD-2007c) for the project on August 29, 2007. 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. Staff has incorporated the District conditions in this Preliminary Staff Assessment.

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

Applicable LORS	Description
Federal	New Source Review: Best Available Control Technology (BACT) and Offset requirements
	Title V: Federal permit
	New Source Performance Standard: 75 ppm NO_x and 150 ppm SOx @15% oxygen (O_2).
State	California Health and Safety Code: Permitting of source needs to be consistent with approved Clean Air Plan.
Local	Regulation IV: Particulate Matter and Visible Emissions: Emissions shall not be darker than Ringelmann No. 1 for a continuous three-minutes, and no more than 0.01 grains PM per standard dry cubic foot.
	Regulation XI: Standards for Electric Utility Operations and Stationary Gas Turbines: NOx emissions from these sources shall not exceed 42 ppm@15%O_2
	Regulation XII: Federal Operating Permits: Acid Rain: Requires continuous emission monitoring system
	Regulation XIII: New Source Review: BACT, offsets, and new sources shall not cause or make worse a violation of an Ambient Air Quality Standard.

SETTING

CLIMATE AND METEOROLOGY

The project is located in the southern Mojave Desert at approximately 2,850 feet above sea level. Relatively high daytime temperatures, large variations in relative humidity, large and rapid diurnal temperature changes, occasional high winds, and sand, dust, and thunderstorms characterize the climate of the Mojave Desert area. The aridity of the region is caused by the influence of a sub-tropical high-pressure system off the coast of California and topographical barriers that effectively block the flow of moisture to the region. Seasonally, the precipitation totals in the area range from lows of 0.5 inch in the spring to as high as 2.0 inches in the winter. Total annual precipitation averages about four inches.

The most recent meteorological (weather) data was collected at a District monitoring station for 2002 through 2004. The measured wind data are graphically represented by quarterly wind roses, provided in the AFC Appendix G.1 (Victorville 2007a). These wind roses show that for most of the year, the winds are predominately from the south and the west, although between July through September, winds are predominately from the south. Mixing heights in the area, which represent the altitudes where different air masses mix together, are estimated to be on average 230 feet (70 meters) in the morning to as high as 5,250 feet (1,600 meters) in the afternoon.

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 2**. As indicated in **Air Quality Table 2**, the averaging times for the various air quality standards, the times over which they are measured, range from one-hour to an annual average. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 or $\mu g/m^3$, respectively).

In general, an area is designated as attainment if the concentration of a particular air contaminant does not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that contaminant standard is violated. Where not enough ambient data are available to support designation as either attainment or non-attainment, the area can be designated as unclassified. The unclassified area is normally treated the same as an attainment area for regulatory purposes. An area could be attainment for one air contaminant while non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same air contaminant.

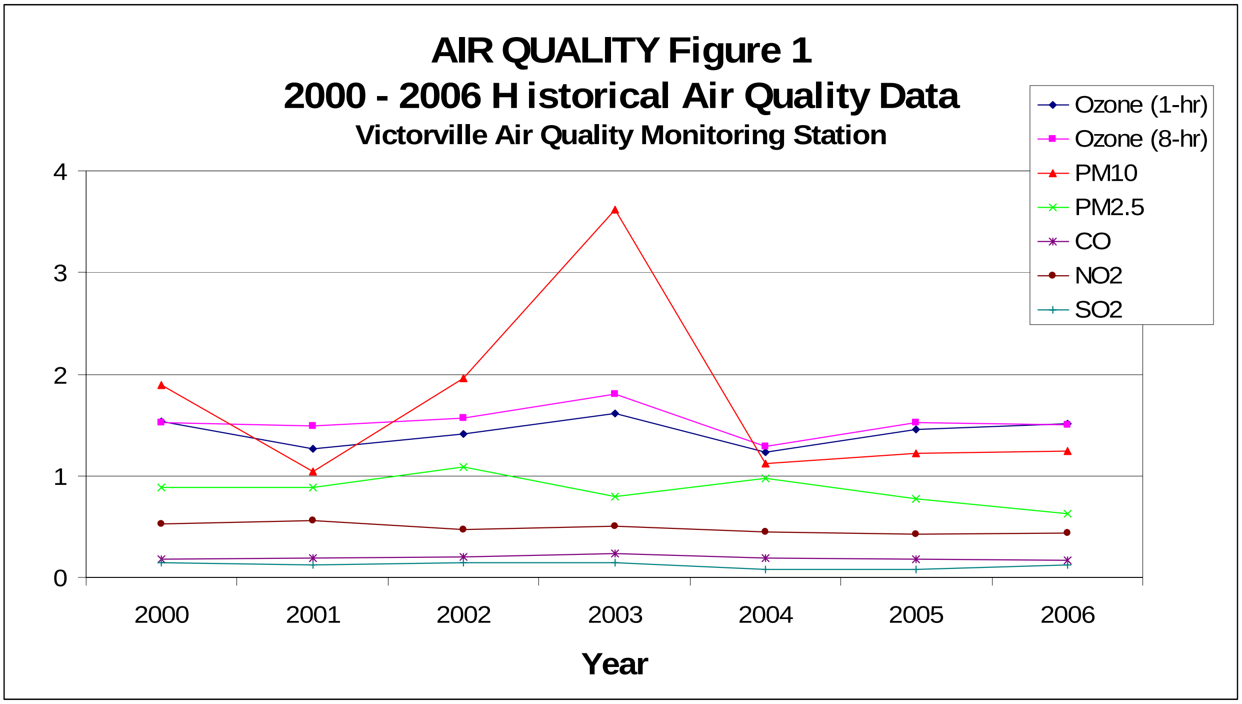
Victorville 2 is located in the Mojave Desert Air Basin and is under the jurisdiction of the Mojave Desert Air Quality Management District. This area is designated as non-attainment for the state annual PM2.5 standard, non-attainment for both the state and the federal (1-hour and 8-hour) ozone and 24-hour PM10 standards, attainment for the state's CO, NO_2, SO_2, SO_4 and Pb standards, and unclassified for the federal PM2.5, CO, NO_2 and SO_2 standards. **Air Quality Table 3** summarizes the area's attainment status for various applicable state and federal standards.

Ambient air quality monitoring data for ozone, PM10, PM2.5, CO, NO_2, and SO_2, compared to most restrictive applicable standards for the year between 2000 through 2006 (the last year that the complete annual data is currently available) at the Park Avenue, Victorville monitoring station are shown in **Air Quality Figure 1**. This monitoring station is located nine miles south of the project site and is operated by the District staff. In this figure, the highest measured ambient concentrations of various criteria air contaminants were divided by their applicable standard and provided as a graphical point. Any point on the chart that is greater than one (e.g., ozone and PM10) means that the measured concentrations of such air contaminant exceeds the standard, and any point that is less than one (e.g., CO, SO_2, and NO_2) means that the respective standard is not exceeded. Measured state PM2.5 levels are close to one, but the region is designated non-attainment, as shown in **Air Quality Table 3**, meaning that from a regulatory standpoint, the standard is being violated.

Air Quality Table 2
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	Federal Standards	
			Primary	Secondary
Ozone(O_3)	1-hour	0.09 ppm (180 $\mu g/m^3$)	None	Same as primary
	8-hour	0.07 ppm (137 $\mu g/m^3$)	0.08 ppm (157 $\mu g/m^3$)	
Particulate Matter (PM10)	Ann.Geo. Mean	20 $\mu g/m^3$	---	Same as primary
	24-hour	50 $\mu g/m^3$	150 $\mu g/m^3$	
	Ann.Arit. Mean	---	50 $\mu g/m^3$	
Fine Particulate Matter (PM2.5)	24-hour	No separate standard	35 $\mu g/m^3$	Same as primary
	Ann.Arit. Mean	12 μg/m3	15 $\mu g/m^3$	
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	---
	8-hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
Nitrogen Dioxide (NO_2)	1-hour	0.25 ppm (470 $\mu g/m^3$)	---	Same as primary
	Ann.Arit. Mean	---	0.053 ppm (100 $\mu g/m^3$)	
Lead(Pb)	30-day	1.5 $\mu g/m^3$	---	Same as primary
	Cal. Quarter	---	1.5 $\mu g/m^3$	
Sulfur Dioxide (SO_2)	Ann.Arit. Mean	---	0.03 ppm (80 $\mu g/m^3$)	---
	24-hour	0.04 ppm (105 $\mu g/m^3$)	0.147 ppm (365 $\mu g/m^3$)	---
	3-hour	---	---	0.5 ppm (1300 $\mu g/m^3$)
	1-hour	0.25 ppm (655 $\mu g/m^3$)	---	---
Sulfates	24-hour	25 $\mu g/m^3$	No federal standard	
H_2S	1-hour	0.03 ppm (42 $\mu g/m^3$)	No federal standard	

Source: California Air Resources Board



Source: California Air Resources Board

AIR QUALITY Table 3
Mojave Desert Attainment Status

Pollutant	Averaging Time	California Status	Federal Status
Ozone (O_3)	8 Hour	Non-attainment	Non-attainment
	1 Hour	Non-attainment	N/A
Carbon Monoxide (CO)	8 Hour	Attainment	Attainment
Nitrogen Dioxide (NOx)	Annual	N/A	Attainment
	1 Hour	Attainment	N/A
Sulfur Dioxide (SO_2)	Annual	N/A	Attainment
	24 Hour	Attainment	Attainment
	1 Hour	Attainment	N/A
PM10	Annual	Non-attainment	N/A
	24 Hour	Non-attainment	Non-attainment
PM2.5	Annual	Non-attainment	Unclassified/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** shows that the maximum 1-hour ozone concentrations are between 1.2 to 1.6 times the standard, and that violations of the state 1-hour ambient air quality standard for ozone occurred every year from 2000 to 2006. Peak ozone levels and numbers of violations of the state 1-hour ozone standard have remained relatively stable since 2000. 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 1.2 to 1.8 times the new California 8-hour ozone standard since 2000.

The ARB report: "Second Triennial Review of the Assessment of the Impacts of Transported Pollutants on Ozone Concentrations in California" (ARB 1996) 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 40% 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.

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**). 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 both the state and 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) recently adopted a new 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** shows that the PM2.5 concentrations, measured between 2000 through 2006, are hovering near the federal 24-hour PM2.5 standard with a slight downward trend.

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.

PROJECT DESCRIPTION

The proposed project consists of 250 acres of parabolic solar-thermal collectors with associated heat transfer equipment integrated into a combined cycle consisting of two 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 268 MW, an auxiliary boiler, and a ten-cell cooling tower. The solar system includes a heat transfer fluid heater.

The applicant (city) proposes to equip each combustion turbine with selective catalytic reduction (SCR) systems to limit the NOx emissions to 2.0 ppm@15% O_2. The city also proposes to install a CO oxidation catalyst system on each turbine to maintain CO emissions to no more than 3 ppm (Victorville 2007a, Table 6.3-15).

Construction of the proposed Victorville 2 would require three areas that total 388 acres, located immediately north of the Southern California Logistics Airport (SCLA) which is the site of the former George Air Force Base. Including the land required for the solar collectors, the footprint of the power plant would require grading of approximately 338 acres, and construction lay down would require two separate temporary areas of 20 and 30 acres each. The project site is situated approximately 3.5 miles east of Highway 395 and approximately 0.5 mile west of the Mojave River.

The city proposes that the facility would operate with 50 cold starts, 260 hot (or warm) starts, 310 shut down events per unit per year, and that the duct burner would be operated approximately 2,000 hour per year (Victorville 2007a, pp. 6.3-53). 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 (Victorville 2007a, pp. 6.3-53). 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 4** 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.

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. 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.

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 achievable emission rate for power plants with SCR systems.

Air Quality Table 4
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	--
Turbine (normal operation in lb/hr)	14.6	5.45	1.2	13.35	18
Cooling Towers (lb/hr)	-	-	-	-	1.62
Auxiliary Boiler (lb/hr)	0.38	0.19	0.02	2.59	0.26
Heater (lb/hr)	0.44	0.22	0.02	2.88	0.15
Maximum Daily Emissions (lb/day)[2]					
Turbine[3] Cooling Towers[4]	934 -	354 -	57.6 -	2,068 -	864 39
Total Daily	**934**	**354**	**57.6**	**2,068**	**903**
Maximum Annual (tons/year)					
Two Turbines[5]	107.4	34.2	8.3	252.7	117.1
Cooling Towers	-	-	-	-	7.1
Auxiliary Boiler	0.1	0.05	0.01	0.63	0.07
Heater	0.22	0.11	0.01	1.44	0.15
Emrgy Generator/ Fire Pump Engines	0.7	0.04	0.004	0.41	0.02
Total Annual Emissions (tons/year)	**108.4**	**34.4**	**8.3**	**255.2**	**124.4**

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.
3. The turbine maximum daily emissions include 2.5 hours of start-up and shut down and 21.5 hour of normal operation for each turbine.
4. Cooling tower emissions were estimated using 24 hour day operational schedule.
5. The turbines' annual emissions include 8,760 hours of normal operation and 2,000 hours of supplement duct burning for each turbine.

Source: AFC Section 6.3.4.1.3 (Victorville 2007a) and 7/23/07 Data Response (Victorville 2007c).

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 non-attainment 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 and PM2.5; 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,

[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.

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 (Victorville 2007a), 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, which would last approximately 27 months. 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 5**. The modeling analysis included both the fugitive dust and vehicle exhaust emissions, which include PM10, NOx, and CO. In **Air Quality Table 5**, the first and second columns list the air contaminant, i.e., NO_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.

Air Quality Table 5
Maximum Project Construction Impacts

Pollutants	Avg. Period	Impacts ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr.	817	169	986	322	300%
CO	8-hr.	1,523	2,415	3,938	10,000	40%
PM10	24-hr.	106	98	214	50	**430%**

Source: AFC, Appendix 8.1D, Table 8.1D-4 (Victorville 2007a).

Staff reviewed the modeling and finds that construction of the facility would result in significant, unavoidable short-term NO2 and PM10 impacts.

Construction Impacts Mitigation

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

NOx

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 approximately 170 $\mu g/m^3$. 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). Thus the project construction emissions would no longer cause a new violation of the NO_2 air quality standard, and the project NO_2 construction impact will be reduce to 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 (Victorville 2007a, c):

A. All unpaved roads and disturbed areas in the project and linear construction sites will be watered until sufficiently wet to ensure that no visible dust plumes leave the project site.

B. Vehicle speeds will be limited to 15 miles per hour within the construction site.

C. All construction equipment vehicle tires will be washed or cleaned free of dirt prior to entering paved roadways.

D. Gravel ramps will be provided at the tire washing/cleaning station.

E. All entrances to the construction site will be graveled or treated with water or dust soil stabilization compounds.

F. Construction areas adjacent to any paved roadway will be provided with sandbags to prevent run-off to the roadway.

G. All paved roads within the construction site will be swept twice daily when construction activity occurs.

H. At least the first 500 feet of any paved public roadway exiting from the construction site will be swept at least twice daily on days when construction activity occurs, and twice daily on any other day when dirt or runoff from the construction site is visible on the public roadways.

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

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

K. Wind erosion control techniques such as windbreaks, water, chemical dust suppressants, and vegetation will be used on all construction areas that may be disturbed. Any windbreaks used will remain in place until the soil is stabilized or permanently covered with vegetation.

L. Any construction activities that may cause excessive fugitive dust will cease when the wind exceeds 25 miles per hour unless water, chemical dust suppressants, or other measures have been applied to reduce dust such that no visible dust leaves the project site.

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**, which requires the use of ultra-low sulfur diesel fuel, 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/PM2.5 air quality standards. Therefore, the project PM10/PM2.5 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/PM2.5 to a level of less than significant.

Operational Impacts

The city 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 (Victorville 2007a). 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 Table 6**. The analysis shows that the project does not cause any new violations of NO_2, CO or SO_2 air quality standards even with worst case ambient concentrations recorded. The project, however, would contribute to existing violations of the state 24-hour and annual PM10, the federal 24-hour PM2.5 air quality standards, and the state 1-hour and the 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 provided.

Operational Impacts Mitigation

The city is proposing to mitigate the project's contribution to the ambient ozone, PM10 and PM2.5 by providing VOC emission reduction credits (for ozone precursors), obtained from sources in the upwind neighboring South Coast Air Quality Management District (SCAQMD), and paving of roads in the Victorville area for PM10/PM2.5 and its precursors. Details of the mitigation plan are following:

Air Quality Table 6
Project Operation Emission Impacts

Pollutants	Avg. Period	Impacts (μg/m³)	Background (μg/m³)	Total Impacts (μg/m³)	Standard (μg/m³)	Percent of Standard
NO_2	1-hour (start-up)	243	169	412	470 [1]	88%
	1-hour (steady state)[3]	240	169	409	470 [1]	87%
	Annual	0.3	41	41.3	100 [2]	41%
SO_2	1-hour	1.5	31	32.5	655 [1]	5%
	24-hour	0.3	16	16.3	105 [1]	16%
CO	1-hour	1,069.71	3,680	4,749.71	23,000 [1]	21%
	8-hour	178.23	2,178	2,356.23	10,000 [1]	23%
PM10	24-hour	5.9	181	186.9	50 [1]	**370%**
	Annual	0.3	34	34.3	20 [1]	**172%**
PM2.5	24-hour	5.9	38	43.9	35 [2]	**125%**
	Annual	0.3	13.9	14.2	12 [1]	**118%**

Notes
1. State standards
2. Federal standards
3. Including impacts from fire pump engine.
Source: Victorville 2007a.

Ozone precursors (NOx and VOC)

Due to the unavailability of ozone precursor ERCs in the Mojave District, the city proposes to secure ozone precursor ERCs (VOC priority reserve emission reduction credits) from the South Coast Air Quality Management District (SCAQMD). This type of emission offsetting is referred to as inter-pollutant/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 SCAQMD cause an overwhelming contribution to ozone violations in the District. Therefore, the use of VOC ERCs from the SCAQMD to mitigate the facility NOx and VOC emissions contribution to existing violations of ozone air quality standards is acceptable.

To support its case, the city utilized the Urban Airshed Model (UAM) modeling analysis performed by SCAQMD to demonstrate the effectiveness of their proposed mitigation. The following is a summary of the circumstances affecting the adequacy of the city's proposed inter-basin/inter-pollutant offsets strategy:

- Violations of the ambient air quality standard for ozone in the District are due, largely, to transport of pollution from the SCAQMD.
- District Rule 1305 (B)(5)(b) allows the use of inter-basin emission reductions from the SCAQMD to offset project emissions provided:
  - o The emissions reductions from the SCAQMD are obtained in a non-attainment area which has a greater classification than the area where the offsets are to be used [Rule 1305 (B)(5)(b)(i)], and

  - The emissions from the SCAQMD contribute to a violation of the Ambient Air Quality Standards in the area where the offsets are to be used. [Rule 1305 (B)(5)(b)(ii)].

- VOC emission reductions in the SCAQMD will reduce its ozone precursor's inventory. Such reductions may also reduce transport of ozone to Mojave District. Reduction of SCAQMD ozone and the SCAQMD ozone precursors and reduced transport to the District constitutes an air quality benefit.
- The magnitude of the reduction of transported ozone concentration in the Mojave District will depend on where, when and under what meteorological conditions the reductions within the South Coast District will occur. Those emission reductions that are nearer or more directly upwind of the Victorville area will result in greater reductions of transported ozone.

The results of the aforementioned modeling analysis support the city proposed inter-pollutant, inter-basin mitigation at a ratio of 2.08 pounds of VOC for every pound of new NOx emission (Victorville 2007a, pp. 6.3-85). Additionally, the city also proposed to mitigate 1.3 pounds of VOC emission reduction credits for every new pound of VOC emissions. As a result, the city would have to provide 270 tons (225.5 tons for NOx and 44.7 tons for VOC) per year of VOC ERCs obtained from the South Coast air basin prior to starting construction of the project.

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 Victorville 2 facility. Staff acknowledges that the ozone air quality standard violations in the Mojave Desert area are overwhelmingly caused by emissions from SCAQMD (ARB, 1996). Therefore, staff concludes that the project's incremental effects, including offsets and control mitigation measures, are not cumulatively considerable and are less than significant. Staff recommends the adoption of Condition of Certification **AQ-SC8** to ensure timely purchase of the SCAQMD VOC Priority Reserve emission reduction credits.

It should be noted that the city proposes the use of priority reserve credits that are generated by the SCAQMD's Rule 1309. Among the many requirements for qualification to draw SCAQMD priority reserve VOC emission reduction credits is to conduct due diligence to secure all other available emission reduction credits in the District. The city has performed such an analysis (LW 2007a). The SCAQMD board has approved the city's due diligence report and has issued a resolution approving the withdrawal of VOC priority reserve from the SCAQMD.

Rule 1309.1 continues to be subject to criticisms and legal challenges, and the rule has already been revised several times in response. Staff believes that the project will comply with applicable LORS including SCAQMD priority reserve credits as currently defined. If the rule or districts' approval of the transfer are revised, staff would assess the changes and their effect on the project, impact mitigation and LORS compliance.

PM10 and their precursors:

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 Victorville, Adelanto, Apple Valley, Hesperia, Hellendale, Hinkey, Lucerne Valley, and Phelan. 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.

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 construction of the facility. This will ensure that emission reduction credits have been provided prior to start 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 132.7 tons of PM10/PM2.5 and their precursors (124.4 tons PM10 and 8.3 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 District Rule 1406. These requirements include the selection of roads that are not scheduled to be paved as part of the District 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 survey 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 District NSR program to mitigate new emissions from a new or modified project. Staff has incorporated these requirements into Condition of Certification **AQ-SC9**.

Similar to mitigation for ozone precursors, the rule underlying the city’s use of PM10/PM2.5 emission reduction credits is being legally challenged. Thus, while staff believes that the project complies with current applicable LORS, 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-SC10**, 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 132.7 tons of PM2.5 per year into Condition of Certification **AQ-SC9**.

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 District's Rule 1406 (see discussion above) that is being legally challenged. Thus, staff believes that the project will 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.

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 city, in consultation with the District, has conducted a search of current and probable construction and operation of facilities within six miles radius of the project, and indicated that the expansion of the Southern California Logistic Airport and the Victor Valley Wastewater Reclamation Authority facility 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 26, 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 MDAQMD 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 MDAQMD 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 expansion of the Southern California Logistic Airport and the Victor Valley Wastewater Reclamation Authority facility would cause violations of the ozone standards.

Particulate Matter

The District is currently classified as nonattainment for the state and the federal 24-hour PM10 air quality standard. The District adopted a Federal Particulate Matter (PM10) Attainment Plan (PMAP) in July 31, 1995. However, some experts are critical of the federal standards as not being sufficiently health protective. California has adopted far more stringent standards for PM10. 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 CARB classified the area as non-attainment of the annual state PM2.5 air quality standard.

The PMAP states that "(t)he air quality of the MDAQMD is impacted by both fugitive dust from local sources and occasionally by region-wide wind blown dust during moderate to high wind episodes. This region-wide or “regional” event includes contributions from both local and distant dust sources which frequently result in violations of the NAAQS that are multi-district and interstate in scope." It also states that "(i)t is not feasible to implement control measures to reduce dust from regional wind events." Therefore, the District would have put considerable effort to reduce the emissions from "…unpaved road travel, construction, and local disturbed areas in the populated areas, and certain stationary sources operating in the rural Lucerne Valley*."*

It is unlikely that the project emissions, fully mitigated, with emissions from the expansion of the Southern California Logistic Airport and the Victor Valley Wastewater Reclamation Authority facility will lessen the overwhelming contributions from fugitive and windblown dust. Therefore, the cumulative impacts of the project and the expansion of the Southern California Logistic Airport and the Victor Valley Wastewater Reclamation Authority facility on the existing air quality would be insignificant.

GREENHOUSE GASES

The generation of electricity can produce air emissions known as greenhouse gases (GHGs) in addition to the criteria air pollutants. GHGs are known to contribute to the warming of the earth's atmosphere. These include primarily carbon dioxide, nitrous oxide (N_2O, not NO or NO_2, which are commonly know as NOx or oxides of nitrogen), and methane (unburned natural gas). Also included are sulfur hexafluoride (SF_6) from high voltage equipment, and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment.

Climate change from rising temperatures represents a risk to California's economy, public health, and environment (CEC 2003). 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 should require reporting of GHG emissions as a condition of state licensing of new electric generating facilities (CEC 2003, p. 42). Such reporting would be done in accordance with reporting protocols currently in place or that will be adopted with the implementation of new laws.

The Intergovernmental Panel on Climate Change (IPCC), an international scientific body, has developed standard reporting protocols and methodologies for governments and agencies to follow in calculations for GHG inventories. The IPCC-approved methodology for calculating GHG emissions in an inventory is particular to the type of fossil fuel burned. In their *Revised 1996 Guidelines for National Greenhouse Gas Inventories: Reference Manual*, the IPCC established the factors for oxidation, fuel-based emissions, and global warming potential.

The California Global Warming Solutions Act of 2006 (AB32) requires the California Air Resources Board (ARB) to adopt a statewide GHG emissions limit equivalent to the statewide GHG emissions levels in 1990 to be achieved by 2020. To achieve this, ARB has a mandate to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB is expected to adopt early action GHG reduction measures in 2007 and establish a statewide emissions cap by January 2008. By January 1, 2008, ARB is scheduled to adopt regulations requiring mandatory GHG emissions reporting and define the statewide GHG emissions cap for 2020. ARB would adopt a plan by January 1, 2009 that would indicate how emission reductions would be achieved from significant sources of GHGs via regulations, market mechanisms, and other actions.

Then, during 2009, ARB staff would draft rule language to implement its plan and hold public workshops on each measure including market mechanisms (ARB, 2006c). Strategies that the state might pursue for managing GHG emissions in California are identified in the California Climate Action Team's Report to the Governor (CalEPA, 2006). 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 Electricity Greenhouse Gas Emission Standards Act (SB1368[2]) was also enacted in 2006, requiring base load generation resources or contracts be subject to a GHG or Environmental Performance Standard of 1,100 pounds (or 0.5 metric tons) CO_2 per megawatt-hour (MWh). The Emissions Performance Standard applies (EPS) 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.[3] If this project plans to sell baseload electricity to California utilities, it will have to document compliance with the EPS.

Staff recommends Condition of Certification **AQ-SC11**, which requires the project owner to report the quantities of relevant GHGs emitted as a result of electric power production. Staff believes that **AQ-SC11**, with the reporting GHG emissions, will enable the project to be consistent with the potential regulations and policies described above, and provide the information to determine compliance with the EPS. The GHG emissions to be reported in **AQ-SC11,** are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFCs and PFCs emissions that are directly associated with the production and transmission of electric power.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any comments from either the public or agencies.

CONCLUSIONS

- The project would comply with applicable District Rules and Regulations, including New Source Review requirements (MDAQMD 2007c).
- 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 priority reserve credits, as currently defined, from the SCAQMD (**AQ-SC8**) would mitigate the project's ozone impact to a level that is less than significant.

[2] Public Utilities Code § 8340 et seq.

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

- 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.
- The project PM2.5 emissions and PM2.5 precursor emissions of SOx may cause a new violation of the federal 24-hour PM2.5 and would contribute to violations of 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.

PROPOSED CONDITIONS OF CERTIFICATION

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with **AQ-SC3**, **AQ-SC4 and AQ-SC5** for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and AQCMM Delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the Compliance Project Manager (CPM).

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit to the CPM for approval, the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM Delegates.

AQ-SC2 Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with **AQ-SC3**, **AQ-SC4, AQ-SC5** and **AQ-SC6**.

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

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the CPM in each Monthly Compliance Report (MCR) 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. 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. No vehicle shall exceed 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 District.

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

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

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

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

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

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

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

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if step 2, specified above, fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The owner/operator may appeal to the 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-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM in the MCR, a construction mitigation report that demonstrates compliance with the following mitigation measures for the 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 be fueled only with ultra-low sulfur diesel, which contains no more than 15 ppm sulfur.

B. 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.

C. All construction diesel engines, which have a rating of 100 hp or more, shall meet, at a minimum, the Tier 2 California Emission Standards for Off-Road Compression-Ignition Engines as specified in California Code of Regulations, Title 13, section 2423(b)(1) unless certified by the on-site AQCMM that such engine is not available for a particular item of equipment. In the event a Tier 2 engine is not available for any off-road engine larger than 100 hp, that engine shall be equipped with a Tier 1 engine. In the event a Tier 1 engine is not available for any off-road engine larger than 100 hp, that engine shall be equipped with a catalyzed diesel particulate filter (soot filter), 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” if, among other reasons:

   1. There is no available soot filter that has been certified by either the California Air Resources Board (ARB) or U.S. Environmental Protection Agency (EPA) for the engine in question; or

   2. The construction equipment is intended to be on-site for ten (10) days or less.

   3. The CPM may grant relief from this requirement if the AQCMM can demonstrate that they have made a good faith effort to comply with this requirement and that compliance is not possible.

D. The use of a soot filter may be terminated immediately if one of the following conditions exists, provided that the CPM is informed within ten (10) working days of the termination:

   1. The use of the soot filter is excessively reducing normal availability of the construction equipment due to increased downtime for maintenance, and/or reduced power output due to an excessive increase in backpressure.

   2. The soot filter is causing or is reasonably expected to cause significant engine damage.

3. The soot filter is causing or is reasonably expected to cause a significant risk to workers or the public.

4. Any other seriously detrimental cause which has the approval of the CPM prior to the termination being implemented.

E. All heavy earthmoving equipment and heavy duty construction related trucks with engines meeting the requirements of (c) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

F. All diesel heavy construction equipment shall not remain running at idle for more than five minutes, to the extent practical.

Verification: The AQCMM shall include in the MCR:

1. A summary of all actions taken to maintain compliance with this condition,

2. A list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained, and

3. Any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC6 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-SC7 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-SC8 The project owner shall provide valid evidence that 270 tons per year of VOC emission reduction credits from the South Coast Air Quality Management District Priority Reserve have been purchased prior to start of construction of the project.

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-SC9 The project owner shall pave, with asphalt concrete, unpaved local roads to provide emission reductions of 132.7 tons per year of PM2.5, prior to start construction of the project.

Verification: At least one year prior to start construction, the project owner shall submit to the CPM and the District, for approval, a list and pictures of candidate roads to be paved, their daily average traffic count including classifications of vehicles (ADT), and daily vehicle miles travel (DVMT), 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-SC10 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.

AQ-SC11 Until the California Global Warming Solutions Act of 2006 (AB32) is implemented, the project owner shall either participate in a climate action registry approved by the CPM, or report on a annual basis to the CPM the quantity of greenhouse gases (GHG) emitted as a direct result of facility electricity production.

The project owner shall maintain a record of fuel types and carbon content used on-site for the purpose of power production. These fuels shall include but are not limited to each fuel type burned: (1) in combustion turbines, (2) HRSGs (if applicable) or auxiliary boiler (if applicable), (3) internal combustion engines, (4) flares, and/or (5) for the purpose of startup, shutdown, operation or emission controls.

The project owner may perform annual source tests of CO_2 and CH_4 emissions from the exhaust stacks while firing the facility's primary fuel, using the following test methods or other test methods as approved by the CPM. The project owner shall produce fuel-based emission factors in units of lbs

CO_2 equivalent per mmBtu of fuel burned from the annual source tests. If a secondary fuel is approved for the facility, the project owner may also perform these source tests while firing the secondary fuel.

Pollutant	Test Method
CO_2	EPA Method 3A
CH_4	EPA Method 18 (POC measured as CH_4)

As an alternative to performing annual source tests, the project owner may use the Intergovernmental Panel on Climate Change (IPCC) Methodologies for Estimating Greenhouse Gas Emissions (MEGGE). If MEGGE is chosen, the project owner shall calculate the CO_2, CH_4 and N_2O emissions using the appropriate fuel-based carbon content coefficient (for CO_2) and the appropriate fuel-based emission factors (for CH_4 and N_2O).

The project owner shall convert the N_2O and CH_4 emissions into CO_2 equivalent emissions using the current IPCC Global Warming Potentials (GWP). The project owner shall maintain a record of all SF_6 that is used for replenishing on-site high voltage equipment. At the end of each reporting period, the project owner shall total the mass of SF_6 used and convert that to a CO_2 equivalent emission using the IPCC GWP for SF_6. The project owner shall maintain a record of all PFCs and HFCs that are used for replenishing on-site refrigeration and chillers directly related to electricity production. At the end of each reporting period, the project owner shall total the mass of PFCs and HFCs used and not recycled and convert that to a CO_2 equivalent emission using the IPCC GWP.

On an annual basis, the project owner shall report the CO_2 and CO_2 equivalent emissions from the described emissions of CO_2, N_2O, CH_4, SF_6, PFCs, and HFCs.

Verification: The project annual GHG emissions shall be reported, as a CO_2 equivalent, by the project owner to a climate action registry approved by the CPM, or to the CPM as part of the fourth Quarterly or the annual Air Quality Report, until such time that GHG reporting requirements are adopted and in force for the project as part of the California Global Warming Solutions Act of 2006.

DISTRICT'S PERMIT CONDITIONS

COMBUSTION TURBINE GENERATOR POWER BLOCKS (TWO IDENTICAL UNITS)

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.

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, NO_x and VOC during periods of startup, shutdown and malfunction:

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

1. NO_x as NO_2 – 15.60 lb/hr (based on 2.0 ppmvd corrected to 15% O_2 and averaged over one hour)

2. CO – 14.25 lb/hr (based on 2.0 ppmvd (3.0 ppmvd with duct firing) corrected to 15% O_2 and averaged over one hour)

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

1. VOC as CH_4 – 5.44 lb/hr (based on 1.4 ppmvd (2.0 ppmvd with duct firing) corrected to 15% O_2)

2. SO_x as SO_2 – 1.21 lb/hr (based on 0.2 grains/100 dscf fuel sulfur)

3. PM_{10} – 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 NO_x 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. Cold startup is defined as a startup when the CTG has not been in operation during the preceding 48 hours. 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:

1. Cold startup – 108 minutes

2. Other startup – 78 minutes

3. Shutdown – 30 minutes

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

1. NO_x – 96 lb

2. CO – 410 lb

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

1. NO_x – 40 lb

2. CO – 329 lb

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

1. NO_x – 57 lb

2. 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 and cooling tower, shall not exceed the following emission limits, based on a calendar day summary:

A. NO_x – 1306 lb/day, verified by CEMS

B. CO – 4824 lb/day, verified by CEMS

C. VOC as CH_4 – 556 lb/day, verified by compliance tests and hours of operation in mode

D. SO_x as SO_2 – 59 lb/day, verified by fuel sulfur content and fuel use data

E. PM_{10} – 917 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 and cooling tower, shall not exceed the following emission limits, based on a rolling 12 month summary:

A. NO_x – 108 tons/year, verified by CEMS

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

C. VOC as CH_4 – 34 tons/year, verified by compliance tests and hours of operation in mode

D. SO_x as SO_2 – eight tons/year, verified by fuel sulfur content and fuel use data

E. PM_{10} – 124 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 minutes in any one 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.

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 NO_x, 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.

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 MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District no later than six weeks prior to the expiration date of this permit. The following compliance tests are required:

A. NO_x as NO_2 in ppmvd at 15% oxygen and lb/hr (measured per USEPA Reference Methods 19 and 20).

B. VOC as CH_4 in ppmvd at 15% oxygen and lb/hr (measured per USEPA Reference Methods 25A and 18).

C. SO_x as SO_2 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. PM_{10} in mg/m^3 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 NO_x, Performance Specification 2.

B. For O_2, 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, NO_x 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 NO_x, CO, PM_{10}, VOC and SO_x (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)

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 141 tons of NO_x, 45 tons of VOC, and 124 tons of PM_{10} offsets (VOC ERCs may be substituted for NO_x ERCs at a ratio of 1.6:1).

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, NO_x, CO, VOC and ammonia concentration limits shall not apply. The O.O. shall minimize emission of NO_x, 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 NO_x from the CTG and HRSG at the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor. The NO_x 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 NO_x 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 NO_x by the SCR shall not exceed 624 hours during the initial commissioning period. Such operation without NO_x 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, including start up and shut down emissions from the turbines and all other associated and emergency equipment, shall not exceed the following emission limits (verified by CEMS):

A. NO_x - 32 tons, and 242 pounds/hour/CTG

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

In addition the total emissions from the commissioning period shall be accrued toward the annual emission limits specified in Condition **AQT-7**.

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 **AQT-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 BURNERS (TWO IDENTICAL UNITS)

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 NO_x 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 SYSTEMS (TWO IDENTICAL UNITS)

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 SYSTEMS (TWO IDENTICAL UNITS)

AQSCR-1 Operation of this equipment shall be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted below.

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

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

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

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

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

AQSCR-4 Ammonia shall be injected whenever the selective catalytic reduction system has reached or exceeded 550° Fahrenheit except for periods of equipment malfunction. Except during periods of startup, shutdown and malfunction, ammonia slip shall not exceed 5 ppmvd (corrected to 15% O_2), averaged over three hours.

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

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

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 PM_{10} 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 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 on-site 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

AQB-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.

AQB-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.

AQB-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. NO_x as NO_2 – 0.39 lb/hr (based on 9.0 ppmvd corrected to 3% O_2 and averaged over one hour)

B. CO – 2.59 lb/hr (based on 100 ppmvd corrected to 3% O_2 and averaged over one hour)

C. VOC as CH_4 – 0.19 lb/hr

D. SO_x as SO_2 – 0.02 lb/hr (based on 0.2 grains/100 dscf fuel sulfur)

E. PM_{10} – 0.26 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**.

AQB-4 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**.

AQB-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 NO_x, CO, PM_{10}, VOC and SO_x (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.

AQB-6 The O.O. shall perform the following annual compliance tests on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District no later than six weeks prior to the expiration date of this permit. The following compliance tests are required:

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

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

C. SO_x as SO_2 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. PM_{10} in mg/m^3 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

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. NO_x as NO_2 – 0.44 lb/hr (based on 9.0 ppmvd corrected to 3% O_2 and averaged over one hour)

B. CO – 2.96 lb/hr (based on 100 ppmvd corrected to 3% O_2 and averaged over one hour)

C. VOC as CH_4 – 0.22 lb/hr

D. SO_x as SO_2 – 0.02 lb/hr (based on 0.2 grains/100 dscf fuel sulfur)

E. PM_{10} – 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 NO_x, CO, PM_{10}, VOC and SO_x (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 MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District no later than six weeks prior to the expiration date of this permit. The following compliance tests are required:

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

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

C. SO_x as SO_2 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. PM_{10} in mg/m^3 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

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.

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

AQFP-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.

AQFP-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.

AQFP-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.

AQFP-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.

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

AQFP-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.

AQFP-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.

AQFP-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.

REFERENCES

ARB (Air Resource Board). 1996. Second Triennial Review of the Assessment of the Impacts of Transported Pollutants on Ozone Concentration in California.

CEC 2007a – California Energy Commission (tn: 39788). Data Adequacy Recommendation. 3/28/07. Received 3/28/07.

CEC 2007f - California Energy Commission/J. Kessler (tn: 41119). Data Request Set 1 (#s1 – 110). 6/22/07. Received 6/22/07.

CURE 2007a – California Unions for Reliable Energy/G. Smith (tn: 40951). CURE's Data Request Set 1. Received 6/12/07

CURE 2007b – California Unions for Reliable Energy/G. Smith (tn: 41778). CURE's Data Request Set 2. Received 7/30/07

DTSC 2007a – Department of Toxic Substances Control/G. Holmes (tn:42237). Letter from G. Holmes – DTSC to B.B. Blevins – CEC providing comments to AFC. 9/10/07. Received 9/11/07

ENSR 2007a – ENSR/S. Head (tn:40346). Application for Prevention of Significant Deterioration Permit to U.S.EPA. Received 5/3/07.

ENSR 2007c – ENSR/S. Head (tn:41481). Response to CURE's Data Request Set 1. Received 7/12/07.

ENSR 2007d – ENSR/S. Head (tn:42131). Response to CURE's Data Request Set 2. 8/28/07. Received 8/29/07.

Inland Energy 2007a – Inland Energy Inc./T. Penna (tn: 40150). Applications for Authority to Construct and Permit to Operate. 4/19/07. Received 4/25/07.

LW 2007a – Latham & Watkins LLP/M. Carroll (tn:39938). Confidential Submittal – Emission Reduction Credits Due Diligence Results. Received 4/5/07

LW 2007b - Latham & Watkins LLP/M. Carroll (tn:41332). Supplement to Application for Prevention of Significant Deterioration Permit. Received 7/2/07

MDAQMD 2007a – Mojave Desert Air Quality Management District/E. Heaston (tn: 39756). Letter to city of Victorville stating that MDAQMD considers the AFC as an application for applicable District permits. 3/19/07. Received 3/26/07.

MDAQMD 2007b – Mojave Desert Air Quality Management District/E. Heaston (tn: 39757). Letter to the Energy Commission stating that MDAQMD has reviewed the AFC and finds the application complete for processing applicable District permits. 3/19/07. Received 3/26/07.

MDAQMD 2007c – Mojave Desert Air Quality Management District/E. Heaston (tn: 42123). Preliminary Determination of Compliance. 8/29/07. Received 8/29/07.

USEPA 2007a – U.S. Environmental Protection Agency/G. Rios (tn: 41540). Determination of Completeness for Application for Prevention of Significant Deterioration Permit. 6/13/07. Received 6/17/07.

Victorville 2007a – City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vol. 1&2. 2/27/07. Received 2/28/07.

Victorville 2007b – City of Victorville (tn: 39934). Application for Certification Data Adequacy Supplement. Vol. 3. 4/6/07. Received 4/9/07.

Victorville 2007c – City of Victorville (tn: 41644). Applicant's Responses to CEC's Data Request Set 1, #s 1 – 110. 7/23/07. Received 7/23/07.

BIOLOGICAL RESOURCES

N. Misa Ward

SUMMARY OF CONCLUSIONS

The Victorville 2 Hybrid Power Project (Victorville 2) would impact the following plant communities: Mojave desert scrub, desert saltbush scrub, Mojavean juniper woodland and scrub, non-native grassland, and developed/disturbed areas, which provide habitat to common plants and animals. In addition, Victorville 2 would impact special-status plant and animal species known to occur on site or in the project vicinity. Compliance with the federal and state Endangered Species Acts (ESA), biological resources Conditions of Certification, and other laws, ordinances, regulations, and standards (LORS) discussed in the staff assessment would likely mitigate impacts to biological resources from Victorville 2. However, staff is awaiting additional information on likely mitigation details related to desert tortoise and Mohave ground squirrel as will be determined when the federal Biological Opinion, and state Incidental Take Permit are completed and accepted. Therefore, additional measures may be required to ensure that impacts to biological resources are mitigated to less than significant levels. In summary, outstanding items needed for the Final Staff Assessment include likely mitigation details and habitat compensation ratios, which were missing in the Biological Assessment, but would be included in the Biological Opinion and Incidental Take Permit; agency input regarding the need for tortoise exclusion fencing along Colusa Road, Helendale Road, and Adelanto Road; and details on the applicant's proposed agency-approved desert plant relocation areas and plant adoption centers/programs. With the exception of agency input on fencing that staff requested earlier, staff intends to address these items in the Preliminary Staff Assessment workshop. Limited availability of sufficient, suitable, and contiguous mitigation land is likely to pose significant challenges to mitigating cumulative impacts to biological resources in the region.

INTRODUCTION

This section of the Preliminary Staff Assessment (PSA) provides the California Energy Commission (Energy Commission) staff's preliminary analysis of potential impacts to biological resources from the construction and operation of Victorville 2. Information provided in this document addresses potential impacts to special-status species and areas of critical biological concern. This analysis also describes the biological resources at the project site and at the locations of ancillary facilities. This document explains the need for mitigation, the adequacy of mitigation proposed by the applicant, and where necessary, specifies additional mitigation measures to reduce identified impacts to less than significant levels. It also describes compliance with applicable LORS, and recommends Conditions of Certification.

This analysis is based, in part, upon information provided in the Application for Certification (AFC) for Victorville 2 (Victorville 2007a), responses to intervenor and staff data requests (ENSR 2007d, Victorville 2007c), site visits conducted on April 19, 2007 and June 8, 2007, a data response and issues resolution staff workshop on August 8, 2007, and discussions with various agency and applicant representatives.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

The applicant will need to abide by the following 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.
Migratory Bird Treaty (Title 16, United States Code, sections 703 through 711)	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act.
Clean Water Act (Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26))	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge from dredged or fill materials into waters of the U.S., including wetlands. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity which may result in a discharge into a California water body, including wetlands, must request state certification that the proposed activity will not violate state and federal water quality standards.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	This law provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.
State	
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's rare, threatened, and endangered species.

California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals of California that are declared rare, threatened, or endangered.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations Title 14, section 670.7).
Nest or Eggs (Fish and Game Code section 3503)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.
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), Public Resources Code 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 California Department of Fish and Game's (CDFG's) Special Animals List.
Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.
California Native Plant Protection Act of 1977 (Fish and Game Code section 1900 et seq.)	Designates state rare, threatened, and endangered plants.
California Desert Native Plants Act of 1981 (Food and Agricultural Code section 80001 et seq.)	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	
San Bernardino County General Plan	The Conservation Element includes several goals and policies relating to biological resources in the county. These policies aim to conserve the County's natural resources, including rare species, significant habitats, and common desert species and ecosystems.
San Bernardino County Development Code (Title 8, division 9, chapter 4, section 89.0420)	The code specifies "regulated desert native plants" that, with some stipulations, require a permit from the Agricultural Commissioner or other applicable County Reviewing Authority prior to removal or harvesting. Such plants include smoke tree (*Psorothamnus spinosus*); mesquite (*Prosopis* spp.); century plants, nolinas, and yuccas (all Agavaceae); creosote (*Larrea tridentata*) rings; and all Joshua trees (*Yucca brevifolia*).
City of Victorville General Plan	The Resource Element of the city's General Plan includes general policies aimed at protecting biological resources. These policies encourage protection of sensitive plants and wildlife. The general plan encourages riparian habitat protection and management by implementing the Mojave River Corridor Plan.
City of Victorville Municipal Code (Title 13, chapter 13.33)	This code protects Joshua trees in Victorville. An inventory of Joshua trees, tree relocation/removal plan, and City inspection are required prior to applying for a grading permit.
City of Hesperia Municipal Code (Development Code, title 16, article II, chapter 16.24)	This code also specifies certain desert plants to be protected. These plants include those specified in the San Bernardino County Development Code and in the California Desert Native Plant Protection Act as described earlier.
Southern California Logistics Airport (SCLA) Specific Plan	Victorville 2 is located within the SCLA Specific Plan area, which provides development requirements for developing and/or reusing the SCLA area. The plan requires biological monitoring during construction and includes procedures for protecting biological resources.

SETTING

REGIONAL SETTING

The proposed Victorville 2 project site is located approximately 100 miles northeast of the city of Los Angeles and approximately 45 miles northwest of the city of San Bernardino in the city of Victorville, San Bernardino County, California. Portions of the transmission line route occur in the adjacent city of Hesperia. The project is located north of the SCLA, the former George Air Force Base, and approximately 3.5 miles east of U.S. Highway 395 and approximately 0.5 mile west of the Mojave River. The transmission line route crosses Oro Grande Wash, the California Aqueduct, and Interstate 15. The project would occupy approximately 275 acres in the Victor Valley, a portion of the southwestern Mojave Desert. The area has been termed the “High Desert” due to its elevation (approximately 2,900 feet above sea level) (Victorville 2007a).

PROJECT AREA AND VICINITY DESCRIPTION

The project area consists of the proposed Victorville 2 power plant site (Victorville 2 site) and all associated linear facilities. The Victorville 2 site lies just north of the intersection of Colusa Road and Helendale Road and approximately one mile northeast of the SCLA runway’s northern end (Victorville 2007a). It is mostly flat, and elevations range from approximately 2,780 to 2,820 feet above mean sea level. The topography at, and beyond, the eastern site boundary slopes down to the Mojave River.

The total land required to construct the proposed Victorville 2 is 388 acres, consisting of 338 acres that would be graded for the power plant and solar collectors in order to provide a 275-acre footprint for the power plant, and two nearby temporary construction laydown areas of 20 and 30 acres each. The linear facilities include 21 miles of transmission lines (4.3 miles of which occupy a new right-of-way), a natural gas interconnection (12-inch diameter) to the existing Kern River-High Desert Power Project Lateral (24-inch diameter), a 3-mile potable water pipeline to extend along Perimeter Road, as well as a new 1.5-mile reclaimed process water pipeline (14-inch diameter) and a new 1.25-mile sanitary wastewater line, both of which connect to the Victor Valley Wastewater Reclamation Authority (VVWRA) wastewater treatment plant. Process wastewater would be treated using a zero liquid discharge system resulting in a salt cake that would be disposed in a landfill. In addition, access to the project would occur via Adelanto Road, Colusa Road, and Helendale Road. Portions of the aforementioned three roads would be paved (Victorville 2007c, Victorville 2007e). Staff intends to request clarification of the total length of road proposed for paving in the Preliminary Staff Assessment workshop.

The applicant conducted biological resource surveys of the property on which the proposed Victorville 2 power plant site and laydown areas would be located as well as areas within a one-mile radius and those within 1000 feet of linear facilities (where possible). In addition, the applicant conducted protocol-level surveys for rare plants, desert tortoise, Mohave ground squirrel, and burrowing owl as well as prepared a preliminary delineation of jurisdictional waters. However, the applicant also noted that some areas of the power plant site and transmission line route were not surveyed for rare plants and burrowing owl (Victorville 2007a).

Vegetation and Wildlife

The Victorville 2 site is primarily located on undisturbed, natural land, which is also surrounded by undisturbed open space with the exception of a few rural home sites and dirt roads. Vegetation on the site and in the immediate project area consists of primarily Mojave creosote bush scrub. This plant community is common in the California desert and comprised of scattered shrubs (Holland 1986). Annual plants are also characteristic of Mojave creosote bush scrub but were notably absent during the applicant’s surveys due to low rainfall (Victorville 2007a). In the project area, the following plant species are dominant: white bursage (*Ambrosia dumosa*), creosote bush (*Larrea tridentata*), and cheeseweed (*Hymenoclea salsola*) (Victorville 2007a). Other associated species include freckled milkvetch (*Astragalus lentiginosus* var. *fremontii*), Nevada ephedra (*Ephedra nevadensis*), winter fat (*Krascheninnikovia lanata*), pencil cholla (*Opuntia ramosissima*), sandpaper plant (*Petalonyx thurberi*), and Joshua tree (*Yucca brevifolia*) (Victorville 2007a). Additional plant communities and habitats within the project footprint include desert saltbush scrub, rabbitbrush scrub, Mojavean juniper woodland and scrub, developed/disturbed land, non-native grassland, and open sandy riverbed (Holland 1986, Victorville 2007a, ENSR 2007b). Other vegetation types within a one-mile radius of the proposed power plant site and 1000 feet of linear facilities include agricultural land, Mojave riparian forest, open cottonwood-willow woodland, southern willow scrub, Mojave wash scrub, and cottonwood forest associated with the Mojave River located approximately 0.5 mile east of the power plant site and parallel to transmission line Segment 1 (Victorville 2007a).

The Victorville 2 site's vegetation provides suitable habitat for several regionally common wildlife species such as side-blotched lizard (*Uta stansburiana*), desert night lizard (*Xantusia vigilis*), longnose leopard lizard (*Gambelia wislizenii*), Great Basin whiptail (*Aspidoscelis [Cnemidophorus] tigris tigris*), coachwhip (*Masticophis flagellum*), Mojave rattlesnake (*Crotalus scutulatus*), verdin (*Auriparus flaviceps*), black-throated sparrow (*Amphispiza bilineata*), horned lark (*Eremophila alpestris*), cactus wren (*Campylorhynchus brunneicapillus*), common raven (*Corvus corax*), black-tailed jackrabbit (*Lepus californicus*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), coyote (*Canis latrans*), and kit fox (*Vulpes macrotis*).

The ephemeral drainages and washes in the project area drain either directly or secondarily (via Oro Grande Wash) into the Mojave River (Victorville 2007a). One ephemeral drainage flows into the VVWRA wastewater treatment plant (Victorville 2007a). A total of 55 drainages lacking wetland and riparian habitat occur in the project footprint and 100-foot wetland delineation buffer; all occur along the proposed transmission line corridor (Victorville 2007c). The applicant determined that 54 drainages fall under jurisdiction of the USACE and CDFG. The remaining drainage falls under the jurisdiction of CDFG only. The Lahontan RWQCB would require section 401 permitting for the discharge of any pollutants into these water bodies. The closest riparian habitat occurs approximately 0.5 mile away within the Mojave River, which exhibits surface flow to the east of the proposed power plant site. This riparian habitat provides potential nest sites for raptors. In addition, the Mojave River (and adjacent areas) is a well-documented wildlife movement corridor for migratory birds in particular (Victorville 2007a). The applicant made direct observations of the following species associated with the Mojave River: bald eagle (*Haliaeetus leucocephalus*, state-listed Endangered), Swainson's hawk (*Buteo swansoni*, state-listed Threatened), turkey vulture (*Cathartes aura*), hermit warbler (*Dendroica occidentalis*), and Wilson's warbler (*Wilsonia pusilla*) (Victorville 2007a).

Special-Status Species

Biological Resources Table 2 lists special-status species that are known to occur or could potentially occur in the project area and vicinity. Many of these special-status plants and animals are unlikely to be impacted by Victorville 2 due to lack of suitable habitat at the project site or because occurrences are presumed extirpated. Special-status species in the project vicinity are associated with the following plant communities:

Mojave creosote bush scrub, desert saltbush scrub, and cottonwood-willow riparian vegetation. Staff provides an analysis of potential impacts to special-status species that may be impacted by the project in a later section.

Biological Resources Table 2
Special-Status Species Known or Potentially Occurring
In the Victorville 2 Area

Plants	**Scientific Name**	**Status**
small-flowered androstephium	*Androstephium breviflorum*	__/__/2.3
Palmer's mariposa lily	*Calochortus palmeri* var. *palmeri*	__/__/1B.2
Plummer's mariposa lily	*Calochortus plummerae*	__/__/1B.2
Booth's evening-primrose	*Camissonia boothii* ssp. *boothii*	__/__/2.3
San Bernardino Mountains owl's-clover	*Castilleja lasiorhyncha*	__/__/1B.2
Mojave tarplant	*Deinandra mohavensis*	__/SE/1B.3
sagebrush loeflingia	*Loeflingia squarrosa var. artemisiarum*	__/__/2.2
Parish's desert-thorn	*Lycium parishii*	__/__/2.3
Mojave monkeyflower	*Mimulus mohavensis*	__/__/1B.2
short-joint beavertail	*Opuntia basilaris* var. *brachyclada*	__/__/1B.2
Mojave fish-hook cactus	*Sclerocactus polyancistrus*	__/__/4.2
southern skullcap	*Scutellaria bolanderi* ssp. *austromontana*	__/__/1B.2
San Bernardino aster	*Symphyotrichum defoliatum*	__/__/1B.2
Gastropods		
Victorville shoulderband (snail)	*Helminthoglypta mohaveana*	__/__
westfork shoulderband (snail)	*Helminthoglypta taylori*	__/__
Insects		
Andrew's marble butterfly	*Euchloe hyantis andrewsi*	__/__
San Emigdio blue butterfly	*Plebulina emigdionis*	__/__
Reptiles		
southwestern pond turtle	*Actinemys marmorata pallida*	__/SC
desert tortoise	*Gopherus agassizii*	FT/ST
coast (San Diego) horned lizard	*Phrynosoma coronatum* (blainvillii population)	__/SC
chuckwalla	*Sauromalus ater*	__/__
Amphibians		
arroyo toad	*Bufo californicus*	FE/SC
California red-legged frog	*Rana aurora draytonii*	FT/SC
mountain yellow-legged frog	*Rana muscosa*	FE/SC
Birds		
tricolored blackbird	*Aegelaius tricolor*	__/SC
Cooper's hawk	*Accipiter cooperi*	__/SC
long-eared owl	*Asio otus*	__/SC
burrowing owl	*Athene cunicularia*	__/SC
Swainson's hawk	*Buteo swansoni*	__/ST
Costa's hummingbird	*Calypte costae*	__/__
Lawrence's goldfinch	*Carduelis lawrencei*	__/__
Vaux's swift	*Chaetura vaux*	__/SC
northern harrier	*Circus cyaneus*	__/SC

western yellow-billed cuckoo	*Coccyzus americanus occidentails*	FC/SE
hermit warbler	*Dendroica occidentalis*	FC/SE
yellow warbler	*Dendroica petechia brewsteri*	__/SC
southwestern willow flycatcher	*Empidonax traillii extimus*	FE/SE
prairie falcon	*Falco mexicanus*	__/SC
bald eagle	*Haliaeetus leucocephalus*	FD/SE
yellow-breasted chat	*Icteria virens*	__/SC
loggerhead shrike	*Lanius ludovicianus*	__/SC
osprey	*Pandion haliatus*	__/SC
Nuttall's woodpecker	*Picoides nuttallii*	__/__
summer tanager	*Piranga rubra*	__/SC
white-faced ibis	*Plegadis chihi*	__/SC
rufous hummingbird	*Selasphorus rufus*	__/__
Brewer's sparrow	*Spizella breweri*	__/__
chipping sparrow	*Spizella passerine*	__/__
Le Conte's thrasher	*Toxostoma lecontei*	__/SC
California thrasher	*Toxostoma redivium*	__/__
least Bell's vireo	*Vireo bellii pusillus*	FE/SE
gray vireo	*Vireo vicinior*	__/SC
Mammals		
pallid San Diego pocket mouse	*Chaetodipus fallax pallidus*	__/SC
San Bernardino flying squirrel	*Glaucomys sabrinus californicus*	__/SC
silver-haired bat	*Lasionycteris noctivagans*	__/SC
hoary bat	*Lasiurus cinereus*	__/SC
Mohave River vole	*Microtus californicus mohavensis*	__/SC
Mohave ground squirrel	*Spermophilus mohavensis*	__/ST
American badger	*Taxidea taxus*	__/SC

***Status Legend:** Federal/State/California Native Plant Society (CNPS) List, CNPS list is for plants only:
FE = Federally listed Endangered; **FT** = Federally listed Threatened; **FC** = Candidate Species for Listing; **FD** = Delisted; **SE** = State-listed Endangered; **ST** = State-listed Threatened; **SC** = Species of Concern; **List 1B** = Rare, threatened, or endangered in California and elsewhere; **List 2** = Rare, threatened, or endangered in California, more common elsewhere; **List 4** = Plants of limited distribution (watch list); CNPS threat rank extensions: .2 = Fairly endangered in California, .3 = Not very endangered in California; __ = Not listed in that category. **Sources**: Victorville 2007a, California Natural Diversity Database (CDFG 2007), CNPS (2007).

Sensitive Habitats

Critical Habitat

Critical habitat is a term defined by the federal ESA that refers to areas designated by the USFWS that are essential for the conservation of threatened or endangered species and may require special management and protection (USFWS 2005). The USFWS has designated critical habitat for a number of species in the project vicinity (Victorville 2007a). Critical habitat for the southwestern willow flycatcher is located within approximately 150 feet of portions of the Segment 1 transmission line route. Critical habitat for the desert tortoise is located approximately three miles north of the power plant site. Critical habitat for the arroyo toad is located approximately 3.5 miles southeast of the end of Segment 3 of the transmission line route. The closest critical habitat to the project site for the least Bell's vireo is located approximately 26 miles south. California red-legged frog critical habitat was designated approximately 60 miles west. With the exception of southwestern willow flycatcher (discussed later), these critical habitat areas are located a distance of approximately three miles or greater from the project and are not expected to be impacted by the project.

CDFG Sensitive Natural Communities

In addition to special-status species, a search of CDFG's California Natural Diversity Database (CNDDB) revealed the presence of a sensitive natural plant community in the project vicinity: southern sycamore alder riparian woodland. While other riparian communities occur in the Mojave River, this particular type of native riparian plant community does not occur in the project area. The nearest occurrence was recorded at Grass Valley Creek, which is approximately six miles north of the southern end of the project's transmission line (CDFG 2007).

Aquatic and Riparian Habitat

As discussed earlier, numerous ephemeral drainages and washes, which flow into the Mojave River, traverse the transmission line route. Riparian and freshwater marsh habitats are located in the Mojave River approximately 0.5 mile east of the project. Sections 401 and 404 of the federal Clean Water Act, and section 1600 of the Fish and Game Code regulate impacts to wetlands, "waters of the U.S.," "waters of the state," and riparian vegetation. Impacts to aquatic and riparian habitats are discussed in more detail in later sections.

Desert Native Vegetation

Certain common California desert plants protected under the California Desert Native Plants Act and other county and city codes are present within the project area. These include, but are not limited to, Joshua trees, cacti (four *Opuntia* species), and any creosote bush rings (creosote ring) above a 10-foot diameter (Victorville 2007a) that may occur in the project area. Although creosote bush grows throughout the project area, the applicant did not state whether any protected creosote rings are present or were searched for. A creosote ring is formed when the main stem of creosote bush splits into segments, which then begin to branch. The center of the plant dies and decomposes, leaving bare ground surrounded by a ring of what appears to be individual shrubs. However, creosote rings are in fact one individual, and large ones are believed to be quite old (Armstrong 2007).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD 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. The significance of the activity is in large part dependent on the setting and the existing LORS for the particular site. For example, disturbance during construction on a "brownfield" (i.e., developed) site may not be significant, but this same activity on a "greenfield" (i.e., undeveloped) site may be significant because of the greater likelihood of sensitive biological resources in the area. Significance of impacts is generally determined by compliance with applicable LORS; however, because of the diversity of biological resource impacts, guidelines adopted by resource agencies may also be used.

Significant biological resource impacts would occur if special-status species, such as state- or federal-listed species, state fully protected species, candidates for state or federal listing and/or Species of Special Concern, are likely to be impacted from the construction or operation of the proposed project. Interruption of species migration, reduction of native fish, wildlife and plant habitat, causing a fish or wildlife population to drop below self-sustaining levels, and disturbance of wetlands, marshes, riparian areas or other wildlife habitat would also be considered significant impacts. Harassment of a protected species, even if it does not result in the loss of habitat or reduction in population numbers, would still be considered a significant impact. Substantial degradation of the quality of the environment or environmental effects that are individually limited, but cumulatively considerable, would also be considered significant.

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.

Projects in developed sites typically have less of an impact on sensitive biological resources because they lack suitable habitat on site. However, such projects are evaluated for the impacts they could have on surrounding areas that remain in more natural conditions and support sensitive biological resources.

Biological Resources Table 3 summarizes the direct impacts of temporary and permanent disturbance within the project footprint for the power plant site and other features discussed in the following text. The applicant defines permanent impacts as “those actions that result in irreversible damage to or loss of, natural resources associated with biological systems” and “result in the inability to recover or restore an area to a natural state within a period of three years” such as grading or trench excavation (Victorville 2007a). Temporary impacts are changes that “do not extend substantially beyond the term of initial work completion” such as crushing of vegetation from driving vehicles or staging equipment (Victorville 2007a).

Biological Resources – Table 3
Summary of Affected Acreage

Feature	Number of Acres Affected during Project Construction	
	Temporary	**Permanent**
Power Plant	0	338
Western Construction Staging Area	0	30
Southern Construction Staging Area	0	20
T-line Segment 1 (includes pipeline right-of-ways, tower sites, tower staging/assembly areas, access/patrol and spur roads)	9.2	10.31
T-line Segment 2	2.2	0.13
T-line Segment 3	55	0.3
Reclaimed Water Pipeline	0	5
Sanitary Wastewater Pipeline	0	4
TOTAL	**66.4 acres**	**407.74 acres**

Source: Victorville 2007a

Tables 10 and 11 in Appendix H of the AFC (Victorville 2007a) as well as the section below discuss impacts to individual vegetation types and affected acreages. A total of six vegetation types are expected to be impacted by Victorville 2: Mojave creosote bush scrub, desert saltbush scrub, Mojavean juniper woodland, non-native grassland, rabbitbrush scrub, and developed/disturbed areas.

Construction Impacts and Mitigation

Power Plant Site

The Victorville 2 site currently contains some existing structures, which would be demolished to clear the site for development of the proposed power plant (Victorville 2007a). Mass site grading and vegetation clearing would commence at the beginning of construction, starting at the staging areas, and the power plant, and then to the solar field. The power plant would permanently disturb by grading a total of approximately 338 acres of Mojave creosote bush scrub (285 acres), non-native grassland (3 acres), and developed/disturbed land (50 acres) (Victorville 2007a). These plant communities provide habitat for common and special-status species and likely contain wildlife movement corridors (Victorville 2007a). Staff agrees with the applicant's conclusion that the impact to wildlife movement corridors is less than significant due to the availability of adjacent alternate routes and avoidance of surface waters, and therefore staff has not proposed mitigation.

To address general biological resource impacts and habitat loss, the applicant proposed mitigation measures including worker environmental awareness training, construction monitoring of sensitive habitats, and avoidance of sensitive habitats. Staff agrees with the applicant's proposed mitigation and has incorporated them into the following Conditions of Certification to address general impacts to biological resources. Condition of Certification **BIO-1** requires the selection of a qualified Designated Biologist by the project owner. A qualified Designated Biologist is necessary to oversee the implementation of mitigation measures for impacts to biological resources. Condition of Certification **BIO-2** outlines specific duties that the Designated Biologist must carry out to mitigate impacts. Condition of Certification **BIO-3** outlines the qualifications for any Biological Monitors assigned to assist the Designated Biologist. Condition of Certification **BIO-4** describes the authority of the Designated Biologist and the Biological Monitor to ensure that impacts to biological resources are avoided to the extent possible. Condition of Certification **BIO-5** describes a Worker Environmental Awareness Program that would be required to ensure that construction personnel do not cause additional impacts biological resources during construction of the project. Condition of Certification **BIO-6** describes a Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) that would be prepared by the applicant that describes all measures necessary to ensure compliance with LORS and minimization of impacts related to special-status species and other biological resources. Condition **BIO-7** requires a closure plan, which discusses restoration of the site following project closure. Condition of Certification **BIO-8** requires the applicant to incorporate feasible measures to avoid impacts to biological resources in the project design. Condition of Certification **BIO-9** outlines measures designed to avoid harassment and harm to wildlife during construction of the project.

The applicant reported that Joshua trees and cacti, which are protected by local ordinances, are sparsely distributed throughout the power plant site and estimated that several hundred of these plants would be directly impacted by the project (ENSR 2007d). The AFC does not state whether any protected creosote rings with diameters of ten feet or greater occur in the project area or whether creosote rings were looked for during surveys. Impacts to these desert native plants is significant, and the applicant has proposed to mitigate through plant salvage, which involves relocating plants offsite to agency-approved locations, donating plants to local adoption programs, and/or transplanting plants onsite for landscaping/restoration purposes (Victorville 2007a). The applicant's "pre-determined, agency-approved locations" for plant translocation are not specified in the AFC. Staff intends to resolve this issue through data requests. The applicant's proposed mitigation has been incorporated into Condition of Certification **BIO-15**, which requires a desert native plant protection, compensation, or salvage plan to reduce this impact to a less than significant level.

Four special-status plant species have potential to occur at the power plant site: small-flowered androstephium, Booth's evening-primrose, sagebrush loeflingia, and Mojave monkeyflower. These plants can grow in Mojave creosote bush scrub (or in adjacent washes) but are typically associated with sandy and/or gravelly soils, which are not extensive on the site (Victorville 2007a). Due to the low rainfall year, these species' occurrence could have been missed during the applicant's 2007 surveys. In addition, the entire project site was not surveyed for rare plants. As mitigation for this potentially significant impact, the applicant proposed conducting a pre-construction survey for rare plants (concurrent with wildlife surveys), avoiding construction in washes and drainages, and notifying CDFG ten days prior to construction regarding salvage of any rare plants located (Victorville 2007a, Victorville 2007c). In addition, the applicant stated the following regarding special-status cacti (short-joint beavertail and Mojave fish-hook cactus) that could be found onsite, "they would either be avoided by construction or transplanted along with all of the other cacti as required by San Bernardino County ordinance and the Native Desert Plant Protection Act" (Victorville 2007a). Staff has incorporated these measures into Condition of Certification **BIO-14**, which requires the applicant to conduct a rare plant survey next spring (2008) to assess rare plant impacts and determine further mitigation measures if rare plants are present. However, staff has added additional potential mitigation measures (e.g., preservation of existing occurrences, creation of offsite occurrences through transplantation or seed collection) in the event that rare plants are located in the project area and loss of plants is unavoidable. If necessary, the details of a rare plant mitigation plan would be included in the project's BRMIMP (**BIO-6**).

Mojave creosote bush scrub at the power plant site provides suitable habitat for the following special-status wildlife species: desert tortoise, Mohave ground squirrel, burrowing owl, and other nesting birds. Power plant construction could result in direct and indirect impacts to these species due to habitat loss or injury/fatality of individuals because their presence on site was confirmed by protocol-level surveys (Victorville 2007a, Moore 2007). The Bureau of Land Management (BLM) estimated that public land adjacent to the project contained as many as 20 desert tortoises per square mile in 1984 (Victorville 2007a). Critical habitat for desert tortoise is located approximately three miles north of the power plant site, but no direct impacts to critical habitat are expected. The applicant also observed several other special-status migratory bird species (e.g., Costa's hummingbird, Le Conte's thrasher, bald eagle, loggerhead shrike) foraging in the project area that could experience direct impacts due to loss of foraging habitat. In addition, non-native grassland and developed/disturbed areas provide nesting habitat for ground-nesting birds (Victorville 2007a). The loss of active bird nests or young is regulated by the federal Migratory Bird Treaty Act and Fish and Game Code section 3503. These impacts are significant, and the applicant has proposed mitigation that is discussed below and incorporated into staff's Conditions of Certification, to avoid and minimize impacts to nesting birds, special-status wildlife, and other biological resources on the power plant site.

The applicant proposes to mitigate direct impacts to desert tortoise, Mohave ground squirrel, burrowing owl, and other nesting bird species through the following measures: federal ESA Section 7 consultation with USFWS whereby a Biological Opinion would be issued for desert tortoise, state ESA Section 2080.1 concurrence with the Biological Opinion for desert tortoise from CDFG, state ESA Section 2081 Incidental Take Permit for Mohave ground squirrel from CDFG, offsite habitat compensation, and species-specific impact minimization measures (e.g., relocation guidelines, exclusion fencing, raven control plan, injury reporting) (Victorville 2007a). Staff agrees with the applicant's proposed mitigation and has incorporated into Conditions of Certification **BIO-10** (Nesting or Migratory Bird Surveys and Impact Avoidance), **BIO-11** (Desert Tortoise Protection), **BIO-12** (Mohave Ground Squirrel Protection), and **BIO-13** (Burrowing Owl Impact Avoidance and Minimization Measures). The draft Biological Assessment does not specify proposed mitigation ratios, acreages, or locations of proposed mitigation land (ENSR 2007b). Other terms and conditions will be determined in the ESA consultation process and included in either the Final Staff Assessment upon receipt of the Biological Opinion or the project's final BRMIMP. The applicant's draft Biological Assessment has been deemed data adequate, and a draft Biological Opinion is being prepared and anticipated to be completed in November 2007 (Bransfield 2007a).

Water quality in the Mojave River could be impacted by discharge of toxic materials released during construction, or migration of any existing toxic materials present in the subsurface soils and groundwater into stormwater runoff from the project site. During and after construction, drainage and sedimentation control measures would be implemented to limit the discharge of potentially contaminated sediment from the site. The **SOIL AND WATER RESOURCES** section provides a more detailed discussion of potential soil, water quality, and aquifer recharge issues in relation to the Mojave River and recommends Conditions of Certification to avoid or minimize impacts.

Construction Staging Areas

Two temporary construction staging areas would be located just south and west of the power plant site. These two areas would be cleared of vegetation and covered with gravel. A total of 50 acres of Mojave creosote bush scrub would be removed, and this direct impact is considered permanent due to the length of time required for vegetation to re-establish. Because these areas provide habitat to the sensitive species such as the desert tortoise and the Mohave ground squirrel, staff concludes there would be significant impacts to biological resources during the establishment and use of the proposed construction staging area. The Conditions of Certification discussed above are designed to mitigate impacts to a less than significant level.

Transmission Line

The project's transmission line is divided into three segments. Segment 1 extends south from the power plant site for approximately 4.3 miles and connects to the existing High Desert Power Plant and the Southern California Edison (SCE) regional grid (Victorville 2007a). The following plant communities would be directly impacted in this segment: Mojave creosote bush scrub (7 acres permanent, 2 acres temporary), desert saltbush scrub (less than one acre permanent), and developed/disturbed land (4 acres permanent, 0.2 temporary). These habitats are suitable for the same special-status species as those discussed above for the power plant site, direct impacts are considered significant, and the same Conditions of Certification are proposed to mitigate impacts.

Unlike the power plant site, Segment 1 contains 40 ephemeral washes, which have been avoided in the current project design by spanning transmission conductors over the washes (Victorville 2007a, 2007c). If the project is later unable to avoid washes, the applicant would likely need the following permits: Clean Water Act Section 401 certification from the Regional Water Quality Control Board, Section 404 permit from the U.S. Army Corps of Engineers, and Streambed Alteration Agreement from CDFG. However, because the applicant has avoided these features, staff has not included specific Conditions of Certification. In addition, the applicant estimates that approximately 100 square feet of desert saltbush scrub that could potentially support San Emigdio blue butterfly, which is not state or federally listed but considered sensitive by CDFG (2007), would be permanently impacted in the construction of two transmission towers (Victorville 2007a). This impact is considered insignificant due to the small area of potential impact, avoidance of suitable wash habitat, and the habitat restoration that has been proposed by the applicant. Similarly, Mojave River vole could also be directly impacted by activities in this segment. However, this potential impact is mitigated to a less than significant level by applicant-proposed avoidance of washes and biological monitoring.

Segment 2 is 5.7 miles in length, located within an existing right-of-way (ROW), ends at SCE's Victor Substation, and involves the installation of three new transmission towers. Mojave creosote bush scrub habitat would be permanently (0.13 acre) and temporarily (2 acres) impacted. Ten ephemeral washes would be avoided during installation. Potentially significant impacts could occur, so proposed Conditions of Certification are the same as those discussed for the power plant site.

Portions of Segments 1 and 2 are located within 150 feet of designated critical habitat for the southwestern willow flycatcher (Victorville 2007a). Impacts to critical habitat would be considered significant; therefore, the applicant has proposed timing construction of the reclaimed water pipeline and transmission line work near the Mojave River's riparian vegetation outside this species' nesting season (February 15 – August 31) as well as biological monitoring, which has been incorporated into staff's Conditions of Certification (Victorville 2007a).

Segment 3 is also located in an existing ROW and extends 11 miles south to the SCE Lugo Substation. Mojave creosote bush scrub habitat would be permanently (0.13 acre) and temporarily (32 acres) impacted, and the species impacts and proposed mitigation are similar to the power plant site. Five ephemeral washes would be avoided during installation (Victorville 2007a). In addition, Mojavean juniper woodland and scrub would be permanently (0.17 acre) and temporarily (23 acres) impacted. This plant community provides potentially suitable habitat for a state species of concern, the coast (San Diego) horned lizard. However, the applicant has proposed avoidance of suitable wash habitat, biological monitoring during construction activities, and habitat restoration to mitigate potential direct impacts to the species. An historic (1953) museum specimen of yellow warbler, a state species of concern, was mapped by the CNDDB as a non-specific (1-mile circle) near Segment 3's terminus (CDFG 2007). However, no impacts to this species are expected because no suitable nesting habitat exists within Segment 3.

Conditions of Certification **BIO-1** through **BIO-15** would be needed to mitigate impacts related to the transmission line.

Pipelines

The reclaimed water supply pipeline is located immediately adjacent to the Mojave River. Installation of the pipeline would result in the permanent loss of 2.5 acres of Mojave creosote bush scrub, causing the same impacts as at the power plant site, with the exception of impacts to the southwestern pond turtle, which could occur in the VVWRA wastewater treatment facility ponds and to riparian nesting birds within the Mojave River. Mitigation for riparian nesting birds was discussed in the transmission line section. Additional discussion of impacts related to the Mojave River is provided in the **SOIL AND WATER** section. The applicant proposes to avoid potential impacts to southwestern pond turtle by avoiding impacts to the treatment ponds and conducting biological monitoring during construction activities. The sanitary wastewater pipeline is approximately 1,000 feet west of the Mojave River at its closest point and would permanently impact three acres of Mojave creosote bush scrub. There are two ephemeral washes, which would be avoided during installation.

No additional impacts to biological resources beyond those discussed for the power plant site would result from the natural gas and potable water supply lines because they would connect with existing lines in graded roadways adjacent to the power plant site lacking biological resources and are covered in the previous discussion.

Light

Under certain circumstances, lights can disorient migratory birds flying at night, or attract wildlife such as insects and insect-eaters. An increase in light and glare at the site is expected to occur during construction and operation of the project. During periods when nighttime construction would take place, illumination that meets state and federal worker safety guidelines would be required (Victorville 2007a). Nighttime lighting would be directed onsite, and non-glare fixtures, task-specific lighting, shields, and devices to minimize lighting time would be used to minimize significant light and glare (Victorville 2007a). Because the project is located just north of the SCLA, an existing source of light and the project description includes light minimization measures (see Conditions of Certification in the **VISUAL RESOURCES** section), staff concludes there would be no significant impacts to sensitive species from the lighting associated with construction and operation of the new facility.

Noise

The site's ambient noise comes from local street traffic, occasional aircraft from SCLA (approximately one mile away), off-highway vehicles, and natural sounds (Victorville 2007a). Construction activities would result in elevated noise levels at the project site. Excessive noise levels can cause birds to abandon nests and associated vibration can result in the collapse of burrows. The U.S. Fish and Wildlife Service (USFWS) has communicated to Energy Commission staff that loud construction noise and vibration could affect burrowing owls (USFWS 2006a). These previous discussions focused on pile-driving. Although it does not appear in the current project description, it is unclear from data responses in other technical areas whether pile-driving would occur during power plant construction. The applicant has proposed mitigation, such as timing construction outside the breeding season and conducting biological monitoring, to minimize the direct impact of noise to sensitive biological resources surrounding the site such as those associated with riparian areas (i.e., reclaimed water pipeline in VVWRA treatment facility) (Victorville 2007a). Staff has also included Condition of Certification **BIO-13**, which specifies setbacks or barriers, to mitigate potential noise-related impacts to burrowing owl. With the species-specific mitigation discussed above, staff concludes there would be no significant impacts to biological resources from increased construction noise.

Operation Impacts and Mitigation

Potential operation impacts include impacts to birds due to collision with and/or electrocution by the transmission line, disturbance to wildlife due to increased noise and lighting, desert tortoise impacts from increased road traffic, and impacts to vegetation and rare plants from the power plant's air emissions.

Bird Collisions and Electrocutions

Birds are known to collide with transmission lines and other elevated structures, causing injury and fatality. It is possible that birds could collide with the transmission lines. However, staff does not believe such impacts would be significant because the project lacks tall, guyed antennas typically associated with bird collisions, and the project area rarely has poor visibility weather conditions like coastal fog (Victorville 2007a). The project is also located in an area not known for large flocks of migratory waterfowl. The applicant has also proposed a “raptor-friendly” construction design for the transmission line with conductor wire spacing greater than the wingspans of large birds to help prevent electrocution as described in *Suggested Practices for Raptor Protection on Power Lines*: *The State of the Art in 2006* (APLIC 2006). With the proposed mitigation addressed in Condition of Certification **BIO-8,** staff concludes that the proposed transmission lines would not pose a significant collision or electrocution threat to bird populations.

Noise and Lighting

Impacts from noise and lighting due to operation of the project are not expected to be significant. Although plant operations would create additional noise, the type of noise would be generally consistent with the site’s ambient noise from local street traffic, occasional aircraft from SCLA, off-highway vehicles, and natural sounds, and it is likely that resident animals in the area would be able to habituate to routine noise. Similarly, impacts to biological resources due to lighting are not expected to be significant. Non-glare fixtures and restriction of lighting to areas in which it is needed would minimize impacts of lighting to biological resources. Noise and light impacts to resident and migratory wildlife may be partially mitigated by Conditions of Certification **BIO-8** through **BIO-10**. **BIO-8** requires the applicant to implement impact avoidance features, such as preventing side casting of light. **BIO-9** outlines mitigation measures to avoid harassment or harm of sensitive wildlife, such as prohibiting pets on the project site. **BIO-10** requires the applicant to conduct nesting or migratory bird surveys and schedule work outside the nesting season or establish buffers to avoid impacts.

Increased Traffic

The applicant has stated that portions of Adelanto Road and Colusa Road would be paved just prior to construction initiation, and the access plan would result in increased traffic along these roads (Victorville 2007c). Staff believes that paving part of Helendale Road may also be included as part of the project to facilitate access to the solar array and mitigate air quality impacts. Although the length of road proposed for paving is not specified in the revised site access route discussion (Traffic and Transportation Data Response 85, Victorville 2007c, Victorville 2007e), staff estimates approximately six miles of paving assuming all three roads would be paved. Paving roads generally facilitates increased driving speeds, which may not allow enough time for vehicles to stop or safely swerve to avoid collisions with slow-moving wildlife such as the state and federally listed desert tortoise. The applicant has not proposed tortoise-exclusion fencing along these roads, but staff is discussing the need for this additional mitigation measure with wildlife agency staff. It is possible that this additional mitigation measure will be necessary and added to the Final Staff Assessment.

Cooling Tower Drift

Cooling tower drift is the fine mist of water droplets that escape the cooling tower's mist eliminators and are emitted into the atmosphere. Cooling towers concentrate the particulates (total dissolved solids) during the cooling process and produce a salt mist. At high concentrations, salts can physically damage leaf cells, which affect the photosynthetic ability of the plant. Other effects include blocking the stomata (leaf pores) so that normal gas exchange is impaired, as well as affecting leaf adsorption and solar radiation reflectance. These effects can reduce productivity in crops, trees, and sensitive special-status plant species in a deposition area. Given the absence of crops adjacent to the project and low emissions of dissolved solids in the project cooling water (Victorville 2007a), no impacts to biological resources are expected due to cooling tower drift, and no mitigation is proposed.

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, section 15130).

The High Desert Power Plant currently operates within the vicinity of the proposed power plant. The Cities of Victorville and Adelanto are rapidly developing. Several known projects in the area will convert undeveloped lands: a 1,600-acre intermodal railway facility located at SCLA, extensive housing to the east and south, expansion/relocation of Highway 395 to the east, public land conversion to private for development purposes to the north, and retrofitting/expansion of the TXI Cement Plant east of the Mojave River (ENSR 2007b).

Habitat loss, degradation, and fragmentation are significant cumulative impact issues that were identified in BLM's West Mojave Plan (ENSR 2007b). Victorville 2 would further decrease the undeveloped acreage available in the area that is available for special-status species such as the desert tortoise, Mohave ground squirrel, and burrowing owl. Loss of Mohave ground squirrel habitat is of particular concern with respect to cumulative impacts due to its relatively small range. Loss of acreage would be mitigated by the project, but habitat fragmentation concerns have the potential to remain as cumulative residual impacts depending on the location, quality, and quantity of available mitigation lands determined in the ESA consultations. The applicant has indicated that mitigation would occur "…according to regulatory agency guidelines and conform to the long-term biological reserve design identified in the West Mojave Plan" (Victorville 2007a). If suitable land is available to implement this biological reserve design, staff would conclude that cumulative impacts will not be significant. However, limited availability of sufficient, suitable, and contiguous mitigation land is likely to pose significant challenges to mitigating cumulative impacts to biological resources in the region.

COMPLIANCE WITH LORS

Staff's Conditions of Certification address compliance with applicable LORS, including the San Bernardino County General Plan and City of Victorville General Plan. The West Mojave Plan, the framework for a multi-agency Habitat Conservation Plan to be completed in 2008, would only apply if the Biological Opinion calls for translocation of tortoises to public land. There are no Significant Natural Areas or Designated Ecological Reserves in the project area. BLM's Fremont-Kramer Desert Wildlife Management Area is located three miles north of the project and is co-located with desert tortoise critical habitat. Most of the designated critical habitat units in the area are located three miles or farther from the project and unlikely to be affected by Victorville 2. However, critical habitat for the southwestern willow flycatcher is within 150 feet of portions of Segments 1 and 2 of the transmission line. Timing of construction outside nesting season and biological monitoring would mitigate potential impacts to this critical habitat. Staff needs more information to complete the Final Staff Assessment and make a conclusion regarding compliance with applicable LORS.

NOTEWORTHY PUBLIC BENEFITS

There are no noteworthy public benefits to biological resources from construction of Victorville 2.

FACILITY CLOSURE

In the future, Victorville 2 will experience either a planned closure or be unexpectedly (either temporarily or permanently) closed. When facility closure occurs, it must be done in such a way as to protect the environment and public health and safety. A closure plan would be prepared by the project owner prior to any planned closure. 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 staff assessment. Facility closure mitigation measures would also be included in BRMIMP prepared by the project owner.

The facility closure plan should address habitat restoration measures to be implemented in the event of a planned or an unexpected permanent closure. 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.

Condition of Certification **BIO-7** contains measures that need to be implemented to ensure that impacts to biological resources are addressed prior to the planned permanent or unexpected permanent closure of the project.

CONCLUSIONS

The Conditions of Certification proposed in this analysis are necessary to mitigate impacts to biological resources from the project to less than significant levels. The applicant has avoided some construction and operation impacts by spanning jurisdictional waters and thereby avoiding impacts to associated biological resources. Clearing of the project site and construction of the power plant and associated linear facilities would result in potentially significant impacts to special-status wildlife and plants. Staff is unable to conclude whether impacts to biological resources during construction and operation of Victorville 2 would be mitigated to less than significant levels due to the lack of information described below.

Modifications to the applicant's proposed mitigation may be necessary based on the USFWS Biological Opinion, and CDFG concurrence and Incidental Take Permit. Additional Conditions of Certification or modifications to currently proposed Conditions of Certification may be necessary based on further consultation with agency personnel and information provided prior to completion of staff's Final Staff Assessment. For staff to complete the Final Staff Assessment, the following information is needed from the applicant and will be addressed in the Preliminary Staff Assessment workshop.

- Details on proposed "pre-determined, agency-approved" desert native plant relocation areas and plant adoption centers/programs referenced in the AFC.
- Information on the species, impacts, mitigation, and likely amount of habitat compensation required by USFWS and evidence that it is acceptable to USFWS.
- Information on the species, impacts, mitigation, and likely amount of habitat compensation required by CDFG and evidence that it is acceptable to CDFG.

In addition, staff is awaiting agency input regarding the need for desert tortoise-exclusion fencing along Colusa Road, Helendale Road, and Adelanto Road.

PROPOSED CONDITIONS OF CERTIFICATION

Designated Biologist Selection

BIO-1 The project owner shall assign a 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.

The Designated Biologist must meet the following minimum qualifications:

1. Bachelor's Degree in biological sciences, zoology, botany, ecology, or a closely related field; and
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; and
3. At least one year of field experience with biological resources found in or near the project area.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, 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 site (or related facilities) mobilization. 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 ten 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 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.

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 wetlands and 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 Report; and

9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, and all permits.

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 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 their duties are ceased 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. The resume shall demonstrate, to the satisfaction of the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks.

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the Conditions of Certification, BRMIMP, WEAP, 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 site (or related facilities) mobilization. The Designated Biologist shall submit a written statement to the CPM confirming that individual Biological Monitor(s) have 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 ten days prior to their first day of monitoring activities.

Designated Biologist and Biological Monitor Authority

BIO-4 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.

If required by the Designated Biologist and Biological Monitor(s) the project owner's construction/operation manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist.

The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;

2. Inform the project owner and the construction/operation manager when to resume activities; and

3. Notify 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.

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 following morning of 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-5 The project owner shall develop and implement a CPM-approved WEAP in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, ground disturbance, grading, construction, operation, and closure are informed about sensitive biological resources associated with the project.

The WEAP must:

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;

3. Present the reasons for protecting these resources;

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 they received training and shall abide by the guidelines.

The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.

Verification: At least 60 days prior to the start of any site (or related facilities) mobilization, the project owner shall provide to the CPM two copies of the proposed 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 ten days prior to site and related facilities mobilization submit two copies of the CPM-approved materials.

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.

During project operation, signed statements for operational personnel shall be kept on file for six months following the termination of an individual's employment.

Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP)

BIO-6 The project owner shall develop a 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 be prepared in consultation with the Designated Biologist and shall identify:

1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;
2. All biological resources Conditions of Certification identified as necessary to avoid or mitigate impacts;
3. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion and CDFG Incidental Take Permit;
4. All biological resources mitigation, monitoring and compliance measures required in other state agency terms and conditions, such as those provided in the RWQCB permit (if needed);
5. All sensitive biological resources to be impacted (e.g., desert tortoise, Mohave ground squirrel, Joshua trees and cacti), avoided (e.g., southwestern pond turtle, San Diego coast horned lizard, Mojave River vole, San Emigdio blue butterfly), or mitigated by project construction, operation and closure;
6. All required mitigation measures for each sensitive biological resource;
7. A raven control plan;

8. A rare plant mitigation plan, if rare plants are found during pre-construction surveys;

9. A wetland mitigation plan for temporary and permanent impacts to state and federal jurisdictional waters. This component is only needed if project changes affecting jurisdictional waters occur after project licensing;

10. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities (e.g., restoration of desert saltbush scrub habitat for San Emigdio blue butterfly);

11. 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;

12. 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;

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

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

15. All performance standards and remedial measures to be implemented if performance standards are not met;

16. A discussion of biological resources-related facility closure measures including a description of funding mechanism(s);

17. Restoration and re-vegetation plan including a plan that addresses protection, compensation, or salvage methods for Joshua trees, cacti, and creosote rings;

18. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval; and

19. A copy of all biological resources-related permits obtained.

Verification: The project owner shall provide the specified document at least 60 days prior to start of any site (or related facilities) mobilization.

The CPM, in consultation with other appropriate agencies, will determine the BRMIMP's acceptability within 45 days of receipt. If there are any permits that have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to the CPM within five days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition within ten days of their receipt by the project owner. Ten days prior to site and related facilities mobilization the revised BRMIMP shall be resubmitted to the CPM.

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 (e.g., rare plant and burrowing owl survey results, 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 closure 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.

Closure Plan Measures

BIO-7 The project owner shall incorporate into the permanent or unexpected permanent closure plan and the BRMIMP measures that address the local biological resources related to facility closure.

The planned permanent or unexpected permanent closure plan shall address biological resources-related mitigation measures. Typical measures are below:

1. Removal of transmission conductors when they are no longer used and useful;

2. Removal of all power plant site facilities and related facilities;

3. Measures to restore wildlife habitat to promote the re-establishment of native plant and wildlife species; and

4. Re-vegetation of the project site and other disturbed areas utilizing appropriate seed mixture.

The closure plan that shall also include a cost estimate to complete closure-related activities and evidence of a funding mechanism (e.g., bond or “sinking” fund) to minimize risk and ensure the implementation of measures.

Verification: Draft permanent or unexpected closure measures shall be made part of the BRMIMP. At least 12 months prior to commencement of 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 Biological Resources Element shall be incorporated into the Facility Closure Plan and include a complete discussion of the local biological resources and proposed facility closure mitigation measures and funding source(s) for these measures.

Impact Avoidance Mitigation Features

BIO-8 Any time the project owner modifies or finalizes the project design they shall incorporate all feasible measures that avoid or minimize impacts to the local biological resources, including the following:

1. Design, install and maintain transmission line poles, access roads, pulling sites, and storage and parking areas to avoid identified sensitive resources;

2. Avoid impacts to jurisdictional waters;

3. Design, install, and maintain transmission lines and all electrical components in accordance with the Avian Power Line Interaction Committee's (APLIC) *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* to reduce the likelihood of electrocutions of large birds;

4. Design, install, and maintain transmission lines and all electrical components in accordance with the APLIC *Mitigating Bird Collisions with power lines: The State of the Art in 1994* to reduce the likelihood of bird collisions;

5. Eliminate any California Exotic Pest Plants of Concern List A species from landscaping plans;

6. Prescribe a road surfacing and sealant as well as soil bonding and weighting agents to non-paved surfaces that are non-toxic to wildlife and plants; and

7. Design, install, and maintain facility lighting to prevent side casting of light towards wildlife habitat.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. Implementation of the measures will be reported in the Monthly Compliance Reports by the Designated Biologist. Within thirty 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.

Mitigation Management to Avoid Harassment or Harm

BIO-9 The project owner shall implement the following measures to manage their construction site and related facilities in a manner to avoid or minimize impacts to local biological resources:

1. Install temporary fencing and provide wildlife escape ramps for construction areas that contain steep walled holes or trenches if outside of an approved, permanent exclusionary fence. The temporary fence shall be hardware cloth or similar materials that are approved by USFWS and CDFG;

2. Conduct maintenance monitoring of permanent desert tortoise-exclusion fencing on a monthly basis and complete repairs within one week of problem identification. Temporary fencing must be installed at any gaps if it shall remain open over night. Submit records of all monitoring dates, identify repair locations, and corrective actions in the Monthly Compliance Report and Annual Compliance Report;

3. Make certain all food-related trash is disposed of in closed containers and removed at least once a week;

4. Prohibit feeding of wildlife by all workers;

5. Prohibit non-security-related firearms or weapons from being brought to the site;

6. Prohibit pets from being brought to the site;

7. Report all deaths of sensitive species to the appropriate project representative. Injured animals shall be reported to CDFG and the project owner shall follow instructions that are provided by CDFG; and

8. Minimize use of rodenticides and herbicides in the project area and prohibit the use of chemicals and pesticides known to cause harm to amphibians.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP. 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.

Nesting or Migratory Bird Surveys and Impact Avoidance

BIO-10 The project owner shall implement the following measures to avoid or minimize impacts to nesting birds:

1. If ground disturbance activities will occur during the nesting season (generally February 1 – August 31) of birds potentially inhabiting the power plant site, such as Le Conte's thrasher and loggerhead shrike, survey for nesting birds in the project area, 30 days prior to the start of initial ground disturbance activities to assess presence and need for further mitigation.

2. Complete a pre-construction survey for other nesting birds in the remainder of the project area (e.g., linear facilities) in the spring and no less than 30 days prior to the start of initial ground disturbance activities.

3. If active, occupied nests are found, schedule work outside nesting periods or prohibit work within 500 feet of raptor nests or 200 feet of other species' nests including southwestern willow flycatcher, least Bell's vireo, western

yellow-bird cuckoo, and other special-status birds that could nest in riparian habitat associated with the Mojave River.

4. Common raven nests in desert tortoise habitat shall be removed as part of desert tortoise mitigation during the non-nesting period in consultation with USFWS and CDFG.

Verification: 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 the BRMIMP, which includes nesting bird survey results and any necessary impact avoidance measures. All modifications to the approved BRMIMP must be made only after consultation with the CPM and CDFG. The project owner shall notify the CPM five working days before implementing any modifications to the BRMIMP.

Desert Tortoise Protection and Compensation

BIO-11 The project owner shall acquire a Biological Opinion from the USFWS and concurrence from the CDFG, and incorporate all terms and conditions into the project's final BRMIMP. The project owner will secure appropriate habitat compensation as determined in the Endangered Species Act consultation process. The project owner will implement the mitigation measures identified in Biological Resources Section 6.4 and Appendix H of the Application for Certification (Victorville 2007a), responses to data requests (ENSR 2007d), and the Draft Biological Assessment (ENSR 2007b). Such measures include installing permanent, desert tortoise-exclusion fencing that extends below ground and a raven control plan. The project owner's mitigation measures shall be incorporated into the final BRMIMP unless they conflict with terms and conditions required by the USFWS or CDFG within their respective Biological Opinion or concurrence.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the USFWS Biological Opinion and the final CDFG concurrence. The project owner shall also provide the CPM written verification that the required habitat compensation has been acquired.

Mohave Ground Squirrel Protection and Compensation

BIO-12 The project owner shall acquire an Incidental Take Permit from the CDFG, and incorporate all terms and conditions into the project's final BRMIMP. The project owner will secure appropriate habitat compensation as determined in the Endangered Species Act consultation process and implement the mitigation measures identified in Biological Resources Section 6.4 and Appendix H of the Application for Certification (Victorville 2007a), responses to data requests (ENSR 2007d), and the Draft Biological Assessment (ENSR 2007b). The project owner's mitigation measures shall be incorporated into the final BRMIMP unless they conflict with terms and conditions required by the Incidental Take Permit.

Verification: At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the final

CDFG Incidental Take Permit. The project owner shall also provide the CPM written verification that the required habitat compensation has been acquired.

Burrowing Owl Impact Avoidance and Minimization Measures

BIO-13 The project owner shall implement the following measures for the burrowing owl:

1. Complete a pre-construction survey for burrowing owls on the project site and linear facilities no less than 30 days prior to the start of initial ground disturbance activities. If burrowing owls are present within 500 feet of the project site or linear facilities, then the CDFG burrowing owl guidelines (1995) shall be implemented;

2. Monitor burrowing owl pairs within 500 feet of any activities that exceed ambient noise and/or vibration levels;

3. Establish a 500-foot set back from any active burrow and construct additional noise/visual barriers (e.g., haystacks or plywood fencing) to shield the active burrow from construction activities. Post signs (in both English and Spanish) designating presence of sensitive area;

4. Consult with CDFG to determine compensation ratio(s) for direct loss of nesting and foraging habitat;

5. If one-way doors are used to exclude burrowing owls, the burrows shall be monitored and hand excavated to ensure the individual has evacuated the burrow prior to ground disturbing activities; and

6. If a burrowing owl is occupying an active burrow within the project site or linear facilities and requires passive relocation, mitigation in the form of artificial burrows should be mitigated at a 2:1 ratio. Newly constructed artificial burrows should be installed in an adjacent protected area that provides a minimum of 6.5 acres per pair or solitary owl around the site (CDFG 1995, 2006). Construction and installation of burrows should be done in consultation with CDFG.

Verification: The project owner shall submit a report to CDFG and USFWS at least 14 days prior to the start of site mobilization that describes when surveys were completed, what was observed, mitigation measures and the results of the measures. If artificial burrows need to be installed, the project owner shall coordinate with and report to CDFG on the number of new burrows, their locations, and how the new wildlife will be protected for the life of the project. The end-of-construction report shall be provided to the CPM, CDFG, and USFWS at least 30 days prior to the start of commercial operation.

Rare Plant Survey and Impact Avoidance

BIO-14 A qualified botanist shall survey for rare plants on the power plant site and in suitable habitat along linear facilities in the spring (and other appropriate identification periods if needed) according to the California Native Plant Society's Botanical Survey Guidelines (CNPS 2001). If no rare plants are found, the botanist shall document this in the Monthly Compliance Report, and no further mitigation will be required.

If any rare plants are found, the following measures shall be implemented:

1. If the plants can be avoided, they will be clearly marked in the field by a qualified botanist for avoidance during construction activities.

2. If avoidance is not possible, consult with the Energy Commission and CDFG to develop a mitigation plan, which could include salvage of plants by CDFG a minimum of ten days prior to construction, creation of offsite occurrences through transplantation or seed banking, preservation and enhancement of existing occurrences, and/or restoration or creation of suitable habitat in sufficient quantities to compensate to for the impact(s).

3. Incorporate the mitigation plan into the final BRIMIMP.

Verification: At least 30 days prior to start of any project-related ground disturbance activities, the project owner shall perform a survey for rare plants. The survey results, and if rare plants are present, the actions taken to avoid, minimize, or compensate for any rare plants located, shall be documented in the Monthly Compliance Report by the Designated Biologist, and that report submitted to the CPM. This mitigation plan shall be approved by the CPM and CDFG and incorporated into the final BRMIMP.

Joshua Tree, Cacti, and Creosote Ring Protection

BIO-15 The project owner shall incorporate into the BRMIMP a plan that address the protection of Joshua trees, cacti, and creosote rings as well as obtain the necessary permits related to impacting these plants.

The desert native plant protection, compensation, and salvage plan shall address measures including but not limited to those below:

1. An inventory of Joshua trees, cacti, and creosote rings (≥10 feet in diameter);

2. Plant relocation/removal plan;

3. Plant avoidance or protection measures;

4. Landscaping plan;

5. Re-vegetation plan;

6. Transplantation measures and success criteria;

7. Compensation methods;

8. Maps showing agency-approved plant relocation areas; and

9. Contact information for local plant adoption programs or nurseries, if used.

Verification: At least 30 days prior to start of any project-related ground disturbance activities, the project owner shall perform an inventory of Joshua trees, cacti, and creosote rings. The survey results, and actions taken to avoid, minimize, or compensate for impacts, shall be documented in the Monthly Compliance Report by the Designated Biologist, and that report submitted to the CPM. The desert native plant protection, compensation, and salvage plan shall be made part of the BRMIMP. At least 30 days prior to the start of any site or related facilities mobilization activities, the project owner shall submit to the CPM a copy of the permits authorizing removal/relocation of these plants from the County, the city of Victorville, and the city of Hesperia, as necessary.

REFERENCES

APLIC (Avian Power Line Interaction Committee) 1994. Mitigating Bird Collisions with Power Lines: the State of the Art in 1994. Edison Electric Institute. Washington, DC.

APLIC (Avian Power Line Interaction Committee) 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, CA.

Armstrong, W. P. 2007. "Botanical Record-Breakers (Part 1 of 2) Amazing Trivia About Plants." Available at http://waynesword.palomar.edu/ww0601.htm. Accessed on September 27, 2007.

Bransfield, R. 2007a. Personal Communication between Misa Ward and Ray Bransfield, USFWS regarding the status and schedule of the Victorville 2 Biological Opinion. September 29, 2007.

Bransfield, R. 2007b. Personal Communication between Misa Ward and Ray Bransfield, USFWS regarding potential Nitrogen deposition impacts to sensitive species. October 1, 2007.

CDFG (California Department of Fish and Game). 1995. Staff Report on Burrowing Owl Mitigation. 9 pp.

CDFG (California Department of Fish and Game). 2006. Comment letter written by Kimberly Nicol in response to Application for Small Power Plant Exemption for the El Centro Gas Turbine Plant. May 10, 2006.

CDFG (California Department of Fish and Game) 2007. California Natural Diversity Data Base (CNDDB). Search of the Adelanto, Baldy Mesa, Helendale, Hesperia, Victorville, Victorville NW, and Silverwood Lake 7.5-minute USGS quadrangles. CNDDB's RareFind June 2007 government edition.

CEC 2007f - California Energy Commission/J. Kessler (tn: 41119). Data Request Set 1 (#s1 – 110). 6/22/07. Received 6/22/07.

CNPS (California Native Plant Society) 2001. CNPS Botanical Survey Guidelines. Sacramento, CA. December 9, 1983, revised June 2, 2001.

CNPS (California Native Plant Society) 2007. California Native Plant Society's Online Inventory of Rare and Endangered Plants of California. Available at: <www.cnps.org/inventory>. Accessed July 30, 2007.

CURE 2007a – California Unions for Reliable Energy/G. Smith (tn: 40951). CURE's Data Request Set 1. Received 6/12/07

CURE 2007b – California Unions for Reliable Energy/G. Smith (tn: 41778). CURE's Data Request Set 2. Received 7/30/07

ENSR 2007b – ENSR/S. Head (tn:40410). Draft Biological Assessment. Received 5/3/07.

ENSR 2007c – ENSR/S. Head (tn:41481). Response to CURE's Data Request Set 1. Received 7/12/07.

ENSR 2007d – ENSR/S. Head (tn:42131). Response to CURE's Data Request Set 2. 8/28/07. Received 8/29/07.

Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish Game, Sacramento.

LW 2007d - Latham & Watkins LLP/M. Carroll. Applicant's Objections to CURE's Data Request Set 2. Received 8/17/07.

LRWQCB 2007b – Lahontan Regional Water Quality Control Board/M. Dellavalle (tn: 40581). Data Request Set 1. 5/23/07. Received 5/24/07.

Moore, T. 2007 – Personal Communication between Misa Ward and Tonya Moore, Environmental Scientist, California Department of Fish and Game regarding Mohave ground squirrel occurrence, April 30, 2007.

USFWS 2005. "What is Critical Habitat?" Available at http://www.fws.gov/mountain-prairie/species/mammals/lynx/what%20is%20Critical%20Habitat.12.05.pdf. Accessed September 27, 2007.

USFWS 2006a - FWS-IMP-4754.2/C Roberts (37192) Concerns Regarding IID's Proposed El Centro Unit 3 Repower Project Email Dated 06/14/06. Submitted to Dockets on 06/26/06.

Victorville 2007a – City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vol. 1&2. 2/27/07. Received 2/28/07.

Victorville 2007b – City of Victorville (tn: 39934). Application for Certification Data Adequacy Supplement. Vol. 3. 4/6/07. Received 4/9/07.

Victorville 2007c – City of Victorville (tn: 41644). Applicant's Responses to CEC's Data Request Set 1, #s 1 – 110. 7/23/07. Received 7/23/07.

Victorville 2007e – City of Victorville. Supplementary Traffic And Transportation Evaluation To Address Site Vehicular Access Route Revision. Received 9/27/07.

CULTURAL RESOURCES

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SUMMARY OF CONCLUSIONS

Additional cultural resources surveys need to be completed on part of Segment 3 of the transmission line and along the route of the potable and back-up processing water pipeline. Because additional cultural resources may be found as a result of these surveys, staff cannot reach final conclusions about impacts to cultural resources. The applicant has indicated that reports on all of the additional field work will be provided early in December, 2007. Assuming that the new information does not indicate that the project would have significant impacts on cultural resources, staff expects to conclude as follows:

Staff has determined that the Victorville 2 Hybrid Power Project would not have a significant impact on known significant archaeological or ethnographic resources. With the adoption and implementation of the proposed Conditions of Certification **CUL-1** through **CUL-7**, the Victorville 2 project would not have a significant impact on potentially significant archaeological resources that may be discovered during construction. With the adoption and implementation of proposed Conditions of Certification **CUL-8** and **CUL-9**, the project's adverse impacts on a known significant standing structure would be mitigated to a level less than significant.

INTRODUCTION

This cultural resources assessment identifies the potential impacts of the proposed Victorville 2 Hybrid Power Project (Victorville 2) on cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, and historic districts. Three kinds of cultural resources are considered in this assessment: prehistoric, historic, and ethnographic.

Prehistoric archaeological resources are those materials relating to prehistoric human occupation and use of an area. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In the Mojave Desert region of California, the prehistoric period began over 11,500 years ago and lasted until 1776, the time when the first Europeans traveled through the project area.

Historic-period resources are those materials, archaeological and architectural, usually associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, buildings and structures, traveled ways, artifacts, or other evidence of human activity. Under federal and state requirements, historical cultural resources must be greater than 50 years old to be considered of potential historical importance. A resource less than 50 years of age may be historically important if the resource is of exceptional significance.

Ethnographic resources are those materials important to the heritage of a particular ethnic or cultural group, such as African Americans, Mexican Americans, Native

Americans, European, Asian, or Latino immigrants and their descendants. They may include traditional resource collecting areas, ceremonial sites, topographic features, cemeteries, shrines, or ethnic neighborhoods and structures.

For the proposed Victorville 2 project, staff provides an overview of the environmental setting and cultural history of the project area, an inventory of the cultural resources identified in the project vicinity, a consideration of the significance of those cultural resources, and an analysis of the effects of possible project impacts on those cultural resources, using significance criteria from the California Environmental Quality Act (CEQA). Where impacts to significant cultural resources, both known and not yet discovered, cannot be avoided, measures to mitigate the adverse effects on or loss of the resources are proposed. The primary concerns are to ensure that all potential impacts to cultural resources are identified and that conditions are imposed on the project that ensure that any significant impacts are reduced to less-than-significant levels.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects licensed by the California Energy Commission (Energy Commission) are reviewed to ensure compliance with all applicable laws. For this project, in which there is no federal involvement,1 the applicable laws are primarily state laws. Although the Energy Commission has pre-emptive authority over state and local laws, it typically ensures compliance with these laws, ordinances, regulations, standards, plans, and policies (**Cultural Resources Table 1**).

1 Cultural resources are indirectly protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, Section 431 et seq.) and subsequent related legislation, policies, and enacting responsibilities, e.g., federal agency regulations and guidelines for implementation of the Antiquities Act.

Cultural Resources Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	**Regulation**
State	
Public Resources Code, section 21083.2	The lead agency may require reasonable steps to preserve a unique archaeological resource in place. Otherwise, the project applicant is required to fund mitigation measures to the extent prescribed in this section. This section also allows a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, which may require the project applicant to fund mitigation and delay construction in the area of the find (CEQA).
California Code of Regulations, Title 14, section 15064.5, subsections (d), (e), and (f)	Subsection (d) allows the project applicant to develop an agreement with Native Americans on a plan for the disposition of remains from known Native American burials impacted by the project. Subsection (e) requires the landowner [possibly the project applicant] to rebury Native American remains elsewhere on the property if other disposition cannot be negotiated within 24 hours of accidental discovery and required construction stoppage. Subsection (f) directs the lead agency to make provisions for historical or unique archaeological resources that are accidentally discovered during construction, which may require the project applicant to fund mitigation and delay construction in the area of the find (CEQA Guidelines).
California Code of Regulations, Title 14, section 15126.4(b)	This section describes options for the lead agency and for the project applicant to arrive at appropriate, reasonable, enforceable mitigation measures for minimizing significant adverse impacts from a project. It prescribes the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction as mitigation of a project's impact on a historical resource; discusses documentation as a mitigation measure; and advises mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan (CEQA Guidelines).

Applicable Law	Regulation
Public Resources Code 5024.1	The California Register of Historical Resources (CRHR) is established and includes: properties determined eligible for the National Register of Historic Places (NRHP) under four criteria (A. events; B. important persons; C. distinctive construction; and D. data); State Historic Landmark No. 770 and subsequent numbered landmarks; points of historical interest recommended for listing by the State Historical Resources Commission; and historical resources, historic districts, and landmarks designated or listed by a city or county under a local ordinance. CRHR eligibility criteria are: (1) events, (2) important persons, (3) distinctive construction, and (4) data.
Public Resources Code 5020.1 (h)	"Historic district" means a definable unified geographic entity that possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.
California Health and Safety Code, Section 7050.5	This code makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Local	
County of San Bernardino 2007 General Plan (County of San Bernardino 2007)	Conservation Element outlines a series of policies, measures, and programs to manage cultural resources in compliance with CEQA and SB-18 to ensure the identification, protection, and enhancement of significant archaeological and historical resources within the county, in consultation with Native American tribes.
City of Victorville General Plan (Victorville 1997)	Resource Element contains policies to identify and protect or salvage significant archaeological resources and to differentiate between sites and structures that are locally significant and those that might qualify for state or national recognition.

SETTING

REGIONAL SETTING

The Victorville 2 project is located in the southern portion of the Mojave Desert Geomorphic Province, in an area known as the Victor Valley, within the Mojave River Basin. The project's main plant site overlooks the Mojave River (Victorville 2007a, pp. 1-2–1-3, 6.6-2). This project region is within the Mojave Block, an area between the Garlock Fault to the northwest and the San Andreas Fault to the southwest (Oakeshott 1971, p. 18; Victorville 2007a, p. 6.6-3). In the western portion of the project area, the land is relatively flat and at the eastern edge it begins to slope toward the Mojave River (Victorville 2007a, p. 1-3).

PROJECT, SITE, AND VICINITY DESCRIPTION

The proposed Victorville 2 project is in the city of Victorville, in San Bernardino County, California. It is situated to the north of the Southern California Logistics Airport (SCLA), the former George Air Force Base, and is approximately 3.5 miles east of U.S. Highway 395 and 0.5 mile west of the Mojave River. The proposed plant would be constructed on three areas (the main plant site and two laydown areas) totaling approximately 388 acres. To provide a usable area of 275 acres for the power block and solar field, approximately 338 acres would have to be graded. Construction laydown would require temporary use of two separate areas consisting of 20 and 30 acres, located south and west of the project site, respectively. The Victorville 2 project area is near the Victor Valley Wastewater Reclamation Authority (VVWRA) treatment plant, located to the southeast along the Mojave River. The area within and surrounding the proposed Victorville 2 plant is primarily undeveloped, with the exception of SCLA to the south and a few residential structures within the southernmost portions (Victorville 2007a, p. 1-3).

The proposed Victorville 2 project is a hybrid thermal power plant, using both natural-gas–fired combined-cycle generating equipment and solar energy generating equipment to produce electricity. The combined-cycle equipment would consist of two combustion turbine generators, two heat recovery steam generators, and one steam turbine generator. The solar equipment would consist of arrays of parabolic, solar-energy collectors, located on approximately 250 acres at the main plant site. The solar equipment would heat a working fluid to generate steam to run the steam turbine generator. The generating equipment would have a net electrical output of 563 MW. The Victorville 2 project's structures and impact areas are summarized in Cultural Resources Table 2 (Victorville 2007a, sec. 2).

During the grading activities at the proposed project's main plant site, the total soil volume to be moved to level the site would be approximately 1.5 million cubic yards. Grading would begin at the beginning of the construction phase, initially with the laydown areas. The elevation range within the plant site is from approximately 2,780 to 2,820 feet AMSL, with most of the site ranging between 2,790 and 2,800 feet AMSL. The final elevation is anticipated to be approximately 2,800 feet AMSL, with no import or export of soil (Victorville 2007a, p. 2-35).

Cultural Resources Table 2.
Summary of Proposed Project Structures and Impact Areas

Structure	Description
Main Power Plant	Two combustion turbine generators (CTGs) Two heat recovery steam generators (HRSGs) A steam turbine generator (STG) An unspecified number of solar energy generating systems (SEGS), arrayed in an approximately 250-acre field A wet-cooling tower An operations building A 230-kV switchyard A water treatment facility Various auxiliary structures
Potable Water Pipeline	A new 3.0-mile, 16-inch-diameter potable and back-up processing water pipeline, to run along an extension of the City of Victorville's system from the SCLA north along Perimeter Road to the proposed project
Laydown Areas	Western laydown Area, of 30 acres, and Southern laydown Area, of 20 acres
Reclaimed Water Supply Pipeline and Storage	A new 1.5-mile, 14-inch-diameter reclaimed water pipeline, for nonpotable uses such as cooling tower make-up water, mirror washing, and fire protection, to run along the same route as Segment 1 of the proposed transmission line A new, 740,000-gallon reclaimed water storage tank
Sanitary Wastewater Disposal Pipeline	A new 1.25-mile, 8-inch-diameter wastewater pipeline, connecting to an existing sewer line near the VVWRA, with part of its route running in the same trench as the reclaimed water supply pipeline
Associated Transmission Line	A transmission line of three segments: Segment 1—4.3 miles of new construction Segment 2—5.7 miles of adding a second circuit to the existing HDPP-Victor 230-kV transmission line support structures Segment 3—11 miles in which an existing 115-kV line would be relocated on new poles, and a new, parallel 230-kV line would be built, all within an existing ROW between Victor and Lugo Substations,
Pull Areas	Located along the proposed transmission line, 100 feet wide by 40 feet long: Segment 1—8 pulling sites Segment 2—14 pulling sites Segment 3—25 pulling sites
Natural Gas Supply Pipeline	A new 0.25-mile, 12-inch-diameter pipeline connecting to an existing pipeline near the southwest corner of the main plant site

*Victorville 2007a, sec. 2; Victorville 2007c, Response to Data Request No. 69 and Data Request No. 78

Prehistoric Setting[2]

Some researchers believe that the earliest human occupation of North America occurred well before the end of the Pleistocene Epoch, although the evidence for this remains equivocal. The Pleistocene Epoch, or Ice Age, is the earlier of two geologic time periods in the Quaternary Period, and dates from 2 million to 11,000 years ago. It was followed by the current and most recent Quaternary Period epoch, which is known as the Holocene and dates from 11,000 years ago to the present. During the Pleistocene, the climate was cooler and wetter than it has been in the Holocene, and the Mojave Desert contained numerous pluvial lakes that are now playas (dry lakes with ephemeral stands following rain storms).

One of the sites for which claims of great antiquity are made is the Calico Early Man site, located northeast of the town of Yermo, which is on the Mojave River about 45 miles downstream from Victorville. Purported artifacts from the Calico site include thousands of specimens, selected from an even greater number of natural pieces of chert and chalcedony, which some analysts have identified as flakes and blades, unifacial and bifacial tools, and prepared cores modified by humans. These artifacts were recovered from a deposit dated to more than 200,000 years old by uranium-series and soils-geomorphic dating of a possible hearth feature that was exposed at a depth of seven meters (Bischoff, et al. 1981; Budinger 1981; Schuiling 1979; Simpson, et al. 1989).

Other researchers believe that the Calico lithic specimens are the result of natural processes and are not artifacts at all (Duvall and Venner 1979; Haynes 1973; Payen 1982). The issue has yet to be completely resolved, and work on the collection from the Calico site continues. It should be noted that the slopes of the eastern Calico Mountains, where the Calico Early Man site is located, are covered on the surface with extensive aboriginal quarries, and there is no question that the many surface artifacts there are the result of human activity focused on lithic resource procurement (Simpson, et al. 1979).

Distinctive fluted projectile points typical of the Clovis Complex and dating from 12,000 to 10,000 years B.P (before the present) are found occasionally along fossil lakeshores in the desert and may represent an episode of occupation or use during the Terminal Pleistocene. Whether these represent a true Paleo-Indian occupation of early, highly mobile hunters in the California deserts or are merely variant point styles from later periods remains inconclusive due to the sparse nature of the evidence (Sutton, et al. 2007, pp. 233-234).

The earliest generally accepted period of human occupation in the Mojave Desert dates from approximately 10,000 to 8,000 years B.P in the early Holocene. The cultural unit associated with the early Holocene in the region of the proposed Victorville 2 project is termed the Lake Mojave Complex. It is distinguished by two projectile point styles, known as Lake Mojave and Silver Lake. In addition, Lake Mojave Complex sites typically include other flaked-stone tools such as scrapers, knives, drills, as well as

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2 The following overview of the prehistory of the region is generally summarized from Moratto (1984), Warren (1984), and Sutton, et al. (2007), with additional references to specific sites or investigations pertinent to the proposed Victorville 2 project area.

heavier core tools used as choppers or hammer stones. Milling stones are rare or absent. Recent studies have challenged earlier views that populations during this period lived in settlements closely tied to pluvial lakeshores with subsistence orientations focused on large game animals. Current interpretations based on work at Fort Irwin in the north-central portion of the Mojave Desert suggest occupation by comparatively small, highly mobile groups whose subsistence was based on a diverse diet that included plants and a wide range of smaller animals (Basgall 1993). To date, no sites with affinities to the Lake Mojave Complex are known from the immediate Victorville 2 project vicinity, probably due to geological processes which eroded ancient land forms or buried them under alluvium.

Beginning about 10,000 B.P., a warming trend began that led to the desiccation of Pleistocene lakes in the Mojave Desert. Local populations had to adapt to this changing environment. A way of life that formerly may have been highly dependent upon rivers and lakes had to become more diversified in response to an increasingly arid environment. Some researchers have argued that conditions became so arid that the desert was abandoned between 7,000 and 4,000 B.P. Others define this period, characterized by the Pinto Complex, as a time when populations struggled to adapt and were limited in size and highly mobile, perhaps concentrating near available water sources and expanding and contracting their territory in the lower desert over several thousand years in response to wet and dry cycles (Schroth 1994).

Archaeological sites assigned to the Pinto Complex are scarce, small, and usually limited to surface deposits, suggestive of temporary and perhaps seasonal occupation by small groups. The tool assemblage at these sites is indicative of a generalized hunting-and-gathering subsistence system and includes the beginnings of a technology for processing hard seeds. Although the type locality for this complex is located in the Pinto Basin at the east end of Joshua Tree National Park, no sites that can definitely be tied to the Pinto Complex have been identified near the proposed Victorville 2 project site or linear routes.

The subsequent Gypsum Complex dates from approximately 4,000 B.P. to 1,500 B.P., a time when populations were successfully adapting to the arid desert. Their subsistence systems became more diversified and may have derived from earlier local Pinto Complex adaptations or may have been brought in from areas beyond the California desert. Evidence for ritual activities and for contact with other groups appears during this period. For example, split-twig figurines, a cultural trait typical of Southwestern cultures, were found at Newberry Cave dating to this time period. Such figurines, together with elaborate petroglyphs, represent an increase in ritual activity and in inter-group relations and trade (Davis and Smith 1981). Hunting continued to be important, as evidenced by the occurrence of Elko Series dart points, but milling implements became more common.

Replacing the earlier atlatl-and-dart hunting kit, the bow and arrow were introduced around 1500 B.P., as indicated by the appearance of smaller projectile points in the Rose Spring Series (Yohe 1992, 1998). The period from 1,500 to 800 B.P is characterized by cultures in the Rose Spring Complex during a time also known as the Saratoga Springs Period. This was basically a continuation of the previous Gypsum Complex except that regional variations are evident within the Mojave Desert. Evidence from the Oro Grande site (CA-SBR-72), located along the Mojave River immediately east of the proposed Victorville 2 project site, indicates that trade with the Pacific coast was occurring during this period, but that pottery had not yet diffused from the Colorado River region. The Oro Grande site has an upper occupational component that yielded radiocarbon dates from 1,100 to 650 B.P., and a 6,000-year-old lower component containing footprints of at least four humans and several animals preserved in a dried clay layer, the oldest such human trackway recorded in the U.S. (Rector, et al. 1983).

From 800 B.P to the time of historic contact, the Late Prehistoric Complex marked a continuation of the regional cultural developments that began during the previous time period characterized by the Rose Spring Complex. Sites along the Mojave River display a relatively elaborate artifact assemblage that continues to show influences from both the Southwest and the California coast. Artifact assemblages include Cottonwood and Desert Side-notched arrow points and the first appearance of ceramics along the upper Mojave River. Numerous sites dating to this most recent period of prehistory are located along the Mojave River (Schneider 1988; Smith 1963).

Ethnographic Setting

The project area is located within the ethnographic territory of the Serrano Indians (Bean and Smith 1978; Benedict 1924; Kroeber 1925; Strong 1929, pp. 5-35), so called by the Spanish because they lived in and around the San Bernardino Mountains (from "*sierra,*" Spanish for mountain range). In the vicinity of the proposed Victorville 2 project, from the Victorville area downstream along the Mojave River to the Mojave Sink, lived the Desert Serrano, often referred to in the literature as the Vanyume. The name Vanyume is derived from *Beñeme*, which was the Mojave Indian name for these people, as recorded in Spanish by Father Francisco Garcés, the first European traveler through the region in 1776 (Coues 1900, vol. I, p. 240). In their own language, which is in the Takic family of the Uto-Aztecan stock, the Serrano referred to themselves simply as *takhtam*, or "people," although individuals usually were identified by the name of their particular clan or village, which often was referred to as a "tribe."

Prior to the time of historic contact, the Serrano were hunters and gatherers who utilized both large and small game, as well as numerous plant resources, for food. Large mammals, such as deer, mountain sheep, and pronghorn, were hunted with bow and arrows, and smaller animals, such as rabbits and various rodents, were taken with throwing sticks, nets, and snares. Acorns, pinyon nuts, and mesquite beans were among the staple foods, supplemented by seeds from plants such as chia and ricegrass, and roots, tubers, and greens (Bean and Smith 1978; Lerch n.d.).

The settlement pattern of the Desert Serrano is poorly known, but potentially relevant to the interpretation of archaeological resources identified on or near the proposed Victorville 2 project site. Entries in the diaries of Spanish missionaries provide some sketchy evidence on Desert Serrano settlement pattern. In March, 1776, Father Garcés encountered a "ranchería of 40 souls" along the Mojave River in the vicinity of Barstow and Daggett. The inhabitants fed him rabbits and acorn mush, the acorns apparently having been obtained through trade or on gathering trips to the San Bernardino Mountains, the nearest locale where oak trees are found. Three miles to the west, he came to another ranchería where the "head chief" of the *Beñeme,* or Vanyume, resided. There the Franciscan was presented with long strings of white sea shells. Twenty miles farther upstream, Garcés came to another ranchería whose population he estimated at 70. Again he was presented with shell beads, and the women sprinkled him and his mules with acorns. In addition to the inhabited villages, Garcés also noted a number of abandoned settlements, which suggests that not all village sites were occupied simultaneously (Coues 1900, vol. I, pp. 241-248; Walker 1986, p. 79).

Four decades later, in 1819, Father Joaquín Nuez traveled down the Mojave River and mentioned the village sites of *Atongaibit* above the Upper Narrows (above Victorville), *Topipabit*, south of the SCLA near the Lower Narrows, and *Cacaumeat,* about nine miles farther downstream. Another 12 miles downstream, Nuez came to the village of *Sisugina*, and after 45 miles more he came to *Angayaba* (Beattie 1955b, pp. 55-56). From the Garcés and Nuez accounts, and by extrapolation from similar data in areas adjoining the study area (e.g., Beattie 1955a), it appears that aboriginal settlements along the Mojave River contained up to 70 persons and were situated approximately ten miles apart. Interestingly, no historical mention was made of a village in the Oro Grande area near the Victorville 2 project site, and archaeological studies at the Oro Grande site (CA-SBR-72) did not recover temporally diagnostic Late Prehistoric artifacts such as ceramics or Desert Side-notched projectile points, suggesting that the site was not occupied ethnographically (Rector, et al. 1983, p. 42).

In 1918, Serrano leader Santos Manuel and his son Tomás traveled throughout the San Bernardino Mountains and into the Mojave Desert as far as Barstow with anthropologist John Peabody Harrington from the U.S. Bureau of American Ethnology. Harrington recorded a substantial amount of information, most of it still unpublished, during these trips, and much of it related to place names and clan territories (Harrington 1986; Laird 1975; Walsh 1976). Although research to date has revealed no Serrano name for the entire Mojave River as a single geographic feature, they had names for particular segments of the river, which appear to have corresponded with clan or lineage territories. The portion of the Mojave River between Victorville and Barstow was known as *Maviat*, from *mave*, which means “groves of trees.” This area of the river was formerly heavily wooded with cottonwoods. The people who inhabited this stretch were called the *Maviatum*. The area of the Mojave River from Barstow to Daggett was known as *Tútu'piat*, named after *tútut*, or desert tea (*Ephedra californica*), because that plant grew abundantly in the vicinity (Bean, et al. 1981b; Earle 1992, pp. 19-21; Earle 1997, pp. 11-12; Harrington 1986).

Details concerning other aspects of Serrano culture such as social organization and religion may be found in a number of sources, including Bean and Smith (1978), Bean, et al. (1981a), Benedict (1924), Gifford (1918), Kroeber (1925), and Strong (1929).

The Desert Serrano, or Vanyume, were brought into the Spanish missions or assimilated by other native groups during the early-to-mid–1800s and had ceased to exist as a distinct social group prior to the turn of the twentieth century. During historical times, Indians of Paiute and Chemehuevi descent worked as cowboys and ranch hands at various ranches along the Mojave River. Local accounts indicate that Native Americans described as Paiute were living in the Newberry Springs area and hunting bighorn sheep in the Newberry Mountains as late as 1904, according to Van Dyke (1994, p. 41). Victorville had an Indian community, which, in the census of 1900, was composed of 44 individuals. Of these, 37 were listed as “Pi Ute,” three as “Chimawaya,” and four had no tribal affiliation. This community was in existence from before 1880 until 1960, when the last resident died (Blomberg 1987; Earle 1997, pp. 55-56). Among these "Pi Ute" were Kawaiisu and Chemehuevi who, when interviewed by Kroeber in the early 1900s, had asserted that the Victorville area was part of their ancient territory, although they themselves had been born in Tehachapi (Kroeber 1925, p. 602).

Although Kroeber, from his early twentieth-century research, concluded the Vanyume were extinct (1925, p. 614), and Harrington did not locate any Vanyume speakers during his fieldwork in the region in 1918 (1986), recent studies involving analysis of mitochondrial DNA combined with genealogical research have traced three lineages from the Fort Tejon area back to baptismal registers from San Fernando Mission and determined that these lineages were originally from the Vanyume village of *Topipabit* (Johnson 2001). This village was located just downstream from Victorville near the Lower Narrows of the Mojave River. The lineages that trace their ancestry to the village of *Topipabit* are now affiliated with the San Fernando Band of Mission Indians in Newhall, which has members of Vanyume, Kitanemuk, Tataviam, and Inland Chumash descent. The San Fernando Band of Mission Indians (formerly known as the Ish Panesh United Band of Indians) is in the process of obtaining federal recognition as an Indian tribe, under the leadership of Tribal Chairman John Valenzuela, and is recognized as a California Native American Tribe by the Native American Heritage Commission (NAHC).

In addition to the San Fernando Band, many people of Serrano descent are affiliated with the San Manuel Band of Mission Indians, at San Manuel Reservation in Highland, California, and the Morongo Band of Mission Indians, at Morongo Reservation in Banning, California. Both San Manuel and Morongo are federally recognized Indian tribes, and also are recognized by the NAHC as California Native American Tribes.

Historic Setting

The history of the proposed Victorville 2 project region revolves around several themes—travel and transportation, mining, and agriculture. Associated with these themes are settlements that developed as way stations along travel routes and that also served as supply centers for mining and agricultural areas, some of them ultimately becoming modern high desert cities. Another important aspect of regional history is the use of the desert for military bases, in particular, the former George AFB, now known as the SCLA.

Travel and Transportation

Travel and transportation across the Mojave Desert began in prehistory and continue to the present. The Mojave River has long served as a conduit for travel because it provided water, a critical resource in this arid environment, and because it served as a natural pathway that was easily followed (Walker 1986; Warren and Roske 1981).

Foot Trails

The earliest historical record for the project region is found in the diary of Spanish missionary Father Francisco Garcés, who was guided in 1776 from the Colorado River to the Pacific coast by Mojave Indians along their ancient trade route, known as the Mojave Trail (Davis 1961; Farmer 1935; Walker 1986). He named the Mojave River the *Arroyo de los Mártires,* or "River of the Martyrs" (Coues 1900, vol. I, p. 246). A second

Spanish account of the area was recorded in 1819 during an expedition by Lieutenant Gabriel Moraga, whose chaplain and diarist, Father Joaquín Pasqual Nuez, named the river *Rio de las Animas,* or "River of the Souls" (Beattie 1955b). American trapper and pathfinder Jedediah Smith, who passed through in 1826 and 1827, called the Mojave River the "Inconstant River" because it flowed beneath the surface for so much of its length (Beattie and Beattie 1939; Brooks 1977). U.S. Army Captain John C. Frémont in 1844 traveled along the river during his second expedition through the West. Near present-day Daggett, Frémont encountered a party of Mojave Indians who informed him that they had formerly lived along the river in the region. His account, recorded in his journal entry of April 23, 1844 (Frémont 1845, p. 260), was as follows:

> Here a party of six Indians came into camp, poor and hungry, and quite in keeping with the character of the country. Their arms were bows of unusual length, and each had a large gourd, strengthened with meshes of cord, in which he carried water. They proved to be the Mohahve [*sic*] Indians mentioned by our recent guide, and from one of them, who spoke Spanish fluently, I obtained some interesting information, which I would be glad to introduce here. An account of the people inhabiting this region would undoubtedly possess interest for the civilized world.
>
> The Indian who spoke Spanish had been educated for a number of years at one of the Spanish missions, and, at the breaking up of those establishments, had returned to the mountains, where he had been found by a party of Mohahve (sometimes called Amuchaba) Indians, among whom he had ever since resided.
>
> He spoke of the leader of the present party as "*mi amo,*" (my master). He said they lived upon a large river in the southeast, which the "soldiers called the Rio Colorado"; but that, formerly, a portion of them lived upon this [Mojave] river, and among the mountains that had bounded the river valley to the northward during the day, and that here along the river they had raised various kinds of melons. They sometimes came over to trade with the Indians of the Sierra [the Serrano], bringing with them blankets and goods manufactured by the Monquis [Hopis] and other Colorado [River] Indians. They rarely carried home horses, on account of the difficulty of getting them across the desert, and of guarding them afterwards from the Pa-utah Indians, who inhabit the Sierra, at the head of the Rio Virgen (river of the Virgin).
>
> He informed us that, a short distance below, this river finally disappeared. The two different portions in which water is found received from the priest's two different names; and subsequently I heard it called by the Spaniards the Rio de las Animas, but on the map we have called it the Mohahve river.

This account by Frémont is the earliest known use of the name "Mohahve," or later "Mojave," for the river. The Desert Mohave informed Frémont that they had lived among the mountains to the north of the river. Other accounts place the Desert Mohave in the region during late prehistory as well, and they continued to use the Mojave Trail well into the historical period (Lerch 1985).

Wagon Roads

Beginning in the later 1840s and 1850s, wagon roads for overland travel—first from Santa Fe, New Mexico and later between Utah and the Mormon colony in San Bernardino—passed through the proposed Victorville 2 project region. The wagon road from the northeast, often labeled on early maps as the "Road to Salt Lake," converged with the Old Government Road from the Colorado River, the successor to the Mojave Trail (Casebier 1975), at a point known as Fork of the Roads, located northeast of the Victorville 2 project near Yermo (Walker 1986). The combined road continued to follow the Mojave River along a route later retraced first by the railroad and then by automobile roads.

Along these travel routes, enterprising settlers established ranches as supply stations in locations with favorable conditions for water and pasture. The next station on the wagon road west of Fork of the Roads toward San Bernardino was Fish Ponds, located in the Nebo area between Barstow and Daggett. Other supply stations along the river included Grapevine at Barstow, Cottonwood near Hodge, Point of Rocks near Helendale, and Lane's Crossing at Victorville (Thompson and Thompson 1995; Walker 1986).

Railroads

Travel through the study area during the late nineteenth century was primarily focused on transporting supplies and other cargo to the mining districts. Towns such as Daggett were established and grew principally as supply depots for nearby mining districts. This was particularly true after the coming of the railroads to the region, beginning in 1882 (Myrick 1992). The first railroad through the desert was built by the Southern Pacific (SP) between Mojave and Needles. Construction began in Mojave on February 20, 1882, and had reached Waterman (Barstow) by October 23, 1882. The line was completed to Needles on April 19, 1883 (Myrick 1992, pp. 765-766). In October, 1884, the line was purchased by the Atlantic and Pacific Railroad (A&P), and subsequently acquired by the Atchison, Topeka, and Santa Fe Railroad (ATSF) in 1890. The ATSF, now known as the Burlington Northern Santa Fe Railroad, continues to operate the line up to the present (Myrick 1992, pp. 766, 788).

Completion of the ATSF line across the desert eroded the monopoly held by the SP in California, and led to an increase in business along the line. More importantly, in 1885 the California Southern Railroad was extended to the Mojave-Needles line through the Cajon Pass from San Bernardino. This new line (which also was soon acquired by ATSF) connected the East to the cities of southern California across the Mojave Desert and gave interior access to coastal ports (Myrick 1992). It would be this route (Cajon Pass-Barstow-Needles) that the first highways would follow across the Mojave Desert.

Highways

The railroad served as a transportation corridor that would be followed by automobiles in years to come. Because the railroad engines were limited in the terrain they could cross, the routing of the railroad had been painstakingly chosen to follow the contours of the land and avoid steep grades. As a result, the route was far easier and more gradual than earlier wagon roads had been. For this reason, subsequent wagon roads and auto routes followed the rail lines. The steam engines required water, as did the section crews living along the line. Water was transported to those sidings that lacked natural sources. Sidings and repair shops were also constructed at frequent intervals along the route. Later wagon travelers and motorists could therefore find water as well as help in emergencies along the railroad line.

One of the first transcontinental highways, National Old Trails Road, passed through the project vicinity. The National Old Trails Road was the culmination of efforts by a private organization that sought a coast-to-coast highway across the United States in the early twentieth century, running through the Southwest. The new highway largely followed existing roads when it was designated in 1913, but it engendered intense interest in automobile travel to the West. The road was promoted heavily, and many followed it to California in the ensuing years. The road was also embraced by many of the communities through which it passed. During the early years of its existence, the road was primitive at best through the California desert (Thompson 1921). Subsequent additions and improvements to this road were constructed by local communities and county governments over time. In 1926, U.S. Highway 66, or Route 66, as the highway more popularly came to be known, was designated, largely following the National Old Trails Road across the California desert. Soon thereafter, substantial improvements were made to that portion of the road across the California desert, although realignments of Route 66 were made in subsequent years (Bischoff 2005; Scott and Kelly 1988; Wallis 1990). In the Victorville 2 project vicinity, Route 66 was located on the east side of the Mojave River, opposite the proposed Victorville 2 power plant location.

Energy Transmission

Another form of transportation important in the project region is electrical energy transport across high-voltage transmission lines. One of the earliest of these was the Control-San Bernardino 115-kV transmission line, constructed by the Southern Sierras Power Company in 1911-1913 and ultimately acquired by Southern California Edison Company (SCE) in 1964. Originally known as the “Tower Line” and spanning 238 miles from Bishop to San Bernardino, it was the world’s longest power line at the time it was built. The patrol road parallel to the transmission line was subsequently purchased by the federal government and reconstructed as U.S. Highway 395 (Myers 1983, pp. 79–80). The line (recorded as CA-SBR-10316H) is still in use, and is located approximately three miles west of the proposed Victorville 2 power plant location. Approximately 10 miles of this line would be used as Segment 3 of the project transmission line

A distance of 225 miles, nearly as long as the Tower Line, was covered by the San Bernardino-Boulder 115-kV transmission line (recorded as CA-SBR-7694H), which was built by SCE in 1930-1931 to provide power for the construction of Hoover Dam. When the dam was completed in 1936, the power flowed from its hydroelectric turbines back to the Los Angeles basin (Myers 1983, pp. 186-187). These and other regional power corridors converge at the Victor Substation, nine miles south of the proposed Victorville 2 power plant location.

Among the smaller transmission lines connecting to the Victor Substation is the Victor-to-Barstow 33-kV line, constructed in 1918 to transport power from the Tower Line circuit to customers in Barstow. The power line (recorded as CA-SBR-10317) is a wood-pole line (Meyers 1983, p. 83; WSA 2007a, p. 29).

Mining

Prior to World War II, mining was the economic mainstay of San Bernardino County. The project region contains the richest silver deposits in the Mojave Desert, as well as quantities of gold, copper, borax, and other minerals (Vredenburgh, et al. 1981, p. 148). Early mining technology was very labor intensive, requiring miners and trammers working below ground to extract the ore, hoist operators and teamsters working above ground to haul the ore to the mill, and mill hands to see the ore crushed and processed in preparation for further transport. Mills frequently were centrally located within a mining area, receiving ore from multiple mines. Mining camps and towns would spring up at both mine and mill sites where merchants would establish businesses catering to the miners. Road networks connected mines to mills, and mills to distribution centers. Some of these facilities were later augmented by narrow-gauge railroads.

Mining operations in the project vicinity began in 1872 with the formation of the McKinzie Mining District, which encompassed the region from Hesperia north to Barstow and east to the Rodman Mountains. The mines were supplied by A. G. Lane from his ranch on the Mojave River near present Oro Grande. An 1873 article in the *San Bernardino Guardian* reported that ore discovered near Lane's Ranch assayed at $160 in gold and $18 in silver per ton. The discovery site, located opposite the project plant site east of the Mojave River, was named Silver Mountain and the surrounding area was known as the Silver Mountain Mining District. A post office opened in 1881 and a mill to crush ore from the Oro Grande and Oro Fino mines was operational the same year, powered by water from the Mojave River. The success of the mines led to the establishment of the Oro Grande Mining Company (Vredenburgh, et al. 1981, pp. 144-145).

After operations at the Oro Grande Mine were scaled back later in the 1880s due to lack of water and high transportation costs, the mill was supplied with ore from the Silver King Mine at Calico. Silver mining also was important in the Oro Grande area, particularly after 1881 following the silver strike at the Waterman Mine north of present-day Barstow. This discovery was later eclipsed by the famous silver discoveries at Calico. At the height of mining activity in the late 1880s no fewer than 46 mines were in operation in the Calico district, including the Silver King, Waterloo, Bismark, Oriental, Garfield, and Burning Moscow mines. At first, teamsters hauled ore by wagon from these mines to various mills, some as distant as Daggett (Vredenburgh, et al. 1981, pp. 148-150). Later, the Oro Grande Mining Company built a narrow-gauge railroad that ran between the Waterloo mine and the Oro Grande mill, located on the north side of the Mojave River opposite Daggett. Sometimes known as the Calico Railroad, this line was sold to the Waterloo Mining Company in 1889 (Myrick 1992, p. 822).

During the 1890s, the Calico district was swarming with prospectors searching for mineral wealth, and new discoveries led to the development of several large mines. Hundreds of new strikes were made (Vredenburgh, et al. 1981, p. 14), but for every discovery there were undoubtedly many more failures. Falling silver prices resulted in many of the Calico mines being shut down between 1892 and 1894, and by 1896 the silver boom was over. Mining resumed in the 1920s in the Oro Grande area and continued intermittently until 1941 (Vredenburgh, et al. 1981, pp. 147-148).

The availability of water has constrained historical settlement and activities in the desert. Aside from the necessity for drinking water, water also plays a key role in mining. Several types of mechanical rock drills used water to cool the drill bit and to clear cuttings from the drill hole. Water also was an integral part of many milling processes, and although so-called “dry” milling techniques were developed, even these required some water for the final ore processing (Hardesty 1988, pp. 38-66). Because of this, many early mills were built along the Mojave River. As more mines were opened and older mines expanded into lower grade deposits, larger quantities of ore needed to be processed. It quickly became more cost-effective to transport water to mills positioned closer to the mines than it was to ship ore to mills placed close to water.

Agriculture

With its deep, well-drained soils and water from the mountains, the Mojave River drainage has long been the focus of agriculture in the Mojave Desert (McIntire 1986). The earliest mention of agriculture along the Mojave River occurs in the 1844 journal of Captain John C. Frémont noted above, when he encountered a party of six Mojave Indians traveling along the river near what is now Daggett. The Mojaves told Frémont that “formerly, a portion of them lived upon this [Mojave] river, and among the mountains that had bounded the river valley to the northward during the day, and that here along the river they had raised various kinds of melons” (Frémont 1845, p. 260).

During the 1850s and 1860s, the various stops along the river are reported to have had pasture, hay, and in some cases, gardens. At Point of Rocks, below Helendale, there was a building, corrals, and pasture in the river bottom. A letter to the *San Bernardino Guardian* on September 9, 1871, reported that the ranch kept by C. Saunders had a field of corn of about five acres, the first field of corn of any size that had been planted on the river. The same writer also reported a “nice garden” with a “good crop of corn, melons and vegetables” at Lane's Crossing, seven miles upstream from Point of Rocks at the Lower Narrows (Walker 1986, p. 283). Lane had irrigated his garden when necessary during dry seasons, but stated in 1868 that irrigation was unnecessary if the crops were planted at the proper time (Peirson 1970, p. 136).

One of the principal crops grown along the Mojave River today is alfalfa, which has been grown along the river since at least 1910, when the second cutting of alfalfa on the Van Dyke ranch east of Daggett yielded four tons per acre (Peirson 1970, p. 175). Alfalfa cultivation formed the basis for another early ranch at Hodge, originally a railroad siding named for the two Hodge brothers who homesteaded that location in 1913 and then made additional claims along the river, developed a water system, and planted a large acreage in alfalfa (Peirson 1970, pp. 143-145).

One of the earliest and most important water conveyances along the river was the Daggett Ditch, which was begun in 1883 and completed in 1902, enabling the first large-scale irrigation in the desert. Despite early confidence, however, the effort was a failure (McIntire 1986, p. 2; Peirson 1970, pp. 195-197). In 1917, approximately one-third of the nearly 10,000 irrigated acres along the river received water from river diversions; the balance drew irrigation water from wells. By 1934, only 200-300 acres were irrigated with water diverted from the river (McIntire 1986, p. 2).

Groundwater pumping for irrigation increased over time, with the result that the water table in the river's underground basins began to drop. This led to adjudication of the groundwater supply and development of projects, such as the Mojave River Pipeline, to replenish the groundwater supply and allow for the continued viability of agriculture along the river.

Settlements

The earliest historic-period settlements along the Mojave River were the supply stations that were established along overland wagon roads during the 1840s. Such stations were located at Lane’s Crossing near Victorville, Point of Rocks near Helendale, Cottonwood near Hodge, Grapevine at Barstow, Fish Ponds at Nebo, and at Fork of the Roads, east of Yermo (Walker 1986).

Many other settlements in the project area had their origins as stations along the railroads. When the A&P Railroad reached the Mojave River in 1882, a station named Waterman (after the nearby Waterman mill, built by Robert W. Waterman in 1881) was established just north of the river and west of the bridge across the river. In November, 1885, the California Southern Railroad was completed from San Bernardino to join with the A&P Railroad on the south side of the river at the east end of the bridge. This area first became known as Waterman Junction, and the town that grew up around it was named Barstow after William Barstow Strong, president of the Achison Topeka & Santa Fe Railway (Myrick 1992, pp. 766-767, 774-776).

As noted above, the town of Oro Grande had its roots as a supply station at Lane’s Ranch as early as the 1850s, and continued through the twentieth century as a mining center. Following the discovery of gold and silver in the area in the early 1880s, a siding was established here when the railroad was completed in 1885, and a small community grew around the siding. The mining tradition of the area continued with the opening of a cement plant in 1907, an industrial use that continues to the present. Later, with Route 66 passing through town, Oro Grande served as a stop on the highway, with several gas stations and small motels (Bischoff 2005, pp. 120-122).

South of the project site, the city of Victorville had its origins as a rail stop known as Victor. The new town was named for James Nash Victor, who was general superintendent of the California Southern, as well as special agent for the company's Boston financiers. Victor, working in concert with the engineer Fred T. Perris, is credited with the conception and realization of the extension railroad. The original map of Victor (renamed Victorville in 1901), was recorded in 1886 (Holladay 1986; Lyman 1988; City of Victorville 2007).

Initially, Victorville’s economy focused on commercial enterprises meeting the industrial and consumer needs of the region's far-flung mines, and on the railroad system that served the mines (Myrick 1992, pp. 857-861). In 1907, in recognition of Victorville's strategic position, the Santa Fe Railway expanded its facilities, replacing the recycled boxcar, which had been its passenger depot since the establishment of the Victor rail stop in 1885, with a new building.

Victorville's early twentieth-century economy was greatly advanced by the development of granite and limestone extraction. Paving blocks for communities throughout southern California were produced locally. Lime burning, an essential aspect of cement manufacturing, had existed in the area since the 1880s. During the opening years of the twentieth century, however, steps were taken that would make cement production the foremost industry of the Victor Valley (an area which encompasses many of the valleys within the vicinity of Victorville). During the first two decades of the twentieth century, two cement plants opened in the area: the Golden State Cement Company in nearby Oro Grande (1908), and the Southwestern Portland Cement Company in Victorville (1916-17). By 1922, the Golden State Cement Company plant was producing 1,000 barrels of cement per day, while the latter firm claimed an output of 2,500 barrels of cement per day. Eighty people were employed by the former company, and 125 by the latter (Brown and Boyd 1922a, 1922b).

Victorville's growing prosperity during the 1910s was given tremendous assistance when, in 1913, it was prominently positioned along the National Old Trails Highway, a transcontinental road that extended from Chicago to Los Angeles. Overnight, the potential economic boom of tourism seemed to be available to the community. The route through town followed the length of D Street until it turned southward at Seventh Street (Bischoff 2005, p. 122).

During the decade of the 1940s, another development had an impact on the local economy: the establishment in 1941 of the Air Corps Advanced Flying School on Victorville Army Airfield, a 2,200-acre site six miles outside of town completed on May 18, 1943. After several name changes, in 1951 the facility became George Air Force Base (AFB). The base was named in honor of World War I fighter ace Harold George who later became a brigadier general in World War II and commander of air operations in the Pacific before his death in an airplane crash in 1942. At its height, George AFB supported two tactical fighter wings flying the F-4 Phantom and employed 6,000 military and civilian staff. In 1989, closure of the base was announced, and it was deactivated in 1992. The following year it was annexed into the city of Victorville and renamed the SCLA (City of Victorville 2007).

Homesteads

Beginning as early as the 1870s, homesteads were filed at many locations throughout the California desert and remained a common feature for many decades. Five types of homestead settlements have been defined (Norris 1982, pp. 298-299):

1. Agricultural areas along well-watered desert margins;
2. Areas along major desert watercourses;
3. Areas surrounding dry lake beds;
4. Areas of speculative ventures associated with land booms; and

5. Lands opened by the government late in the homestead period for miscellaneous purposes.

Examples of the latter two types are found in the Victorville 2 project study area. The southern California land boom of later 1880s (Dumke 1944) provided a setting for Norris's fourth homestead type, manifested in the study area at Hesperia and Minneola. From 1910 to 1930, homesteading tracts were opened by the government at Joshua Tree, Phelan, and Inyokern, providing a setting for Norris's fifth homestead type in the project study area, which involved non-agricultural uses throughout the desert. Still later, particularly during the Great Depression, scattered individual homesteaders settled throughout the desert. According to Norris (1982, p. 304), "[a]t this time, land was taken up near many desert springs by those who preferred 'beans and jackrabbit meat' to the soup line existence then prevalent in the cities." A number of the homestead properties identified in the Victorville 2 project area appear to be related to this later period of homestead activity in the desert.

Many desert homesteaders led a subsistence life style, growing a variety of crops for their own use and for barter or sale. Crops included grain and alfalfa, fruit orchards, and vegetable gardens. Usually animals such as chickens, pigs, and cows were kept as well. Eventually, many homesteads were abandoned because of lack of water. Often settling during a series of wet years, homestead owners found that relying on only shallow wells for water during even a short period of drought made survival impossible (Norris 1982, p. 308-309).

Resources Inventory

Methods: Records Search, Background Research, and Native American Contacts

All cultural resources investigations for the proposed Victorville 2 project were carried out under the direct supervision of Allen Estes, a Registered Professional Archaeologist, of William Self Associates, Inc. (WSA). An archaeological records search was conducted at the California Historical Resources Information System (CHRIS,) San Bernardino County Archaeological Information Center (SBAIC) at the San Bernardino County Museum, Redlands, to identify all known cultural resources located within a ¼-mile radius of the entire proposed project area, and within a 1.0-mile radius of the VV 2 main plant. The records search sought to identify previous cultural resource surveys, archaeological sites, and historic structures within the study area that could be impacted by the proposed project (WSA 2007a, pp. 18-19).

Additional information was obtained from the California State Office of Historic Preservation's (OHP) website for California Historical Landmarks (CHL), the National Park Service's (NPS) database for National Register of Historic Places (NRHP), and the NPS database for National Natural Landmarks. In addition, the applicant reviewed the USGS 1956 "Helendale" and 1934 "Barstow" topographic quadrangles for the presence of historic structures and properties. Staff also reviewed the USGS 1934 Barstow quadrangle and the 1902 and 1942 Hesperia quadrangles, along with a set of aerial photographs of the area taken in 1955, provided by WSA in response to Data Requests 30 and 31 (WSA 2007b).

Along with the record search, the applicant contacted various agencies on May 12, 2006, and inquired about historic or other cultural resources within or adjacent to the Victorville 2 project area (WSA 2007a, pp. 37–38). These agencies included: the Victorville Office of the San Bernardino County Planning Department; City of Victorville Planning Department; Mojave Desert Heritage and Cultural Association; Victor Valley Museum and Art Gallery; San Bernardino Historical and Pioneer Society; and the Mojave Historical Society. Richard Thompson (M.A. History, UC Riverside), a local historian, performed historical research on the structural remains that were discovered during the survey. Other agencies that were contacted consisted of the San Bernardino County Assessor's Office and the San Bernardino County Flood Planning Department.

On February 24, 2006, WSA sent a letter to the Native American Heritage Commission (NAHC) asking that the database of Native American sacred lands be searched for any known properties within a ¼-mile radius of the study area and requesting contact information for Native Americans who have expressed an interest in being notified about development projects in the proposed Victorville 2 project vicinity. The NAHC responded on March 8, 2006, providing a list of five Native American contacts (WSA 2007a, p. 39; App. C). On May 23, 2006, WSA again sent a letter to the NAHC informing them that the record search area had been extended to one mile and requesting information from the database of Native American sacred lands for this larger area (WSA 2007a, p. 39). Also, on May 23, 2006, WSA sent information about the proposed project to the five Native Americans on the NAHC-provided list, asking them to provide information on any cultural resources that could be affected by the proposed project. On June 19, 2006, WSA wrote to the NAHC and requested an additional search of the sacred lands database, this time for the area around the proposed Victorville 2 project’s transmission line. The NAHC in response provided an additional list of six Native American contacts, one more than had been on the March 8 NAHC list. On June 23, 2006, WSA sent an informational letter to the newly added contact and made telephone calls to the four previously contacted individuals who had not responded to the May 23 letters (WSA 2007a, App. C). Additional telephone calls were made on July 13, 2006 (WSA 2007a, p. 39).

On May 18, 2007, Energy Commission staff also requested from the NAHC a Sacred Lands database search for the proposed Victorville 2 project area and a list of Native Americans interested in development in that area. On May 21, 2007, staff received from the NAHC a list of 10 contacts from the NAHC. Staff then sent letters informing the 10 Native American individuals or groups about the proposed SGGS on June 13, 2007.

Methods: Field Surveys

Field surveys of the project components were performed by two-person crews from WSA on March 28-31, May 3-4, November 2-7, and November 9-10, 2006; also on January 24-26 and July 19-20, 2007. The crews conducted intensive pedestrian surveys for archaeological resources on the proposed Victorville 2 main plant site area, two laydown areas, two pipelines referred to as the “Northern Linears,” and three transmission-line segments. The crews used 20-meter transect intervals and recorded site locations using a Trimble GeoXT GPS receiver. The seven surveyed areas are listed below, with details of the survey activities in each area summarized in Cultural Resources Table 3 (WSA 2007, pp. 40-52):

1. The 275-acre main plant site and a “windshield” survey of a 1-mile buffer around it;
2. Laydown Area 1, 50 acres located west of the main plant site;
3. Laydown Area 2, 45 acres located south of the main plant site;
4. The “Northern Linears,” reclaimed water and sanitary pipeline routes, and northern part of Segment 1 of the transmission line route;
5. Segment 1 of the transmission line (southern part);
6. Segment 2 of the transmission line; and
7. Transmission line replacement, paralleling a portion of Segment 3 of the transmission line.

An approximately 0.75-mile stretch of Segment 3 of the proposed transmission line, located east of the Lugo Substation, was not surveyed for cultural resources. In Data Request 37, staff asked for an explanation, and the applicant responded that an inconsistency in understanding about what would happen in this area occurred between the cultural resources consultant and SCE, who would construct the new towers along Segment 3. The applicant stated that this would be resolved, and additional survey, if needed, would be carried out and reported to the Energy Commission (WSA 2007b, p. CR-13). The applicant has indicated that reports on all additional field work will be provided early in December, 2007.

A 3.0-mile potable and back-up processing water pipeline was proposed on July 23, 2007 (Victorville 2007c, Response to Data Request No. 69), as an alternative to an on-site well that had previously been proposed. This new linear facility route apparently was not surveyed for cultural resources, as it does not appear on the revised Figure 5, showing the extent of the applicant’s cultural resources survey, submitted on the same date as the proposal for a potable water pipeline (WSA 2007b). Staff has informed the applicant that survey of this route is necessary. Because the additionally required survey could identify additional cultural resources, staff must wait until receiving a report of this survey to complete its inventory of cultural resources and its analysis of potential impacts to significant cultural resources.

Cultural Resources Table 3
Summary of Survey Activities*

Project Area	Date Surveyed	Description	Size	Comments
1	March 28-29, 2006	Main project plant site	Most of 275+ acres	Plant site plus 200-foot wide buffer around the entire plant site
1	Jan. 24-25, 2007	Main project plant site	Remainder of 275+ acres, except for parcels with inhabited structures	Southern and eastern boundaries of main plant; western access area to the main plant
1	November 2, 2006	“Windshield” survey	1-mile radius around project plant site	Visual reconnaissance of buffer area to determine whether standing historic buildings and structures exist adjacent to the main project plant site
1	July 18-19, 2007	Archaeological survey of nine previously inaccessible parcels	Parcel sizes not documented, but appear to be approx. 2½-5 acres	Only four parcels actually surveyed on foot; five received visual reconnaissance
1	July 19-20, 2007	Evaluation of 8 architectural resources on seven parcels within the main project plant site	Parcel sizes not documented, but appear to be approx. 2½-5 acres	Buildings range in size from 16 by 20 feet to 30 by 30 feet
2	March 29, 2006	Laydown Area 1 survey	50 acres, 30 of which would be disturbed	Included survey of 100-foot buffer zone outside of laydown area boundary
3	March 30, 2006	Laydown Area 2 survey	45 acres, 20 of which would be disturbed	Included survey of 100-foot buffer zone outside of laydown area boundary
4	March 28-31, May 3-4, 2006	“Northern Linears”	2.5 miles of 100-foot ROW plus 100-ft buffer, 300 feet total width	Water and sanitary pipelines –part of northern section of Segment 1
5	Nov. 10, 2006	Segment 1 (4.3 miles total)	3 miles of 100-foot ROW plus 100-ft buffer, 300 feet total width	Southern portion of Segment 1
5	Jan. 24-25, 2007	Segment 1 (4.3 miles total)	not provided	Remaining northern portion of Segment 1
6	Nov. 9-10, 2006	Segment 2 (5.7 miles total)	1.47-mile portion to be disturbed	Corridor for new transmission towers
6	Nov. 9-10, 2006	Segment 2 pull areas	2 300-foot-wide corridors between adjoining towers	2 pull areas, each 100 ft. wide and 40 fee long
7	Nov. 3-7, 2006	Segment 3 (11 miles total)	1 mile, 100 ft. wide	Corridor east of Lugo Substation
7	Nov. 3-7, 2006	Segment 3 tower locations	300 by 300 feet	78 new tower sites
7	Nov. 3-7, 2006	Segment 3 pull locations	8 300-foot corridors between adjoining towers	8 pull areas, each 100 ft. wide and 40 feet long

Project Area	Date Surveyed	Description	Size	Comments
7	Jan. 25-26, 2007	115-kV replacement line corridor parallel to Segment 3	6.5 miles	Corridor that extends from the Victor Substation to the south and parallels the Segment 3 transmission line
7	July 19, 2007	Evaluation of architectural resources at Victor Substation	Parcel size not provided; mapped as approximately 2½ acres on Fig. 5.3, and ca. 30 acres on the DPR 523J form.	Test office building is 40 by 60 feet and 18 feet high

*WSA 2007a, pp. 40-52; WSA 2007c, Addendum to DR29-1

Findings: Prehistoric and Historic Archaeological Resources Identified and Evaluated for Historical Significance

The applicant's CHRIS records search sought information on any previously identified prehistoric and historic-period archaeological sites, historic architectural properties, and Native American sacred sites within a 1.0-mile radius of the proposed Victorville 2 project site. Sixty-one previous cultural resources studies have been conducted within the 1-mile record-search radius of the Victorville 2 main plant site area and within the ¼-mile record-search radius of the remainder of the Victorville 2 project area (WSA 2007a, p. 19). Of these 61 previous studies, the coverages of 21 partly overlap or are adjacent to the Victorville 2 project area. Of those 21 studies, eight covered substantial amounts of the Victorville 2 main plant site, laydown areas, and the northern linears (WSA 2007a, p. 26).

According to these previous cultural resource studies, a total of 67 prehistoric and historic archaeological sites had been recorded within the 1-mile record-search radius of the main plant site area and the ¼-mile record-search radius of the remainder of the Victorville 2 project area (WSA 2007a, p. 28-32). Of these 67 sites, 17 are within current project areas (Cultural Resources Table 4). These previously recorded sites include a prehistoric artifact scatter (CA-SBR-6153) that was not relocated during the current survey, nine historic-period refuse scatters, one fence line, five historic roads, and one railroad grade. Only 3 of the 17 previously recorded sites (CA-SBR-4275H, CA-SBR-8392H, CA-SBR-10951H) were relocated during the survey for Victorville 2 project (Cultural Resources Table 5).

The applicant's recent archaeological survey of the proposed Victorville 2 project impact areas and buffer zones identified 42 new archaeological resources (Cultural Resources Table 4). These include 41 historic-period sites and a single prehistoric site. The historic-period sites represent a variety of resources: refuse scatters, foundations, abandoned houses, and privies. The refuse scatters consist of various cans (sanitary, hole-in-top), glass, metal, and miscellaneous domestic items, mostly dating from the 1950s and 1960s. The single newly recorded prehistoric site (VV2 Site 23) consists of an artifact scatter composed of one mortar bowl fragment and two chert flakes.

Cultural Resources Table 4
Summary of Prehistoric and Historic Archaeological Sites Identified Within Project Areas by Previous and Current Surveys*

CHRIS/WSA Site No.	Project Area Location	Previously Recorded Site?	Site Type/ Age	Description and Current Condition	Eligible for CRHR?
CA-SBR-2910H	Segment 3	Yes	Historic road; early 20th C.	Segment of National Old Trails Road that no longer exists within survey corridor (misidentified as trans-mission line in WSA 2007a, p. 32)	No (portions outside survey area may be CRHR eligible)
CA-SBR-4269H	Segment 3	Yes	Historic road; early 20th C.?	Not relocated (WSA 2007a, p. 31)	No
CA-SBR-4272H	Segment 3	Yes	Historic road; mid-late 19th C.	Salt Lake-Santa Fe Trail (Spanish Trail); (believed destroyed within survey area; WSA 2007a, p. 30)	No
CA-SBR-4274H	Segment 3	Yes	Historic road; early 20th C.?	Not relocated (believed destroyed within survey area; WSA 2007a, p. 32)	No
CA-SBR-4275H	Segment 3	Yes	Historic road; early 20th C.?	Relocated; no site form update (lacks integrity; WSA 2007a, pp. 30-31)	No
CA-SBR-6153	Segment 1	Yes	Prehistoric campsite	Lithic and ceramic scatter; not relocated (presumed destroyed by construction of Shay Road; WSA 2007a, p. 29)	No
CA-SBR-7154H	Segment 1	Yes	Historic-period refuse scatter; mid-20th C.	Two concentrations of cans, glass bottles and shards, ceramic sherds, pot handle, crown caps, and metal automotive parts; not relocated (believed destroyed by recent disturbance at VVWRA plant; WSA 2007a, p. 29)	No
CA-SBR-7742H	Segment 3	Yes	Historic-period refuse scatter; mid-20th C.	Church-key opened sanitary cans, vent-hole cans, hole-in-cap cans, and glass sherds; not relocated (believed destroyed or covered by traffic and dumping along dirt ROW road; WSA 2007a, p. 30)	No
CA-SBR-7743H	Segment 3	Yes	Historic-period refuse scatter; mid-20th C.	Sanitary cans, vent-hole cans, hole-in-cap can, and glass shards; not relocated (believed destroyed or covered by traffic and dumping along dirt ROW road; WSA 2007a, p. 31)	No
CA-SBR-7744H	Segment 3	Yes	Historic-period refuse scatter; early-mid 20th C.	Church-key cans, vent-hole cans, and sun-colored amethyst (SCA) glass shards; not relocated (possibly destroyed or covered over, but may be VV2 Site 41; WSA 2007a, p. 31)	No
CA-SBR-7752H	Segment 3	Yes	Historic-period refuse scatter; mid-20th C.	Historic-period cans and bailing wire; not relocated (site area has been heavily disturbed, and site appears to no longer exist; WSA 2007a, p. 30)	No

CHRIS/WSA Site No.	Project Area Location	Previously Recorded Site?	Site Type/ Age	Description and Current Condition	Eligible for CRHR?
CA-SBR-7739H	Segment 3	Yes	Historic-period refuse scatter; mid-20th C.	Cans and a porcelain dish; not relocated (area heavily disturbed, and site believed destroyed; WSA 2007a, p. 31)	No
CA-SBR-7740H	Segment 3	Yes	Historic-period refuse scatter; mid-20th C.	Cans, glass, and porcelain; not relocated (area heavily disturbed, and site believed destroyed; WSA 2007a, p. 32)	No
CA-SBR-7753H	Segment 3	Yes	Historic-period refuse scatter; mid-20th C.	Cans and a metal flask; not relocated (area heavily disturbed, and site believed destroyed; WSA 2007a, p. 33)	No
CA-SBR-8392H	Segment 2	Yes	Historic Air Force Base railway grade; WWII	Relocated, 10-foot-high RR berm; no site form update (no artifacts present, highly impacted by recent disturbance; WSA 2007a, p. 32)	No
CA-SBR-8832H	Northern Linears: Segment 1	Yes	Historic fence line; mid-20th C.	Not relocated (apparently no longer present in survey area; WSA 2007a, p. 29)	No
CA-SBR-10951H (VV2 Site 22)	Laydown Area 2	Yes	Historic-period refuse scatter; early-mid 20th C.	Primarily tin cans and one piece of sun-colored amethyst glass; relocated, site form updated (lacks integrity, does not meet eligibility criteria; WSA 2007a, pp. 86-87)	No
VV2 Site 1	Main project plant site	No	Historic-period refuse scatter; mid-late 20th C.	Sanitary cans; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, pp. 78-79)	No
VV2 Site 2	Main project plant site	No	Historic-period refuse scatter; early-mid 20th C.	Sanitary cans, ceramics, SCA glass, and aqua glass; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 79)	No
VV2 Site 3	Main project plant site	No	Historic-period refuse scatter, foundation; 1952-1989	One concrete foundation slab; sanitary cans and bottle glass; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 79)	No
VV2 Site 4	Main project plant site	No	Historic-period refuse scatter, foundation; 1952-1955	One concrete foundation slab; sanitary cans, bottle glass, ceramics, wire nails, etc.; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, pp. 79-80)	No
VV2 Site 5	Main project plant site	No	Historic-period refuse scatter, foundation; mid-late 20th C.	One concrete foundation slab; sanitary cans, bottle glass, etc.; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 80)	No
VV2 Site 6	Main project plant site	No	Historic-period refuse scatter, foundation; 1955-1989	One concrete foundation slab; sanitary cans, bicycle frames, bed springs, and building materials; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, pp. 80-81)	No

CHRIS/WSA Site No.	Project Area Location	Previously Recorded Site?	Site Type/ Age	Description and Current Condition	Eligible for CRHR?
VV2 Site 7	Main project plant site	No	Historic-period refuse scatter, foundation; 1952-1989	One concrete foundation slab; sanitary cans and building materials; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 81)	No
VV2 Site 8	Main project plant site	No	Historic-period refuse scatter, foundation; mid-late 20th C.	One concrete foundation slab; sanitary cans and building materials; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 81)	No
VV2 Site 9	Main project plant site	No	Historic-period refuse scatter, foundation; 1952-1989	One concrete foundation slab; sanitary cans, ceramics, bed springs, and building materials; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, pp. 81-82)	No
VV2 Site 10	Main project plant site	No	Historic-period refuse scatter, foundation; 1952-1955	Concrete foundation walls and attached slab; sanitary cans, bed springs, and building materials; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 82)	No
VV2 Site 11	Main project plant site	No	Historic-period refuse scatter, foundation; 1955-1989	One concrete foundation slab; sanitary cans, bottle glass, a couch, bed springs, and building materials; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 82)	No
VV2 Site 12	Main project plant site	No	Historic-period refuse scatter, foundation; mid-late 20th C.	One concrete foundation slab; sanitary cans, bed springs, and building materials; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 83)	No
VV2 Site 13	Main project plant site	No	Historic-period refuse scatter, foundation; pre-1952	One concrete foundation slab; sanitary cans and building materials; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 83)	No
VV2 Site 14	Main project plant site	No	Historic-period refuse scatter, foundation; mid-late 20th C.	Two adjacent concrete foundation slabs; TV cabinet, bottle glass, and building materials; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, pp. 83-84)	No
VV2 Site 15	Main project plant site	No	Historic-period refuse scatter, foundation; mid-late 20th C.	One concrete foundation slab; sanitary cans, ceramics, bottle glass, stove parts, bed springs, and building materials; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 84)	No

CHRIS/WSA Site No.	Project Area Location	Previously Recorded Site?	Site Type/ Age	Description and Current Condition	Eligible for CRHR?
VV2 Site 16	Main project plant site	No	Historic-period refuse scatter, foundation; 1952-1989	One concrete foundation slab and an animal pen; beer and sanitary cans, paint cans, ceramics, bottle glass, and building materials; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 84)	No
VV2 Site 17	Main project plant site	No	Remains of house and privy, and historic-period refuse scatter; pre-1952	Remains of one wood-frame house, built on an earthen pad, and a privy; beer and soda bottles, beer and sanitary cans, glass fruit jar fragments, bed springs, and building materials; newly identified and recorded; test results for subsurface deposits in privy feature were negative (lacks integrity, does not meet eligibility criteria; WSA 2007a, pp. 84-85; Allan 2007)	No
VV2 Site 18	Main project plant site	No	Historic-period refuse scatter, foundation, and concrete pad; 1952-1989	One concrete foundation slab and an attached concrete pad; bottle glass, bed springs, and building materials; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 85)	No
VV2 Site 19	Main project plant site	No	Remains of wood-frame house, possible privy, and wood storage shed; and historic-period refuse scatter; pre-1952	Remains of one wood-frame house built on an earthen pad; remains of a possible privy, and a collapsed wood storage shed; beer and sanitary cans, glass bottle fragments, ceramics, a metal chair frame, a wood bed post, bed springs, and building materials; newly identified and recorded; test results for subsurface deposits in privy feature were negative (lacks integrity, does not meet eligibility criteria; WSA 2007a, pp. 85-86; Allan 2007)	No
VV2 Site 20	Main project plant site	No	Collapsed house, historic-period refuse scatter; pre-1952	One collapsed house; sanitary cans, ceramics, bottle glass, and bed springs; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 86)	No
VV2 Site 21	Main project plant site	No	Historic-period refuse scatter; mid-late 20th C.	Sanitary cans and bottle glass; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 86)	No
VV2 Site 23	Northern Linears: Reclaimed Water Pipeline	No	Prehistoric ground stone and flaked stone scatter	Mortar bowl fragment and two chert flakes; newly identified and recorded, test results for subsurface deposits in 1-by-1–m unit were negative (highly disturbed, does not meet eligibility criteria; WSA 2007a, p. 87; Allan 2007)	No

CHRIS/WSA Site No.	Project Area Location	Previously Recorded Site?	Site Type/ Age	Description and Current Condition	Eligible for CRHR?
VV2 Site 24	Segment 3	No	Historic-period refuse scatter; mid-late 20th C.	Sanitary and key wind cans; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 87)	No
VV2 Site 25	Segment 3	No	Historic-period refuse scatter; mid-late 20th C.	Sanitary cans, a paint cans, and a square can; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, pp. 87-88)	No
VV2 Site 26	Segment 3	No	Historic-period refuse scatter; mid-late 20th C.	Sanitary cans, milk bottle fragments, and brown and clear glass fragments; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 88)	No
VV2 Site 27	Segment 3	No	Historic-period refuse scatter; mid-late 20th C.	Sanitary cans, and clear glass fruit jar fragments; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 88)	No
VV2 Site 28	Segment 3	No	Historic-period refuse scatter; mid-late 20th C.	Sanitary cans, paint cans; brown, green and clear glass containers; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, pp. 88-89)	No
VV2 Site 29	Segment 3	No	Historic-period refuse scatter; mid-late 20th C.	Sanitary cans, and brown, green, and clear bottle glass; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 89)	No
VV2 Site 30	Segment 3	No	Historic-period refuse scatter; mid-late 20th C.	Sanitary cans, and clear bottle and jar glass; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 89)	No
VV2 Site 31	Segment 2	No	Historic-period refuse scatter; mid-late 20th C.	Cans, ceramics, and glass; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, pp. 89-90)	No
VV2 Site 33	Main project plant site	No	Historic-period refuse scatter; early-mid 20th C.	Hole-in-top cans, key-opened cans, an open top beer can, and coffee cans; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 90)	No
VV2 Site 34	Northern Linears: Segment 1	No	Historic-period refuse scatter; early-mid 20th C.	Hole-in-top cans, key-opened cans, sanitary cans; clear, aqua, sun-colored amethyst, and brown bottle glass shards; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 91)	No

CHRIS/WSA Site No.	Project Area Location	Previously Recorded Site?	Site Type/ Age	Description and Current Condition	Eligible for CRHR?
VV2 Site 35	Northern Linears: Segment 1	No	Historic-period refuse scatter; early-mid 20th C.	Bottle glass, hole-in-top cans, sanitary cans, paint cans; green, clear brown, aqua, and cobalt blue glass; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 91)	No
VV2 Site 36	Northern Linears: Segment 1	No	Historic-period refuse scatter; early-mid 20th C.	Sanitary cans and green, clear, and brown bottle glass; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 91)	No
VV2 Site 37	Segment 3	No	Historic-period refuse scatter; early-mid 20th C.	Sanitary cans; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 92)	No
VV2 Site 38	Segment 3	No	Historic-period refuse scatter; early-mid 20th C.	Hole-in-top cans and indeterminate historic-period can fragments; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 92)	No
VV2 Site 39	Segment 3	No	Historic-period refuse scatter; early-mid 20th C.	Hole-in-top cans and a paint can; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 92)	No
VV2 Site 40	Segment 3	No	Historic-period refuse scatter; early-mid 20th C.	Sanitary cans and modern refuse; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 93)	No
VV2 Site 41	Segment 3	No	Historic-period refuse scatter; early-mid 20th C.	Sanitary, hole-in-top, and key-opened cans; amber and aqua glass shards; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 93)	No
VV2 Site 42	Segment 3	No	Historic-period refuse scatter; early-mid 20th C.	Sanitary cans and modern refuse; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 93)	No
VV2 Site 43	Segment 3	No	Historic-period refuse scatter; early-mid 20th C.	Sanitary cans brown beer bottle glass shards, and modern refuse; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 94)	No
VV2 Site 44	Segment 3	No	Historic-period refuse scatter; early-mid 20th C.	Sanitary cans, key wind cans, paint cans, beer cans, bottle glass shards; newly identified and recorded (lacks integrity, does not meet eligibility criteria; WSA 2007a, p. 94)	No

*WSA 2007a, pp. 28-32, Table 2, pp. 52-74, 78-95, Table 11.

The prehistoric and historic archaeological resources are distributed across the project areas as follows (Cultural Resources Table 5):

Cultural Resources Table 5
Summary of Archaeological Sites within Project Areas

Project Area	No. of Previously Recorded/Relocated Sites	No. of Newly Recorded VV2 Sites	Total No. of Sites Recorded/Relocated
Main Plant Site	0/0	22	22/22
Laydown Area 1	0/0	0	0/0
Laydown Area 2	1/1	0	1/1
Northern Linears	0/0	4	4/4
TL Segment 1	3/0	0	3/0
TL Segment 2	1/1	1	2/2
TL Segment 3	12/1	15	27/16
Total	17/3	42	59/45

Main Project Plant Site

No prehistoric archaeological sites or isolates were identified on the 270-acre main project plant site (WSA 2007a, p. 53).

The survey of the main project plant site resulted in the identification of 22 historic-period archaeological sites, all of them newly recorded (see Cultural Resources Tables 4 and 5). These included four refuse scatters, 15 concrete building foundations with refuse scatters, and three sites with the remains of standing or partially collapsed houses and associated refuse scatters. Most of these resources appear to date to the 1940s and 1950s, based on review of the USGS 1956 Helendale topographic quadrangle map of the area, on which these resources are absent. Five of the sites, however, appeared to be somewhat older, based on their artifact content and their appearance on the 1956 quadrangle. These were VV2 Site 2, VV2 Site 13, VV2 Site 17, VV2 Site 19, and VV2 Site 20 (WSA 2007, pp. 53-63).

Two of these sites, VV2 Site 17 and VV2 Site 19, appeared to have the potential to contain subsurface deposits in privy or trash features, and so staff requested that the applicant test the privy features (CEC 2007f, Data Request No. 48). Test excavations at each site determined that no subsurface deposits were present (Allan 2007;

None of the archaeological sites identified on the main project plant site are considered eligible for listing in the CRHR, because they do not meet the criteria for CRHR eligibility, or lack integrity, or both (WSA 2007a, pp. 78-101. Therefore, on the main plant site, no significant archaeological resources were identified that must be considered when evaluating the impacts to cultural resources of the construction of the proposed Victorville 2 project.

Laydown Areas

No archaeological sites were identified in Laydown Area 1. A single site, previously recorded as CA-SBR-10951H and updated as VV2 Site 22, was identified in Laydown Area 2 (see Cultural Resources Tables 4 and 5). This site, a historic-period refuse scatter that appeared to be somewhat older than others in the area based on the presence of "sun-colored" amethyst (SCA) glass (manufactured ca. 1880-1920), was nevertheless evaluated as ineligible for listing in the CRHR because it lacked integrity and did not have the potential to yield information important in history (WSA 2007a, pp. 86-87).

Therefore, on the laydown areas, no significant archaeological resources were identified that must be considered when evaluating the impacts to cultural resources of the construction of the proposed Victorville 2 project.

Northern Linears

No archaeological sites had been previously recorded in the survey areas for the "Northern Linears," corridors proposed for reclaimed water and wastewater pipelines, and for the northern portion of Segment 1 of the transmission line. The applicant's surveyors recorded four new archaeological sites within the Northern Linears project area (see Cultural Resources Tables 4 and 5). One of these is the prehistoric campsite noted above, VV2 Site 23, and the remaining three are historic-period refuse scatters (VV2 Site 34, VV2 Site 35, and VV2 Site 36).

Prehistoric site VV2 Site 23 is the only intact prehistoric site identified in all of the project impact areas (one other, previously recorded prehistoric site CA-SBR-6153, was not relocated in the survey for the Victorville 2 project transmission line Segment 1). Site 23 is situated along the proposed reclaimed water supply line that would run from the VVWRA plant on the Mojave River up to the main project plant site. The site consists of an artifact scatter composed of one mortar bowl fragment and two chert flakes. The area is highly disturbed, with a deep erosional cut through the middle of the site, leading the recorders to conclude that the artifacts are in a secondary context which does not represent an intact cultural deposit (WSA 2007a, p. 23). Staff notes, however, that the mortar bowl fragment is a fairly substantial artifact, measuring 12 by 10 cm, and 3-5 cm thick (WSA 2007a, Site record form for VV2 Site 23). Such a bowl represents an intensive labor investment, and is indicative of a long-term habitation site, in contrast with the artifact assemblage expected in temporary camps or activity areas.

VV2 Site 23 is located approximately 0.75-mile north of the Oro Grande site (CA-SBR-72), a large late-prehistoric habitation site that was excavated in 1977-1978 by the Archaeological Research Unit of the University of California, Riverside, prior to construction of the VVWRA treatment plant. During data recovery excavations, the lower stratum was found to contain prehistoric human and animal tracks preserved within a silty clay layer dating to approximately 6,000 B.P. (Rector, et al. 1983, p. 161).

The Oro Grande site and VV2 Site 23 are on the same river terrace, with the recently constructed VVWRA plant located between them. Thus, it is possible that these two sites could be two parts of a single, dispersed habitation area along the river. This possibility caused staff to consider the likelihood of subsurface deposits at VV2 Site 23 to be very high, so staff requested that the applicant test the site for such deposits. In response to a staff data request, then, this site was tested with a single 1-by-1-m excavation unit. The results of the testing were negative (CEC 2007f, Data Request No. 48; Allan 2007. The negative testing results appear to confirm the initial conclusion by the recorders of the site that it does not contain intact features or deposits and thus does not have the potential to yield information important to prehistory (WSA 2007a, p. 87).

The three historic-period refuse scatters appear to date to the early and mid-twentieth century—with hole-in-top, key-opened, sanitary, and coffee cans; and SCA, clear, aqua, brown, dark green, and cobalt blue glass fragments in evidence. None of them appear to be associated with structure locations or to be associated with buried features or cultural deposits. The applicant's evaluation of these sites was that none met the criteria for CRHR eligibility, and all lacked integrity of location and materials (WSA 2007a, pp. 65-66, 91).

Therefore, on the Northern Linears, no significant archaeological resources, significant impacts to which the applicant would have to mitigate, were identified.

Transmission Line Segments and Pull Areas

Sixteen previously recorded archaeological sites, of which two were relocated, and 16 newly recorded sites were identified within the survey areas for the transmission line and associated pull areas (see Cultural Resources Tables 4 and 5). These are discussed below by segment.

Segment 1

Sites in the portion of Segment 1 that parallels the Northern Linears have been discussed above. In the remainder of Segment 1, south of the VVWRA plant, three previously recorded sites, one prehistoric (CA-SBR-6153) and two historic-period (CA-SBR-7154H, CA-SBR-8832H) were identified as a result of the records search. None of these were relocated during field surveys by WSA, nor were other sites identified (WSA 2007a, p. 29).

The previously noted Oro Grande site, CA-SBR-72, is located adjacent to the Segment 1 transmission line corridor, east of Shay Road, and the Segment 1 survey corridor follows the west side of the same road (WSA 2007b, Attachments DR43-1 and DR45-1. This site, also known as the Mojave Footprints Site, is listed in the NRHP. No surface evidence of the site was found during the field survey of the Segment 1 corridor in the vicinity of site SBR-72 (WSA 2007a, p. 64). It is unknown whether subsurface components of the site, including the human and animal trackway recorded by Rector et al. (1983), might extend into the Segment 1 corridor.

Segment 2

No prehistoric archaeological sites or isolates were identified in the surveyed portions of Segment 2 (WSA 2007a, p. 68).

Two historic-period archaeological sites, a relocated previously recorded site (CA-SBR-8392H) and a newly recorded site (VV2 Site 31), were identified. Site CA-SBR-8392H is a railroad grade that consists of a 10-foot-high berm from which all rails, ties, plates, and spikes have been removed. The site has been highly impacted by recent disturbances, and appears to lack integrity. It passes beneath the transmission lines in Segment 2 between two adjoining towers, and would not be affected by the proposed addition of a second circuit to the line (WSA 2007a, p. 32).

The newly recorded site, VV2 Site 31, is an extensive refuse scatter with hundreds of cans, ceramic sherds, and glass fragments in three loci. The artifacts are slightly embedded in site soils (WSA 2007a, p. 68). The site loci are arranged in a linear pattern that is parallel to a nearby transmission line, the Victor-to-Barstow 33-kV line, recorded as CA-SBR-10317H (see below). The refuse in Site 31 may be related to the transmission line, which was constructed in 1918, or alternatively could have been discarded later from the nearby patrol road. VV2 Site 31 was assessed as lacking integrity and as not meeting the criteria for CRHR eligibility (WSA 2007a, pp. 89-90).

Segment 3

No prehistoric archaeological sites or isolates were identified in the surveyed portions of Segment 3 (WSA 2007a, p. 68).

Four previously recorded historic roads (CA-SBR-2910H, 4269H, 4272H, and 4274H) that were mapped as crossing the survey corridor were not relocated, and are presumed to be destroyed within the survey area. A fifth historic road, CA-SBR-4275H, was relocated but found to be highly disturbed and to lack integrity (WSA 2007a, pp. 30-32).

Fifteen newly recorded historic-period archaeological sites were identified within the Segment 3 survey corridor. These are VV2 Sites 24-30 and 37-44. All are refuse scatters containing cans and glass fragments. Sites 24-30 all appear to date to the mid-late–twentieth century, and Sites 37-44 appear to be slightly older, dating to the early-mid–twentieth century (WSA 2007a, pp. 69-74). None of the archaeological sites identified in the Segment 3 survey corridor are assessed as eligible for listing in the CRHR, because they either lack integrity or do not meet the criteria for CRHR eligibility, or both (WSA 2007a, pp. 87-89, 92-94).

In summary, then, along the three transmission line segments and in the associated pull areas, no significant archaeological resources, significant impacts to which the applicant would have to mitigate, were identified. Staff notes that some cultural resources survey remains to be done on Segment 3 and along the route of the potable and back-up processing water pipeline, so further sites may be found. The applicant has indicated that reports on all additional field work will be provided early in December, 2007.

Findings: Historic Structures Identified and Evaluated for Historical Significance

The applicant identified a total of 15 potentially historic standing structures within the project areas for the proposed Victorville 2 project. Of these 15 resources, five are previously recorded transmission lines, 1 is an associated substation, 1 is a fence line, and eight are historic-period buildings. Cultural Resources Table 6 summarizes these resources.

Cultural Resources Table 6
Summary of Standing Historic Structures within Project Areas from Previous and Current Surveys*

CHRIS #/ WSA # Site No.	Project Area Location	Previously Recorded Site?	Site type	Description and Current Condition	Eligible for CRHR?
CA-SBR-4251H	Segment 3	Yes	Historic transmission line	Baldy Mesa Line; not relocated (believed destroyed within survey area; WSA 2007a, p. 31)	No
CA-SBR-4255H	Segment 3	Yes	Historic transmission line	Hesperia Line; no longer exists within survey area (WSA 2007a, p. 32)	No
CA-SBR-7694H	Segment 3	Yes	Historic transmission line; mid-1930s	Boulder 1 and Boulder 2 287.5-kV; eligible for NRHP; would not be affected by VV2 project (WSA 2007a, p. 30)	Yes
CA-SBR-8832H	Segment 1	Yes	Historic fence line	No longer exists within survey area (WSA 2007a, p. 29)	No
CA-SBR-10316H	Segment 3	Yes	Historic transmission line; 1911-1913	Kramer-to-Victor 115-kV; 34-mile segment of the “Tower Line”; eligible for NRHP; would be significantly impacted by the VV2 project	Yes
None	Segment 3	No	Victor Substation; ca. 1927	Building described as the “test office” is good example of 1920s substation architecture that has retained its historic integrity (WSA 2007c, Response to DR 33-1)	Yes
CA-SBR-10317H	Segment 2	Yes	Historic transmission line; 1918	Victor-to-Barstow 33-kV; portions rerouted and rebuilt; would not be affected by VV2 project (WSA 2007a, p. 29)	Not Evaluated
VV2 Site 32	Northern Linears	No	Possible historic houses, outbuilding, concrete foundation, concrete basin, and concrete pad; refuse scatter; 1952-1989	Two single-family dwellings (one being a single-story Mission/Spanish style structure), an outbuilding, one small concrete foundation, and a concrete basin with associated concrete pad; refuse: wood planks, cans, and rope; newly identified and recorded (site lacks integrity; WSA 2007a, pp. 66-67, 90)	No
APN 0460-232-31	Main project plant site	No	Historic house; 1950s	Concrete block dwelling with well and tank (does not meet criteria for CRHR eligibility; WSA 2007c, Addendum to DR29-1)	No

CHRIS #/ WSA # Site No.	Project Area Location	Previously Recorded Site?	Site type	Description and Current Condition	Eligible for CRHR?
APN 0460-232-38	Main project plant site	No	Historic house; 1950s	Wood frame dwelling with shed, well and tank (does not meet criteria for CRHR eligibility; WSA 2007c, Addendum to DR29-1)	No
APN 0460-242-18	Main project plant site	No	Historic house; 1950s	Wood frame dwelling with shed, well and tank (does not meet criteria for CRHR eligibility; WSA 2007c, Addendum to DR29-1)	No
APN 0460-242-20	Main project plant site	No	Historic house; 1950s	Wood frame stucco dwelling with privy (does not meet criteria for CRHR eligibility; WSA 2007c, Addendum to DR29-1)	No
APN 0460-242-21	Main project plant site	No	Historic house; 1950s	Wood frame dwelling with garage, well and tank (does not meet criteria for CRHR eligibility; WSA 2007c, Addendum to DR29-1)	No
APN 0460-242-25	Main project plant site	No	Historic house; 1950s	Wood frame stucco dwelling with pump house (does not meet criteria for CRHR eligibility; WSA 2007c, Addendum to DR29-1)	No
APN 0460-242-26	Main project plant site	No	Historic house; 1950s	Wood frame stucco dwelling with pump house and three sheds (does not meet criteria for CRHR eligibility; WSA 2007c, Addendum to DR29-1)	No

*WSA 2007a; WSA 2007c

Main Project Plant Site

Seven of the recorded historic structures, listed in Cultural Resources Table 6 by their Assessor's Parcel Numbers (APN), are simple dwellings with outbuildings. All appear to date to the middle-to-late 1950s, and none meets the criteria for CRHR eligibility. Local historian Richard Thompson has raised the possibility that the houses in the project area were constructed as off-base military housing associated with George AFB (WSA 2007b, Att. DR34-1). According to the applicant's architectural historian, none of the buildings is associated with significant events or persons in history, and none has architectural significance (WSA 2007c, Addendum to DR29-1).

Laydown Areas

No historic structure sites were identified in the laydown areas.

Northern Linears

One site with historic structures located near the Northern Linears is VV2 Site 32, which contains two dwellings and an outbuilding, along with a mid-twentieth–century refuse scatter. The site, located at 18401 Shay Road, includes a large Mission, or Spanish, style house with a stucco exterior and shingled roof, with a second, smaller stucco house also on the property. A third structure is a 40-foot-square stucco outbuilding (WSA 2007a, pp. 66-67). The site dates to the mid-1950s or later, and does meet the criteria for CRHR eligibility (WSA 2007a, p. 90).

Transmission Lines and Pull Areas

Seven of the historic structures are located within areas surveyed for transmission line segments and their associated pull areas. These are described as follows:

Segment 1

A single historic site, CA-SBR-8832H, a fence line, was previously recorded in Segment 1. The site was not relocated during the surveys for the Victorville 2 project, and is presumed to be destroyed within the project area (WSA 2007a, p. 29).

Segment 2

The only standing structure identified along Segment 2 is the Victor-to-Barstow 33-kV transmission line. A large portion of the proposed project's addition of its 230-kV wires to the existing HDPP-to-Victor transmission line supports parallels the Victor-to-Barstow 33-kV transmission line. The Victor-to-Barstow 33-kV transmission line, built in 1918, was previously recorded as CA-SBR-10317H, but it was not evaluated for NRHP or CRHR eligibility for this project. The applicant states that this resource would not be affected by the Victorville 2 project (WSA 2007a, p. 29).

Segment 3

Five historic structures were identified along Segment 3, four transmission lines and one substation (Victor Substation). Two of the transmission lines, SBR-4251H (Baldy Mesa) and CA-SBR-4255H (Hesperia), were not relocated during the project survey and appear to have been removed since the time they were recorded. Two others, CA-SBR-7694H (Boulder 1 and 2) and CA-SBR-10316H (Kramer-to-Victor), are extant. They and the Victor Substation have been assessed as potentially eligible for the NRHP (WSA 2007a, pp. 29-30; 2007c, Response to Data Request 33-1(b)), which equates to eligibility for the CRHR. The Boulder 1 and 2 transmission line would not be impacted by the proposed project, but the portion of the Kramer-to-Victor 115-kV transmission line that is located along Segment 3 is the line the project is proposing to dismantle and relocate on new supports.

In summary, of the 15 potentially historic standing structures located on or near the proposed Victorville project impact areas, four are potentially historically significant. They are all transmission-related infrastructure, and all are located along the proposed transmission line. Impacts to these significant resources are discussed below. Staff notes that some cultural resources survey remains to be done on Segment 3 and along the route of the potable and back-up processing water pipeline, so further standing structures may be found. The applicant has indicated that reports on all additional field work will be provided early in December, 2007.

Findings: Ethnographic Resources Identified and Evaluated for Historical Significance

On February 24, 2006, WSA sent a letter to the Native American Heritage Commission (NAHC) asking that the database of Native American sacred lands be searched for any known properties within a ¼-mile radius of the study area. On March 8, 2006, the NAHC informed the applicant that no known Native American cultural resources in the project area were found in the NAHC's sacred lands database. On May 23, 2006, WSA again sent a letter to the NAHC informing them that the record search area had been extended to one mile out from the main plant site, so they needed additional information from the database of Native American sacred lands for this extension. On June 19, 2006, WSA again wrote to the NAHC and requested an additional search of the sacred lands database, this time for the area around the proposed Victorville 2 project's transmission line. On its responses to WSA on both March 8 and June 23, the NAHC indicated that it had found no Native American cultural resources in or near the proposed Victorville 2 project's impact areas (WSA 2007a, p. 39; App. C). On May 21, 2007, the NAHC provided the same findings in response to staff's letter of May 18.

On May 23, 2006, WSA informed seven Native American representatives on the NAHC-provided list about the proposed Victorville 2 project, asking them to provide information on any cultural resources which could be affected by the proposed project (WSA 2007a, p. 39; App. C). Of the five individuals to whom letters were sent on May 23, 2006, only Britt Wilson of the Morongo Band of Mission Indians responded. Mr. Wilson e-mailed WSA on June 6, 2006, and requested a copy of the Phase 1 cultural resources report. WSA's June 23 telephone calls reached two Native Americans who had responses. John Valenzuela of the San Fernando Band of Mission Indians expressed concern about the possibility of prehistoric sites in the impact area and asks to be informed if any cultural materials should be discovered during construction. Goldie Walker of the Serrano Band of Indians also requested to be contacted if any human remains or cultural material were to be encountered during construction (WSA 2007a, App. C).

In response to its June 13, 2007, letter to 10 Native Americans interested in being informed about development projects in the proposed Victorville 2 project area, staff received an e-mail from Britt Wilson on June 26, 2007, and a telephone call from John Valenzuela on July 12, 2007.

Mr. Wilson, of the Morongo Band of Mission Indians, stated that the Tribe is very interested in this project and noted that they had not received the Phase 1 cultural resources report they had requested from the applicant. He also expressed concern over possible impacts to the only prehistoric site that WSA had found in the proposed Victorville 2 project area. Staff e-mailed back to Mr. Wilson, encouraging the Tribe members to attend the Energy Commission's public meetings on the proposed Victorville 2 project and agreeing to try to arrange to get the requested report to the Tribe. Staff also informed Mr. Wilson of staff's data request for archaeological testing on the prehistoric site about which Mr. Wilson expressed concern.

Mr. Valenzuela, of the San Fernando Band of Mission Indians, asked whether any prehistoric archaeological sites had been found on the proposed plant site. When staff explained that the only prehistoric site had been found on one of the project's linear facility routes, Mr. Valenzuela asked to be kept informed of any further cultural resources developments.

Unless further communications with Native Americans disclose significant sites of ethnographic concern, at this time no significant ethnographic sites have been identified that must be considered when evaluating the impacts of the construction of the proposed Victorville 2 project.

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 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." (California Code of Regulations, Title 14, section 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 (Public Resources Code, section 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,3 a resource must meet at least one (and may meet more than one) of the following four criteria (Public Resources Code section 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;

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

- 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 (California Code of Regulations, Title 14, section 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 sections 5020.1 (j) or 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 will change those integrity appraisals.

DIRECT/INDIRECT IMPACTS AND MITIGATION

In the abstract, direct impacts to cultural resources are those associated with project development, construction, and co-existence. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. Construction can have direct impacts on historic standing structures when those structures must be removed to make way for new structures or when the vibrations of construction impair the stability of historic structures nearby. New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, and when the new structures produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Generally speaking, indirect impacts to archaeological resources are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction causes obsolescence and demolition or creates improved accessibility with consequent vandalism and/or greater weather exposure.

Ground disturbance accompanying construction at the proposed plant site and along the proposed linear facilities has the potential to directly impact archaeological resources, unidentified at this time. The risk of potential direct, physical impacts of the proposed construction on unknown archaeological resources is 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 project 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

Identification and Assessment of Direct Impacts on All Cultural Resources

Main Project Plant Site

Construction-related activities having the potential to adversely impact cultural resources at the main plant site include the following:

- During site preparation, demolition of existing structures, removal of the above-ground remains of no-longer-extant structures, grading and leveling, and preparation of drainage features would take place (Victorville 2007a, pp. 2-35, 2-37); these activities would destroy all known cultural resources on the main plant site and could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the ground disturbance in the native soils of the site;
- During construction, holes for the foundations of the power block equipment, holes for the footings for the solar field, and trenches for pipelines and linear connections would be excavated (Victorville 2007a, p. 2-37); these excavations could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the ground disturbance in the native soils of the site;
- During construction, excavation of a trench for a new 3.0-mile-long, 16-inch-diameter potable and back-up processing water pipeline (Victorville 2007c, Response to Data Request No. 69); this excavation could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the trench in the native soils of the route;
- During construction, a trench for the installation of a new 0.25 mile-long, 12-inch-diameter natural gas pipeline with an off-site length of 450 feet (on-site length, unknown) would be excavated to connect the proposed power plant to the Kern River-High Desert Power Project Lateral gas supply pipeline (Victorville 2007a, pp. 2-35–2-36); these excavations could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the ground disturbance in the native soils of the site;
- During construction, security fencing would be installed surrounding the project site, including the solar field (Victorville 2007a, p. 2-33); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the excavation for the fence supports.

Identified and evaluated cultural resources located on the main plant site include 22 historic-period archaeological sites (refuse scatters, house sites with associated features and refuse scatters) and seven standing structures. No ethnographic resources were identified on the main plant site. All of the identified resources would be destroyed during site preparation for the construction of the Victorville 2 project. None of the identified cultural resources, however, were assessed as potentially eligible for the CRHR, so their destruction would not be a significant adverse impact, requiring mitigation. Nonetheless, under CEQA, staff must consider the extent of proposed ground disturbance related to the construction of the Victorville 2 project and provide for the contingency of additional archaeological resources being discovered during construction on the main plant site, requiring identification, assessment, and mitigation sufficient to reduce the significance of the project's impacts to them to negligible, if such discovered resources are assessed as significant.

Laydown Areas

The only construction-related activity described in the AFC as having the potential to adversely impact cultural resources at the two laydown areas is mass-grading. The slightly sloping terrain of the laydown areas and the main plant site would be leveled to a consistent elevation of 2,800 feet above mean sea level, working from the south to north, from the laydown areas to the solar field (Victorville 2007a, p. 2-35). This activity would destroy any known surface cultural resources that are present and could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the cutting and filling.

No cultural resources were known or newly discovered in the western laydown area. In the southern laydown area, no standing structures or ethnographic resources were identified, and only one previously identified and newly evaluated archaeological site was located. Site CA-SBR-10951H (VV2 Site 22), a historic-period refuse scatter, was evaluated as not eligible for the CRHR, so its destruction would not be a significant adverse impact, requiring mitigation. Nonetheless, under CEQA, staff must consider the extent of proposed ground disturbance related to the Victorville 2 project mass-grading and provide for the contingency of additional archaeological resources being discovered during grading and leveling on the two laydown areas, requiring identification, assessment, and mitigation sufficient to reduce the significance of the project's impacts to them to negligible, if such discovered resources are assessed as significant.

Northern Linears

Construction-related activities having the potential to adversely impact cultural resources along the proposed Northern Linears are those associated with both installing two new pipelines and erecting a new overhead transmission line, partly within the same right-of-way. The new pipelines and Segment 1 of the transmission line start together running southeast from the southeast corner of the main plant site for about half a mile, then the reclaimed water pipeline separates, runs east and then south to the VVWRA. The transmission line and wastewater pipeline continue south along much the same route for a little over half a mile, where the pipeline ends, and the transmission line turns east, then south for a total Segment 1 length of 4.3 miles. The potential impacts to cultural resources along the Northern Linears thus include the following:

- Excavation of foundation holes for 31 new tubular steel monopole supports for part of the 4.3 miles of new Segment 1 230-kV transmission line (Victorville 2007a, pp. 2-39–2-40); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the excavation for the supports and of the ground disturbance to the area surrounding each support;

- Grading or other ground preparation activities at the second marshalling yard on Phantom East directly north of Air Expressway, currently used by the City of Victorville's Public Works Department to store road maintenance materials (Victorville 2007a, p. 40); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the grading;
- Grading and clearing of new dirt access roads to each support location (Victorville 2007a, p. 40); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the grading;
- Ground disturbance by heavy equipment at eight pulling sites, located on existing or new access roads (Victorville 2007a, p. 40); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the ground disturbance; and
- Excavation of new trenches for sanitary wastewater (1.25 miles) and reclaimed water (1.5 miles) pipelines (Victorville 2007a, p. 2-36); installation of these pipelines could directly impact buried archaeological resources, unidentified at this time, to the extent of the area (unknown) and depth (three to six feet) of the trench excavations and of the ground disturbance to the area surrounding each trench.

Identified and evaluated cultural resources located on the Northern Linears include three historic-period archaeological sites (all refuse scatters), one prehistoric archaeological site, one standing structure, and no ethnographic resources. The standing structure, a historic-period fence line, was evaluated as not significant. The prehistoric site, VV2 Site 23, when tested, proved to have no subsurface component, and so was assessed as not being eligible for the CRHR. Nonetheless, the presence of a large bowl mortar fragment and the proximity of this site to the Oro Grande habitation site lead staff to persist in being concerned for this site possibly having the potential to yield information important in prehistory, making it a significant historical resource under CEQA. The excavation of the reclaimed water pipeline could adversely impact this site, so staff would provide for professional archaeological scrutiny of this specific area if the proposed reclaimed water pipeline trench is excavated and the pipeline installed.

None of the other identified cultural resources identified along the Northern Linears were assessed as potentially eligible for the CRHR, so their destruction would not be a significant adverse impact, requiring mitigation. Nonetheless, under CEQA, staff must consider the extent of proposed ground disturbance related to the construction-related activities and provide for the contingency of additional archaeological resources being discovered during construction along the Northern Linears, requiring identification, assessment, and mitigation sufficient to reduce the significance of the project's impacts to them to negligible, if such discovered resources are assessed as significant.

Transmission Line Segments and Pull Areas

Segment 1

Construction-related activities having the potential to adversely impact cultural resources along Segment 1, and associated pull areas, of the proposed transmission line include the following:

- Excavation of foundation holes for 31 new tubular steel monopole supports for part of the 4.3 miles of new Segment 1 230-kV transmission line (Victorville 2007a, pp. 2-39–2-40); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the excavation for the supports and of the ground disturbance to the area surrounding each support;
- Grading or other ground preparation activities at the second marshalling yard on Phantom East directly north of Air Expressway, currently used by the City of Victorville's Public Works Department to store road maintenance materials (Victorville 2007a, p. 2-40); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the grading;
- Grading and clearing of new dirt access roads to each support location (Victorville 2007a, p. 2-40); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the grading; and
- Ground disturbance by heavy equipment at eight pulling sites, located on existing or new access roads (Victorville 2007a, p. 2-40); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the ground disturbance.

Identified and evaluated cultural resources located along the northern portion of Segment 1 of the transmission line include one prehistoric archaeological site, three historic-period archaeological sites (all refuse scatters), one standing structure (a fence line), and no ethnographic resources. None of these resources was evaluated as significant, although staff has continuing concerns for the prehistoric site, VV2 Site 23.

Three additional cultural resources were identified along the southern portion of Segment 1. Two of them were previously known archaeological sites, one a historic-period refuse scatter and the other a prehistoric campsite. Neither was relocated during the applicant's survey and surveyor considered both destroyed. The third cultural resource was a housing complex of insufficient age to be considered a potential historical resource. No ethnographic resources were identified along Segment 1.

Previously recorded NRHP-eligible site CA-SBR-72, the Mojave Footprints Site, is located adjacent to the southern portion of Segment 1. The full extent of the buried component containing a human and animal trackway was not defined in the previous archaeological investigations, and it is possible that subsurface materials from this site could be present within the Segment 1 corridor. If such materials are present, they could be encountered during excavation for the new tubular steel monopole supports for the Segment 1 transmission line.

Segment 2

Construction-related activities having the potential to adversely impact cultural resources along Segment 2 of the proposed transmission line include the following:

- Excavation of foundation holes for six new lattice steel towers (two at each of three locations) within the existing HDPP-Victor ROW where the existing line undercrosses another utility's higher voltage circuits Victorville 2007a, p. 2-41); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the excavation for the supports and of the ground disturbance to the area surrounding each support;
- Grading and clearing of new minor dirt "pathways" off of existing access roads to each tower location (Victorville 2007a, p. 2-41); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the grading; and
- Ground disturbance by heavy equipment at 14 pulling sites, located on existing access road or new "pathways" (Victorville 2007a, p. 2-42); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the ground disturbance.

Identified and evaluated cultural resources located on Segment 2 of the proposed transmission line include two historic-period archaeological sites (a newly recorded refuse scatter and a previously recorded railroad grade), one standing structure (a previously recorded transmission line, unevaluated but possibly eligible for the CRHR), and no ethnographic resources. The archaeological sites were assessed as not significant, and the applicant states that the transmission line would not be impacted by the reconductoring activities proposed along Segment 2 on the parallel HDPP-Victor 230-kV transmission line support structures..

Segment 3

Construction-related activities having the potential to adversely impact cultural resources along Segment 3 of the proposed transmission line include the following:

- Excavation of foundation holes for a large number of new steel towers for a new, approximately 11-mile-long, 230-kV transmission line (Victorville 2007a, pp. 2-42–2-43); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the excavation for the supports and of the ground disturbance to the area surrounding each support;
- Excavation of foundation holes for an additional large number of new steel towers for the relocation of an existing 115-kV transmission line, which would be moved to accommodate the new 230-kV line (Victorville 2007a, pp. 2-42–2-43); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the excavation for the supports and of the ground disturbance to the area surrounding each support;
- Dismantlement of the H-frame steel supports and wooden supports of the existing Kramer-to-Victor 115-kV transmission line being relocated and the ground disturbance associated with the lines removal;

- Grading and clearing of new minor dirt “pathways” off of existing access roads to each tower location (Victorville 2007a, p. 2-43); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the grading;
- Ground disturbance by heavy equipment at 25 pulling sites, located on existing access road or new “pathways” (Victorville 2007a, p. 2-43); this activity could potentially impact buried archaeological resources, unidentified at this time, to the extent of the area and depth of the ground disturbance; and
- Installation of four circuit breakers at the Victor Substation to accommodate the new incoming (two new breakers) and new outgoing (two new breakers) 230-kV transmission lines proposed for the project (WSA 2007c, p. CR-12).

Identified and evaluated cultural resources located on Segment 3 of the proposed transmission line include 12 previously recorded historic-period archaeological sites (7 refuse scatters and five old roads), 15 newly recorded historic-period archaeological sites (all refuse scatters), five standing structures (4 transmission lines and 1 substation (Victor Substation)), and no ethnographic resources. Of the seven previously recorded refuse scatters, none was relocated by the applicant’s surveyors. Similarly, of the five previously recorded historic-period roads, only one was relocated, and its potential significance was compromised due to a lack of integrity. None of the 15 newly recorded refuse scatters was assessed as significant.

The Victor Substation was assessed as eligible for the NRHP by the applicant’s architectural historian, who also recommended that the installation of circuit breakers required for the Victorville 2 project would not be a significant impact. Of the four transmission lines (all previously recorded), portions of two (outside of the immediate project area) had been evaluated as potentially eligible for the NRHP, under Criterion A (association with events that have made a significant contribution to the broad patterns of our history). NRHP eligibility equates to CRHR eligibility and significance under CEQA. The activities associated with the proposed Segment 3 transmission line construction and relocation would not impact one of these transmission lines, CA-SBR-7694H. The other, however, CA-SBR-10316H (Kramer-to-Victor 115-kV line) is the line which the Victorville 2 project would dismantle and relocate to accommodate the project’s proposed 230-kV line. Removing the supports and altering the original ROW are significant impacts on a significant historical resource (WSA 2007c, Data Response 32-1(b), Excerpt from Programmatic Agreement), and, under CEQA, this impact would have to be mitigated.

Summary of Impacts from the Transmission Line Segments and Pull Areas

For the three segments of the proposed transmission line and the associated pull sites, with the exception of the Victor Substation, the Boulder 1 and 2 287.5-kV transmission line, and the Kramer-to-Victor 115-kV transmission line, none of the other cultural resources identified was evaluated as significant. Thus, the project’s transmission line construction impacts on those resources would not be significant. The project would have no impacts on the Boulder 1 and 2 transmission line, and its minimal impact on the Victor Substation test office would not affect its historical significance The project’s impacts on the Kramer-to-Victor 115-kV transmission line, however, would be sufficient to impair the ability of the resource to convey its historical significance. That constitutes a significant impact that would require mitigation to reduce it to a less-than significant level.

While no significant archaeological sites were located along the transmission line segments or in pull areas, under CEQA, staff must consider the extent of proposed ground disturbance associated with the construction-related activities proposed for the transmission line segments and pull areas, (above) and provide for the contingency of additional archaeological resources being discovered during construction. If such discovered resources were to be assessed as significant, mitigation would be required sufficient to reduce to negligible the significance of the project's impacts on them.

Summary of Direct and Indirect Impacts on Significant Cultural Resources, All Project Areas

Staff notes that some cultural resources survey remains to be done on Segment 3 and along the route of the potable and back-up processing water pipeline, so further cultural resources may be found. The applicant has indicated that reports on all additional field work will be provided early in December, 2007.

Only one significant prehistoric archaeological site, CA-SBR-72, previously recorded and partially excavated, could be impacted by the construction activities of the proposed project. That site could have subsurface deposits extending beyond its known location. These would not be evident during surface survey and, if present, could be impacted by transmission line support pole foundation excavation on Segment 1. Consequently, contingency mitigation measures to provide appropriate treatment for archaeological discoveries would be needed.

Four potentially significant standing structures were identified from earlier surveys or the applicant's current project-related survey. Two of them would not be impacted by the proposed project, and one would be impacted, but not significantly. The Kramer-to-Victor 115-kV transmission line, however, would undergo a direct, significant impact from the proposed project's transmission line construction, and this significant impact would require mitigation.

No significant ethnographic resources, either previously recorded or newly disclosed in communications with Native Americans, were identified in the vicinity of the project. Consequently, the project would have no direct significant impacts on ethnographic resources.

Neither the applicant nor staff identified any indirect impacts to any identified cultural resources in the impact areas of the proposed project, and so no mitigation measures for indirect impacts would be required for any class of cultural resources.

Applicant's and Staff's Proposed Mitigation Measures

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 (Public Resources Code, section 21083.2; California Code of Regulations, Title 14, sections 15064.5(f) and 15126.4(b)). Consequently, staff recommends that procedures for identifying, evaluating, and possibly mitigating impacts to newly discovered archaeological resources be put into place by means of 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 Victorville 2 project, including the following (WSA 2007a, pp. 6.5-31–6.5-33):

- Having a qualified cultural resources specialist (CRS) who would be on call to investigate and make recommendation on the significance of any archaeological deposits encountered during construction;
- Implementing a construction worker cultural resources awareness training program;
- Having procedures for halting construction in the vicinity of an archaeological discovery;
- Having procedures for evaluating the significance of archaeological discoveries made during construction;
- Having procedures to mitigate adverse impacts to any significant archaeological discoveries;
- Arranging for the curation of recovered cultural materials and all archaeologically acquired and generated documentation;
- Writing a report of any data recovery activities; and
- Complying with Health and Safety Code § 7050.5 and Pub. Resources Code § 5097.98.

The applicant subsequently proposed an additional measure to mitigate the project's significant impact on the historically significant Kramer-to-Victor 115-kV transmission line. This measure entails having the applicant's architectural historian prepare a Historic American Engineering Record (HAER) documentation of the lattice-steel towers and the historic setting. This documentation would follow the treatment prescribed for transmission lines associated with the NRHP-eligible Big Creek Hydroelectric System, as agreed to in the Programmatic Agreement between the State Historic Preservation Officer and SCE (WSA 2007c, Data Response 32-1(b), Excerpt from Programmatic Agreement).

Although staff concurs with many of 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-9**, below.

Staff's additions in **CUL-1** through **CUL-7**, intended to provide for the contingency of discovering archaeological resources during construction include having an archaeologist monitor all construction activities on the project site, at the laydown areas, and along the pipeline and transmission line routes, and having a Native American monitor construction activities where prehistoric cultural resources are likely to be discovered. Staff’s proposed mitigation measures for identifying, evaluating, and possibly mitigating impacts to previously unknown archaeological resources discovered during construction ensure that impacts to significant archaeological discoveries would be mitigated to a less than significant level.

Staff has added **CUL-8** and **CUL-9** to provide mitigation for the proposed project’s significant impact on the historically significant Kramer-to-Victor 115-kV transmission line. Staff agrees with the applicant’s proposed HAER documentation of the towers and the historic setting of this transmission line, but would additionally require incorporation of an appropriate historic context/overview for the complete transmission line of which the Kramer-to-Victor 115-kV transmission line is a part.

Operation Impacts and Mitigation

During operation of the proposed VV 2 power plant, if a leak should develop in the gas or water pipelines supplying the plant, repair of the buried utility could require the excavation of a large hole. Such repairs could impact previously unknown subsurface archaeological resources in areas unaffected by the original trench excavation. The measures proposed below for mitigating impacts to previously unknown archaeological resources during the construction of the plant and linear facilities 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 section 21083; Cal. Code Regs., tit. 14, sections 15064(h), 15065(c), 15130, and 15355).

One recent nearby project and one future nearby project must be considered as contributing to potential cumulative impacts on the cultural resources of the Victorville 2 power plant project. The recent nearby project is the VVWRA. The future nearby project is actually a series of projects planned by the City of Victorville to develop the SCLA as a major multimodal cargo distribution center. The SCLA Specific Plan Area, covering the area south of the proposed Victorville 2 power plant project, will eventually include such large-scale projects as building manufacturing/distribution facilities, building intermodal/multimodal rail facilities, building air cargo facilities and hangars, building aviation maintenance facilities, and building commercial office and related technology facilities. In the immediate future, the “Intermodal” project is the cornerstone for SCLA development and is scheduled to be constructed between September, 2007, and September, 2008 (Victorville 2007a, pp. 6.8-11, 6.8-18).

Cumulative impacts to cultural resources in the project vicinity could occur if the VVWRA, the SCLA Specific Plan projects, and the proposed Victorville 2 project, had or would have impacts on cultural resources that, considered together, would be significant. Cultural resources studies have been conducted for the VVWRA and for a number of projects at the SCLA. These studies have identified cultural resources and potential project impacts to these cultural resources, and the impacts have either been avoided or mitigated to less than a significant level (CRM Tech 2001, 2003, 2004; Earth Tech 1997; Geoscientific Systems and Consulting 1980; Martin Marietta Energy Systems 1991; McKenna 1998; Sheets and Woodman 1990).

The impacts to cultural resources created by the Victorville 2 project were analyzed by staff and found to be not significant, with the implementation of conditions of certification providing for identification, evaluation, and avoidance or mitigation of impacts to significant cultural resources discovered during the construction of the project.

Proponents of future projects can mitigate impacts to as yet undiscovered subsurface archaeological sites to less than significant levels by requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as significant (eligible for the CRHR or NRHP). Impacts to human remains can be mitigated by following the protocols established by state law in Pub. Resources Code section 5097.98. Since the impacts from the Victorville 2 project would be mitigated to a level less than significant by the project's compliance with Conditions of Certification **CUL-1** through **CUL-9**, 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 Victorville 2 project to be cumulatively considerable, when viewed in conjunction with other projects.

COMPLIANCE WITH APPLICABLE LORS

If the Conditions of Certification, below, are properly implemented, the proposed Victorville 2 project would be in compliance with the state and local laws, ordinances, regulations, and standards listed in Table 1.

In its General Plan, San Bernardino County has policies promoting the preservation and re-use of historic sites and structures, the confidential identification of archaeological resources, Native American consultation, review of proposed projects for potential historic sites, and mitigation of adverse impacts to historic sites (County of San Bernardino General Plan 2007).

Staff's Conditions of Certification require specific actions not just to promote but to effect historic preservation and mitigate impacts to all cultural resources. Consequently, if the proposed Victorville 2 project implements these conditions, its actions would be consistent with the cultural resources preservation policies of San Bernardino County.

CONCLUSIONS AND RECOMMENDATIONS

Additional cultural resources surveys need to be completed on part of Segment 3 of the transmission line and along the route of the potable and back-up processing water pipeline. Because additional cultural resources may be found as a result of these surveys, staff cannot reach final conclusions about impacts to cultural resources. The applicant has indicated that reports on all of the additional field work will be provided early in December, 2007. Assuming that the missing information is provided and does not indicate that the project would have significant impacts on cultural resources, staff expects to conclude as follows:

Staff has determined that the Victorville 2 Hybrid Power Project would not have a significant impact on known significant archaeological or ethnographic resources. With the adoption and implementation of the proposed Conditions of Certification **CUL-1** through **CUL-7**, the Victorville 2 project would not have a significant impact on potentially significant archaeological resources that may be discovered during construction. With the adoption and implementation of Proposed Condition of Certification **CUL-8** and **CUL-9**, the project's adverse impacts on a known significant standing structure would be mitigated to less than significant.

Staff recommends that the Energy Commission adopt the proposed cultural resources Conditions of Certification **CUL-1** through **CUL-9**. These conditions are intended to facilitate the identification and assessment of previously unknown archaeological resources encountered during construction and to mitigate any significant project impacts on any newly found resources assessed as significant and on any known resources that may be affected by the project in an unanticipated manner. To accomplish this, the conditions provide for:

- Hiring a Cultural Resources Specialist, Cultural Resources Monitors, and Cultural Resources Technical Specialists;
- Cultural resources awareness training for construction workers;
- Archaeological and Native American (if needed) monitoring of ground-disturbing activities;
- Recovery of significant data from discovered archaeological deposits;
- Preparation of a technical archaeological report on monitoring activities and findings; and
- Curation of recovered artifacts and associated notes, records, and reports; and
- Research and recordation of the portion of the Kramer-to-Victor 115-kV transmission line that the proposed project would relocate and modify.

When properly implemented and enforced, staff believes that these conditions of certification would mitigate any impacts to unknown significant archaeological resources newly discovered in the project impact areas to a less than significant level.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, the project owner shall obtain the services of a Cultural Resources Specialist (CRS), and one or more alternates, 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 Resource Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility 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 (Discovery). No preconstruction site mobilization; construction ground disturbance; construction grading, boring and trenching; or construction shall occur prior to CPM approval of the CRS, unless such activities are specifically approved by the CPM. Approval of a CRS may be denied or revoked for non-compliance on this or other projects.

CULTURAL RESOURCES SPECIALIST

The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the CPM that their training and backgrounds conform to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in the Code of Federal Regulations, 36 CFR Part 61. In addition, the CRS shall have the following qualifications:

1. The CRS's qualifications shall be appropriate to the needs of the project and shall include a background in anthropology, archaeology, history, architectural history, or a related field;

2. At least three years of archaeological or historic, as appropriate, 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 of Certification.

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. a BS or BA degree in anthropology, archaeology, historical archaeology or a related field and one year experience monitoring in California; or

2. an AS or AA degree in anthropology, archaeology, historical archaeology or a related field, and four years experience monitoring in California; or

3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology or a related field, and two years of monitoring experience in California.

CULTURAL RESOURCES TECHNICAL SPECIALISTS

The resume(s) of any additional technical specialists, e.g., historical archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

Verification:

1. At least 45 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, 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 may continue up to a maximum of three days without a CRS. If cultural resources are discovered then construction will remain halted until there is a CRS or alternate CRS to make a recommendation regarding significance.

3. At least 20 days prior to preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, the CRS shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resource monitoring required by this Condition. If additional CRMs are obtained during the project, the CRS shall provide additional letters to the CPM identifying the CRMs and attesting to the qualifications of the CRMs, at least five days prior to the CRMs beginning on-site duties.

4. At least 10 days prior to beginning tasks, the resume(s) of any additional technical specialists shall be provided to the CPM for review and approval.

5. At least 10 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, 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 preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, if the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the AFC, data responses, and confidential cultural resources reports for the project. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1” = 200’) for plotting cultural features or materials. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, or construction 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 submitted prior to the start of each phase. Written notification identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

At a minimum, the CRS shall consult weekly with the project construction manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

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 preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, the project owner shall provide the AFC, data responses, and confidential cultural resource documents to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

2. If there are changes to any project-related footprint, revised maps and drawings shall be provided at least 15 days prior to start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction for those changes.

3. If project construction is phased, if not previously provided, the project owner shall submit the subject maps and drawings 15 days prior to each phase.

4. On a weekly basis during preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, e-mail, or fax.

5. Within five days of identifying changes, the project owner shall provide written notice of any changes to scheduling of construction phase.

CUL-3 Prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, 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 be provided in the Archaeological Resource Management Report (ARMR) format, and, per ARMR guidelines, the author’s name 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 preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; or construction 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. 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. A prescriptive treatment plan may be included in the CRMMP for limited resource types. A refined research design will be prepared for any resource where data recovery is required.

2. The following statement included in the Introduction: “Any discussion, summary, or paraphrasing of the Conditions in this CRMMP is intended as general guidance and as an aid to the user in understanding the Conditions and their implementation. The Conditions, as written in the Commission Decision, shall supersede any summarization, description, or interpretation of the Conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A.”

3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the ground disturbance, construction, and post-construction 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 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 and how long they would be needed to protect the resources from project-related effects.

7. A statement that all cultural resources encountered shall be recorded on a DPR form 523 and mapped and photographed. In addition, all archaeological materials 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 and a copy of an agreement with, or other written commitment from, a curation facility to accept artifacts from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

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 and cannot be treated prescriptively.

10. A description of the contents and format of the Cultural Resource Report (CRR), which shall be prepared according to ARMR guidelines.

<u>Verification:</u>

1. At least 30 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, the project owner shall submit the subject CRMMP to the CPM for review and approval. Preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, or construction may not commence until the CRMMP is approved, unless specifically approved by the CPM.

2. At least 30 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, a letter shall be provided to the CPM indicating that the project owner agrees to pay curation fees for any materials collected as a result of the archaeological investigations (survey, testing, data recovery).

CUL-4 The project owner shall submit the Cultural Resources Report (CRR) to the CPM for approval. The CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The CRR shall report on all field activities including dates, times and locations, findings, samplings, and analyses. All survey reports, Department of Parks and Recreation (DPR) 523 forms, and additional research reports not previously submitted to the California Historic Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as an appendix to the CRR.

If the project owner requests a suspension of 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 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 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the 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.

2. Within 10 days after CPM approval, the project owner shall provide documentation to the CPM confirming that copies of the CRR have been provided to the SHPO, the CHRIS, and the curating institution, if archaeological materials were collected.

3. 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.

CUL-5 Prior to and for the duration of preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment at the project site and on the linear facilities. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when ground disturbance, including landscaping, is completed. The training shall include:

1. A discussion of applicable laws and penalties under the law;

2. Samples or visuals of artifacts that might be found in the project vicinity;

3. Instruction that the CRS, alternate CRS, and CRMs have the authority to halt construction in the area of a Discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;

4. 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;

5. An informational brochure that identifies reporting procedures in the event of a Discovery;

6. An acknowledgement form signed by each worker indicating that they have received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification: No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, or construction, shall occur prior to implementation of the WEAP program, unless such activities are specifically approved by the CPM.

1. At least 30 days prior to the beginning of pre-construction site mobilization, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval, and the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign.

2. On a monthly basis, until ground disturbance is completed, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of workers at the project site and on the linear facilities 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 preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction full time at the project site and linear facilities, and ground disturbance at laydown areas or other ancillary areas, to ensure there are no impacts to undiscovered resources (Discovery) and to ensure that known resources are not impacted in an unanticipated manner. The project owner shall ensure that archaeological monitors observe with particular care the wastewater pipeline trench excavation in the vicinity of site VV2 Site 23 and the foundation excavations of steel monopoles on Segment 1 in the vicinity of known significant site CA-SBR-72 and along Segment 1 where it runs along the river terrace.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of all earth-moving activities on the construction site or along the linear facility routes for as long as the activities are ongoing. Full-time archaeological monitoring shall require at least one monitor per excavation area where machines are actively moving earth. If an excavation area is too large for one monitor to effectively observe the earth-moving, one or more additional monitors shall be retained to observe the area.

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 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 cultural resources-related activities at the construction site, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

The CRS, at his or her discretion, or at the request of the CPM, may informally discuss cultural resource monitoring and mitigation activities with Energy Commission technical staff (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.

The project owner shall obtain a Native American monitor to monitor ground disturbance in any areas where Native American artifacts are discovered. The project owner shall ensure that a Native American monitor observes the wastewater pipeline trench excavation where the pipeline runs along the Mojave River terrace in the vicinity of site VV2 Site 23 and the foundation excavations of steel monopoles on Segment 1 in the vicinity of known significant site CA-SBR-72 and along Segment 1 where it runs along the river terrace. Contact lists of concerned Native Americans and guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored.

During and after construction, the project owner shall fulfill the requests received from Native American tribes or groups to be notified if artifacts are found and to receive copies of all archaeological records and reports resulting from the project.

Verification:

1. At least 30 days prior to the start of preconstruction site mobilization; construction ground disturbance; construction grading, boring and trenching; and construction, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log. 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.

2. 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 acceptable to the CPM. If the CRS concludes that daily reporting is no longer necessary, a letter or e-mail providing a detailed justification for the decision to reduce or end daily reporting shall be provided to the CPM for review and approval at least 24 hours prior to reducing or ending daily reporting.

3. At least 24 hours prior to implementing a proposed change in monitoring level, documentation justifying the change shall be submitted to the CPM for review and approval.

4. No later than 30 days following the discovery of any Native American cultural materials, the project owner shall submit to the CPM copies of letters of transmittal of requested information to the Chairperson of those Native American tribes or groups who requested it. 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.

CUL-7 The project owner shall grant authority to halt construction to the CRS, alternate CRS, and the CRMs in the event of a Discovery. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event cultural resources over 50 years of age or, if younger, considered exceptionally significant are found, or impacts to such resources can be anticipated, construction shall be halted or redirected in the immediate vicinity of the Discovery sufficient to ensure that the resource is protected from further impacts. The halting or redirection of construction shall remain in effect until 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 eligibility, and recommendations for mitigation of any cultural resources Discoveries, whether or not a determination of significance has been made.

2. The CRS has completed field notes, measurements, and photography for a DPR 523 primary form. The “Description” entry of the DPR 523 form shall include a recommendation on the significance of the find. The project owner shall submit completed forms to the CPM.

3. 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 preconstruction site mobilization; construction ground disturbance; construction grading, boring, and trenching; and construction, 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 activities 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. Completed DPR 523 forms 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 Prior to the dismantling of the towers of the Kramer-to-Victor 115-kV transmission line, the project owner shall obtain the services of an architectural historian. The project owner shall provide the CPM with the name and resume of the architectural historian. No preconstruction site mobilization, construction ground disturbance, construction grading, boring and trenching, or construction shall occur prior to CPM approval of the architectural historian, unless specifically approved by the CPM.

The resume for the architectural historian shall include names and telephone numbers of contacts familiar with the architectural historian's work and all information needed to demonstrate that the architectural historian has the following qualifications:

1. meets the Secretary of Interior's Professional Standards for architectural history;
2. has at least three years experience in recording twentieth-century industrial structures;
3. has completed at least one recordation project within the past five years involving coordination with the National Park Service's Heritage Documentation Program (HDP);

Verification:

1. At least 150 days prior to the dismantling of the towers of the Kramer-to-Victor 115-kV transmission line, the project owner shall submit the name and resume of the selected architectural historian to the CPM for review and approval.

2. At least 120 days prior to the dismantling of the towers of the Kramer-to-Victor 115-kV transmission line, the project owner shall confirm in writing to the CPM that the approved architectural historian is available for onsite work and provide a date by

which the architectural historian will undertake the HAER documentation of the Kramer-to-Victor 115-kV transmission line

CUL-9 Prior to the dismantling of the towers of the Kramer-to-Victor 115-kV transmission line, the owner shall ensure that the architectural historian prepares HAER documentation of the historic context and historic setting of the resource, and documentation of each kind of original tower that is present. The owner shall ensure that the architectural historian consults with the HDP, in Washington, D. C., and complies with HDP guidance on the extent and content of documentation appropriate for these structures, as contributing elements of a historic district that is potentially eligible for the National Register of Historic Places, and on the format and materials to be used in the documentation. To provide for the contingency that the HDP may require additional information after reviewing the architectural historian's draft documentation, the project owner shall ensure that the architectural historian over-records, in the field, those physical aspects (e.g., measurements, photographs, and photogrammetry) of the structures that will not be accessible after the structures have been dismantled. No Segment 3 preconstruction site mobilization, construction ground disturbance, or construction shall occur prior to the completion by the architectural historian of the over-recording, in the field, of the towers and historic setting and the submission to and approval by the CPM of the draft HAER documentation of the Kramer-to-Victor 115-kV transmission line, unless specifically allowed by the CPM.

Verification:

1. At least 90 days prior to the dismantling of the towers of the Kramer-to-Victor 115-kV transmission line, the project owner shall submit to the CPM a letter or memorandum from the architectural historian detailing the scope of the HDP-recommended documentation of the resource.
2. At least 60 days prior to the dismantling of the towers of the Kramer-to-Victor 115-kV transmission line, the project owner shall provide a copy of the draft HAER documentation of the resource to the CPM for review and approval.
3. Within 90 days after completion of ground disturbance (including landscaping) the project owner shall include in an appendix to the CRR copies of the transmittal letters for the submission of copies of the final HAER documentation of the towers of the Kramer-to-Victor 115-kV transmission line to the California State Library and to at least two local libraries in San Bernardino County, and a copy of the letter of acceptance of the final HAER documentation by the Library of Congress.

REFERENCES

Allan 2007 – James Allan. William Self Associates, Inc. Personal communication with Michael K. Lerch regarding testing at site VV2-23, October 16, 2007.

Basgall 1993 – Mark E. Basgall. Early Holocene Prehistory of the North-Central Mojave Desert. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Davis, 1993.

Bean and Smith 1978 – Lowell J. Bean and Charles R. Smith. "Serrano." In *Handbook of North American Indians*, vol. 8, pp. 570-574. Robert F. Heizer, ed. Washington, D.C.: Smithsonian Institution, 1978.

Bean, et al. 1981a – Lowell J. Bean, Silvia Brakke Vane, Michael Lerch, and Jackson Young. Native American Places in the San Bernardino National Forest, San Bernardino and Riverside Counties, California. Submitted to the United States Forest Service, South Zone Contracting Office, Arcadia, California. Menlo Park, California: Cultural Systems Research, Inc.,1981.

Bean, et al. 1981b – Lowell J. Bean, Silvia Brakke Vane, Michael Lerch, and Jackson Young. "A Glossary of Serrano and Other Native American Placenames and Other Terms, from the Ethnographic Notes of John Peabody Harrington." In *Native American Places in the San Bernardino National Forest, San Bernardino and Riverside Counties, California,* by Lowell J. Bean, Silvia Brakke Vane, Michael Lerch, and Jackson Young, Appendix. Submitted to the United States Forest Service, South Zone Contracting Office, Arcadia, California. Menlo Park, California: Cultural Systems Research, Inc.,1981.

Beattie 1955a – George W. Beattie (translator). Diario de una Expedición a la Tierra Adentro, Del P. José M' A. de Zalvidea, Desde el 19 de Julio Hasta el 14 de Agosto de 1806. Santa Barbara Archives, Tomo IV, pp. 49-68. In "Preliminary Report of the Archaeological Survey of the Deep Creek Site on the Upper Mohave River," by Gerald A. Smith, pp. 50-52. *San Bernardino County Museum Association Quarterly*, Vol. 2, No. 2, 1955.

Beattie 1955b – George W. Beattie (translator). Diary of Fr. Joaquín Pasqual Nuez, Minister of San Gabriel and Chaplain of the Expedition Against the Mohave Indians, begun by Lieutenant Gabriel Moraga, November 1819. Santa Barbara Archives, Tomo IV, pp. 137-149. In "Preliminary Report of the Archaeological Survey of the Deep Creek Site on the Upper Mohave River," by Gerald A. Smith, pp. 54-58. *San Bernardino County Museum Association Quarterly*, Vol. 2, No. 2, 1955.

Beattie and Beattie 1939 – George W. Beattie and Helen P. Beattie. *Heritage of the Valley: San Bernardino's First Century*. Pasadena, California: San Pasqual Press, 1939.

Benedict 1924 – Ruth F. Benedict. "A Brief Sketch of Serrano Culture." *American Anthropologist,* Vol. 26, No. 3, pp. 366-392, 1924.

Bischoff 2005 – Matt C. Bischoff. *Life in the Past Lane, The Route 66 Experience: Historic and Management Contexts for the Route 66 Corridor in California.* Technical Series 86. Tucson, Arizona: Statistical Research, 2005.

Bischoff, et al. 1981 – J. L. Bischoff, R. J. Schlemon, T. L. Ku, R. D. Simpson, R. J. Rosenbauer, and F. E. Budinger, Jr. "Uranium-Series and Soils-Geomorphic Dating of the Calico Archaeological Site, California." *Geology*, Vol. 9, pp. 576-582, 1981.

Blomberg 1987 – Nancy J. Blomberg. "A Historic Indian Community at Victorville, California." *The Journal of California Anthropology*, Vol. 9, No. 1, pp. 35-45, 1987.

Brown and Boyd 1922a – John Brown, Jr., and James Boyd. "Victorville and Victor Valley." In *History of San Bernardino and Riverside Counties,* Vol. 1, pp. 252-253. Chicago: Lewis Publishing Co., 1922.

Brown and Boyd 1922b – John Brown, Jr., and James Boyd. "Southwestern Portland Cement Company." In *History of San Bernardino and Riverside Counties,* Vol. 3, pp. 1429-1430. Chicago: Lewis Publishing Co., 1922.

Budinger 1981 – F. E. Budinger, Jr. "Evidence for Pleistocene Man in America: The Calico Early Man Site, Yermo, California." *Occasional Papers,* No. 1. Yermo, California: Friends of the Calico Early Man Site, 1981.

Casebier 1975 – Dennis G. Casebier. *The Mojave Road.* Tales of the Mojave Road, No. 5. Norco, California: Tales of the Mojave Road Publishing Company, 1975.

CEC 2007f – California Energy Commission/J. Kessler (tn: 41119). Data Request Set 1 (#s1 – 110). 6/22/07. Received 6/22/07.

City of Victorville 2007 – City History. In City of Victorville, http://www.ci.victorville.ca.us/about/city-history.html, updated 03/01/07, accessed 10/03/07.

County of San Bernardino 2007 – County of San Bernardino. County of San Bernardino 2007 General Plan. San Bernardino, California: County of San Bernardino, Land Use Services Division, 2007. http://www.co.san-bernardino.ca.us/landuseservices/general_plan/Default.asp, accessed 10/03/07.

Coues 1900 – Elliott Coues. *On the Trail of a Spanish Pioneer: The Diary and Itinerary of Francisco Garcés (Missionary Priest) in His Travels Through Sonora, Arizona, and California, 1775-1776.* 2 Vols. New York: Francis P. Harper, 1900.

CRM Tech 2001 – CRM Tech. Identification and Evaluation of Historic Properties, Southern California Logistics Airport Runway 17/35 Extension to 15,000 Feet. Submitted to Tom Dodson and Associates. On file at the San Bernardino Archaeological Information Center, San Berarndino County Museuem. Redlands, Calif., 2001.

CRM Tech 2003 – CRM Tech. Historical/Archaeological Resources Survey Report, Southern California Logistics Airport Specific Plan Amendment and Rail Service Project. Submitted to RBF Consulting. On file at the San Bernardino Archaeological Information Center, San Berarndino County Museuem. Redlands, Calif., 2003.

CRM Tech 2004 – CRM Tech. Historical/Archaeological Resources Survey Report, Victor Valley Wastewater Reclamation Authority Regional Plant Expansion Project. Submitted to RBF Consulting. On file at the San Bernardino

Archaeological Information Center, San Berarndino County Museuem. Redlands, Calif., 2004.

Davis 1961 – James T. Davis. “Trade Routes and Economic Exchange among the Indians of California.” *University of California Archaeological Survey Reports*, Vol. 54, pp. 1-71, 1961.

Davis and Smith 1981 – Alan C. Davis and Gerald A. Smith. *Newberry Cave*. Redlands, California: San Bernardino County Museum Association, 1981.

Dumke 1944 – Glenn S. Dumke. *The Boom of the Eighties in Southern California*. San Marino, Calif.: Huntington Library, 1944.

Duvall and Venner 1979 – J. G. Duvall and W. T. Venner. “A Statistical Analysis of the Lithics from the Calico Site (SBCM 1500A), California.” *Journal of Field Archaeology,* Vol. 6, No. 4, pp. 455-462, 1979.

Earle 1992 – David D. Earle. “Overview of the History of the Upper Mojave River Area.” In *Cultural Resources Sensitivity Study of the Mojave River Corridor, San Bernardino County, California,* by John Torres, David D. Earle, Sean Connell, Stephen Wells, and Bruce Love, pp. 15-72. Archaeological Research Unit, University of California, Riverside (UCRARU #1168). Submitted to Tierra Madre Consultants, Riverside, California. In *Natural Resources of the Mojave River Corridor,* Submitted to Mojave River Corridor Task Force, City of Victorville, Parks and Recreation Department, Victorville, California. Riverside, California: Tierra Madre Consultants, 1992.

Earle 1997 – David D. Earle. “Ethnohistoric Overview of the Edwards Air Force Base Region and the Western Mojave Desert.” Submitted to Edwards AFB, California, and U.S. Army Corps of Engineers, Los Angeles, California. Palmdale, California: Earle and Associates, 1997.

Earth Tech 1997 – Earth Tech. Cultural Resources Investigation for the Rail Alignment Property and TCE Property at George AFB, San Bernardino County, California. Submitted to the United States Air Force. On file at the San Bernardino Archaeological Information Center, San Berarndino County Museuem. Redlands, Calif., 1997.

Farmer 1935 – Malcolm J. Farmer. “The Mohave Trade Route.” *The Masterkey*, Vol. 9, No. 5, pp. 154-157, 1935.

Frémont 1845 – J. C. Frémont. *Report of the Exploring Expedition to the Rocky Mountains in the Year 1842, and to Oregon and North California in the Years 1843-’44*. Washington, D.C.: Gales and Seaton, 1845.

Geoscientific Systems and Consulting 1980 – Final Report: Archaeological/Historical Assessment of George Air Force Base. Submitted to the United States Air Force. Contract No. FO4609-80-C0030. On file at the San Bernardino Archaeological Information Center, San Berarndino County Museuem. Redlands, Calif., 1980.

Gifford 1918 – Edward W. Gifford. “Clans and Moieties in Southern California.” *University of California Publications in American Archaeology and Ethnology*, Vol. 14, No. 2, pp. 155-219, 1918.

Hardesty 1988 – Donald L. Hardesty. *The Archaeology of Mining and Miners: A View from the Silver State.* Special Publication Series, No. 6. Pleasant Hill, California: Society for Historical Archaeology, 1988.

Harrington 1986 – John P. Harrington. “Native American History, Language, and Culture of Southern California/Basin.” *The Papers of John Peabody Harrington in the Smithsonian Institution, 1907-1957*, Vol. 3. Microfilm edition. White Plains, New York: Kraus International Publications, 1986.

Haynes 1973 – C.V. Haynes, Jr. “The Calico Site: Artifacts or Geofacts?” *Science*, Vol. 181, No. 4097, pp. 305-310, 1973.

Holladay, 1986 – Fred Holladay, “Ohioan Helped Rail Route—and Victorville Come to Pass,” *San Bernardino Sun,* October 12, 1986, p. E4.

Johnson 2001 – John R. Johnson. Personal communication with Michael K. Lerch, April 2001.

Kroeber 1925 – Alfred L. Kroeber. *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. Washington, D.C.: Smithsonian Institution, 1925.

Laird 1975 – Carobeth Laird. *Encounter with an Angry God: Recollections of My Life with John Peabody Harrington*. Banning, California: Malki Museum Press, 1975.

Lerch 1985 – Michael K. Lerch. Another Look at the Desert Mohave: A Review of Ethnohistoric Data and Archaeological Implications. Ms. on file, Department of Anthropology, University of California, Riverside., 1985.

Lerch n.d. – Michael K. Lerch. *Chukiam (All Growing Things): The Ethnobotany of the Serrano Indians*. Unpublished manuscript in possession of the author.

Lyman 1988 – Edward L. Lyman, "Outmaneuvering the Octopus, Atchison Topeka and Santa Fe," *California History,* June 1988, 94-107.

Martin Marietta Energy Systems 1991 – Martin Marietta Energy Systems, Inc. Final George Air Force Base, California, World War II Buildings/Facilities Architectural and Historical Evaluation. Prepared in association with Sicence Applications International Corporation and Hatheway & Associates. On file at the San Bernardino Archaeological Information Center, San Berarndino County Museuem. Redlands, Calif., 1991.

McIntire 1986 – Harlan D. McIntire. History and Development. In *Soil Survey of San Bernardino County, California: Mojave River Area,* by Arlene J. Tugel and George A. Woodruff, pp. 1-2. Washington, D.C.: USDA Soil Conservation Service, 1986.

McKenna 1998 – Jeanette A. McKenna. An Intensive Archaeological Survey of the Victor Valley Regional Wastewater Reclamation Plant Expansion Areas, Victorville, San Bernardino County, California. Submitted to VVWRA. On file at the San Bernardino Archaeological Information Center, San Berarndino County Museuem. Redlands, Calif., 1998.

Moratto 1984 – Michael J. Moratto. *California Archaeology*. Academic Press, Orlando, Florida, 1984.

Myers 1983 – William A. Myers. Iron Men and Copper Wires: A Centennial History of Southern California Edison Company. Glendale, Calif.: Trans-Anglo Books, 1983.

Myrick 1992 – David F. Myrick. *Railroads of Nevada and Eastern California: Volume II, The Southern Roads*. Reno, Nevada: University of Nevada Press, 1992.

Norris 1982 – Frank Norris. On Beyond Reason: Homesteading in the California Desert, 1885–1940. *Historical Society of Southern California Quarterly* Vol. 64, No. 4, 1982.

Oakeshott 1971 – G. B. Oakeshott. *California's Changing Landscapes*. New York: McGraw-Hill Book Co., 1971.

Payen 1982 – L. A. Payen. “Artifacts or Geofacts at Calico: Application of the Barnes Test.” In *Peopling of the New World*, edited by J. E. Ericson, R. E. Taylor, and R. Berger, pp. 193-201. Anthropological Papers 23. Los Altos, California: Ballena Press.

Peirson 1970 – Erma Peirson. *The Mojave River and Its Valley.* Glendale, California: Arthur H. Clark Company, 1970.

Rector, et al. 1983 – Carol H. Rector, James D. Swenson, and Philip J. Wilke (editors). *Archaeological Studies at Oro Grande, Mojave Desert, California*. Redlands, California: San Bernardino County Museum Association, 1983.

Schneider 1988 – Joan S. Schneider. “Late Prehistoric Times in the Central Mojave Desert: Some Problems.” *Pacific Coast Archaeological Society Quarterly*, Vol. 24, No. 1, pp. 30-44, 1988.

Schroth 1994 – Adella Schroth. The Pinto Point Controversy in the Western United States. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Riverside, 1994.

Schuiling 1979 – Walter C. Schuiling (editor). *Pleistocene Man at Calico*. Redlands, California: San Bernardino County Museum Association, 1979.

Scott and Kelly 1988 – Quinta Scott and Susan K. Kelly. *Route 66: The Highway and its People*. Norman: University of Oklahoma Press.

Sheets and Woodman 1990 – Robert Sheets and Craig Woodman. Archaeological Survey and Inventory of George Air Force Base, California. Science Applications

Internations Corporation. Submitted to Martin Marietta Systems. On file at the San Bernardino Archaeological Information Center, San Berarndino County Museuem. Redlands, Calif., 1990.

Simpson et al. 1979 – Ruth Dee Simpson, Robert Reynolds, Arda Haenszel, Doris H. Bowers, and Herbert Minshall. *The Eastern Calico Mountains District: An Archaeological Survey in the Mojave Desert of Eastern San Bernardino County*. Ms. on file, San Bernardino County Archaeological Information Center, Redlands, California, 1979.

Simpson, et al. 1989 – R. D. Simpson, R. M. Higginbotham, and D. Kasper. *An Introduction to the Calico Early Man Site Lithic Assemblage*. San Bernardino County Museum Association Quarterly, Vol. 36, No. 3, 1989.

Smith 1963 – Gerald A. Smith. *Archeological Survey of the Mojave River and Adjacent Regions*. Bloomington, California: San Bernardino County Museum Association,1963.

Strong 1929 – William Duncan Strong. *Aboriginal Society in Southern California*. University of California Publications in American Archaeology and Ethnology 26, 1929.

Sutton et al. 2007 – Mark Q. Sutton, Mark E. Basgall, Jill K. Gardner, and Mark W. Allen. “Advances in Understanding Mojave Desert Prehistory.” In *California Prehistory: Colonization, Culture, and Complexity,* edited by Terry L. Jones and Kathryn A. Klar, pp. 229-245. Lanham, Maryland: AltaMira Press, 2007.

Thompson 1921 – David G. Thompson. *Routes to Desert Watering Places in the Mohave Desert Region, California.* Water Supply Paper 490-B. USDI, U.S. Geological Survey. Washington, D.C.: Government Printing Office, 1921.

Thompson and Thompson 1995 – Richard D. Thompson and Kathryn L. Thompson. *Pioneer of the Mojave: The Life and Times of Aaron G. Lane.* Apple Valley, California: Desert Knolls Press, 1995.

Van Dyke 1994 – Dix Van Dyke. “Life on the Mojave River Valley: The Piutes of 1904.” In *Once Upon a Desert*, edited by Patricia Jernigan Keeling, p. 41. Barstow, California: Mojave River Valley Museum Association, 1994.

Victorville 1997 – City of Victorville. Resource Element. In *City of Victorville General Plan,* 1997, updated 08/01/07*.* http://www.ci.victorville.ca.us/about/general-plan.html, accessed 10/3/07.

Victorville 2007a – City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vol. 1&2. 2/27/07. Received 2/28/07.

Victorville 2007c – City of Victorville (tn: 41644). Applicant’s Responses to CEC’s Data Request Set 1, #s 1 – 110. 7/23/07. Received 7/23/07.

Vredenburgh et al. 1981 – Larry M. Vredenburgh, Gary L. Shumway, and Russell D. Hartill. Desert Fever: An Overview of Mining in the California Desert. Canoga Park, California: Living West Press, 1981.

Walker 1986 – Clifford J. Walker. *Back Door to California: The Story of the Mojave River Trail*. Barstow, California: Mojave River Valley Museum Association, 1986.

Wallis 1990 – Michael Wallis. *Route 66: The Mother Road*. New York: St. Martin's Press, 1990.

Walsh 1976 – Jane Maclaren Walsh. John Peabody Harrington: The Man and His California Indian Fieldnotes. *Anthropological Papers*, No. 6. Ramona, California: Ballena Press.

Warren 1984 – Claude N. Warren. “The Desert Region.” In *California Archaeology*, by Michael J. Moratto, pp. 339-430. Orlando: Academic Press, 1984.

WSA 2007a – William Self Associates, Inc. (tn 39589). Draft Confidential Cultural Resource Assessment Report, Victorville 2 Hybrid Power Project, San Bernardino County, California. Received 3/19/07.

WSA 2007b – William Self Associates, Inc. (tn 41731). Confidential Responses to Victorville 2 Hybrid Power Project (07-AFC-01), San Bernardino County, California. CEC Staff Data Request Numbers 24-50. Received 7/27/07.

WSA 2007c – William Self Associates, Inc. (tn 43327). Supplementary Cultural Resources Data Request Responses (DRs 29, 32, 33, and 36). DR29-1. Received 9/28/07.

Warren and Roske 1981 – Elizabeth von Till Warren and Ralph J. Roske. *Cultural Resources of the California Desert, 1776-1880: Historic Trails and Wagon Roads*. Cultural Resources Publications, Anthropology–History. Riverside, California: Bureau of Land Management, 1981.

Yohe 1992 – Robert M. Yohe, II. A Reevaluation of Western Great Basin Cultural Chronology and Evidence for the Timing of the Introduction of the Bow and Arrow to Eastern California Based on New Excavations at the Rose Spring Site (CA-Iny-327). Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Riverside, 1992.

Yohe 1998 – Robert M. Yohe, II. “The Introduction of the Bow and Arrow and Lithic Resource Use at Rose Spring (CA-INY-372).” *Journal of California and Great Basin Anthropology*, Vol. 20, No. 1, pp. 26-52, 1998.

HAZARDOUS MATERIALS MANAGEMENT

Alvin J. Greenberg, Ph.D. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed project, along with staff's proposed mitigation measures, indicate that hazardous materials use at the proposed Victorville 2 Hybrid Power Plant Project (Victorville 2) would not present a significant impact on the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations and standards (LORS). In response to Health and Safety Code, section 25531 et seq., the applicant would be required to develop a Risk Management Plan (RMP). To ensure the adequacy of this plan, staff's proposed conditions of certification require that it be submitted for concurrent review by the Victorville Fire Department (VFD) and the California Energy Commission (Energy Commission) staff. Other proposed conditions of certification address the transportation, storage, and use of aqueous ammonia and engineering controls on the pipes containing the heat transfer fluid in the solar generating system.

INTRODUCTION

The purpose of this **HAZARDOUS MATERIALS MANAGEMENT** analysis is to determine if the proposed Victorville 2 could potentially cause significant impacts on the public from the use, handling, storage, or transportation of hazardous materials at the proposed project site. If significant adverse impacts on the public are identified, Energy Commission staff must evaluate facility design alternatives and additional mitigation measures to reduce those impacts to the extent feasible.

This analysis does not address the potential exposure of workers to hazardous materials used at the proposed project site. Employers must inform employees of hazards associated with their work and provide those employees with special protective equipment and training to reduce the potential of health impacts from the handling of hazardous materials. The **WORKER SAFETY AND FIRE PROTECTION** section of this document describes the protection of workers from those risks.

Aqueous ammonia (19% ammonia in aqueous solution) is the only acutely hazardous material proposed for use or storage at Victorville 2 in quantities exceeding the reportable amounts defined in California Health and Safety Code, section 25532 (j) (Victorville 2007a, section 6.7.4.2). Aqueous ammonia will be used for controlling oxides of nitrogen (NO_x) emissions through selective catalytic reduction. The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with use of the more hazardous anhydrous form of ammonia. Use of the aqueous form eliminates the high internal energy associated with the anhydrous form, which is stored as a liquefied gas at elevated pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air and cause high down-wind concentrations. Spills associated with the aqueous form are much easier to contain than those associated with anhydrous ammonia, and emissions from these spills are limited by the slow mass transfer from the surface of the spilled material.

Other hazardous materials such as mineral and lubricating oils, corrosion inhibitors, herbicides, catalyst panels, acids and bases to control pH, and a heat transfer fluid (HTF) will be present at the proposed project site. Hazardous materials used during the construction phase include gasoline, diesel fuel, motor oil, lubricants, and small amounts of solvents and paint. No acutely toxic hazardous materials will be used on-site during construction. None of these materials pose a significant potential for off-site impacts as a result of the quantities on-site, their relative toxicity, their physical states, and/or their environmental mobility. Although no natural gas is stored, the project will involve the handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. Natural gas will be delivered via an existing gas pipeline adjacent to the property at its southwest boundary; this pipeline also supplies the nearby High Desert Power Plant. A new pipeline spur will be installed to transport the gas the short distance to the site (Victorville 2007a, sections 2.1 and 6.7.4.2). Victorville 2 will also require the transportation of aqueous ammonia to the facility, as well as other liquid and solid hazardous materials. This document addresses all potential impacts associated with the use, storage, and transport of hazardous materials.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

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

HAZARDOUS MATERIALS MANAGEMENT Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III).
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Establishes a nationwide emergency planning and response program, and imposes reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA Section on Risk Management Plans (42 USC §112(r)	Requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 CFR 172.800	Requires that the suppliers of hazardous materials prepare and implement security plans in accordance with U.S. Department of Transportation (DOT) regulations.

49 CFR Part 1572, Subparts A and B	Requires that suppliers of hazardous materials ensure that their hazardous material drivers comply with personnel background security checks.
The Clean Water Act (CWA) (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures (SPCC) plan to be prepared for facilities that store oil that could leak into navigable waters.
Title 49, Code of Federal Regulations, Part 190	Outlines gas pipeline safety program procedures.
Title 49, Code of Federal Regulations, Part 191	Addresses the transportation of natural and other gases by pipeline. Requires preparation of annual reports, incident reports, and safety-related condition reports. Also requires operators of pipeline systems to notify the U.S. Department of Transportation DOT) of any reportable incident by telephone and submit a follow-up written report within 30 days.
Title 49, Code of Federal Regulations, Part 192	Addresses transportation of natural and other gases by pipeline: Requires minimum federal safety standards, specifies minimum safety requirements for pipelines, and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use that characterize the surrounding land. This part also contains regulations governing pipeline construction, which must be followed for Class 2 and Class 3 pipelines, and requirements for preparing a pipeline integrity management program.
6 CFR Part 27	The CFATS (Chemical Facility Anti-Terrorism Standard) regulation of the U.S. Department of Homeland Security (DHS) that requires facilities that use or store certain hazardous materials to submit information to the DHS so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
California Health and Safety Code, section 25531 to 25543.4	The California Accidental Release Program (Cal-ARP) requires the preparation of a Risk Management Plan (RMP) and Off-site Consequence Analysis (OCA) and submittal to the local Certified Unified Program Authority (CUPA) for approval.
Title 8, California Code of Regulations, Section 5189	Requires facility owners to develop and implement effective safety management plans to ensure that large quantities of hazardous materials are handled safely. While these requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

Title 8, California Code of Regulations, Section 5189	Sets forth requirements for design, construction, and operation of the vessels and equipment used to store and transfer ammonia. These sections generally codify the requirements of several industry codes including the American Society for Material Engineering (ASME) Pressure Vessel Code, the American National Standards Institute (ANSI) K61.1, and the National Boiler and Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia but are also used to design storage facilities for aqueous ammonia.
California Health and Safety Code, Section 41700	Requires that "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water.
Local	
City of Victorville, Municipal Code, Section 8.05.020	Adopts the Uniform Fire Code, Year 2000 edition, in its entirety, including provisions for the storage and handling of hazardous materials, fire protection, emergency venting, and hazardous materials thresholds for permitting requirements.

The VFD acts as the Certified Unified Program Authority (CUPA), and is responsible for reviewing RMPs and Hazardous Materials Business Plans. With regard to seismic safety issues, the proposed Victorville 2 site is located in Seismic Risk Zone 4. The construction and design of buildings and vessels storing hazardous materials will meet the seismic requirements of the Uniform Building Code (Victorville 2007a, section 2.4.6).

SETTING

Several characteristics of an area in which a project is located affect its potential for an accidental release of a hazardous material. These include:

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

METEOROLOGICAL CONDITIONS

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

Recorded wind speeds and ambient air temperatures are described in the Air Quality section (6.3.2) and Appendix G.1 of the Application for Certification (AFC) (Victorville 2007a). Staff agrees with the applicant that use of F stability (stagnated air, very little mixing), wind speed of 1.5 meters per second, and the highest recorded temperature in the project area in the past three years are appropriate for conducting an offsite consequence analysis (Victorville 2007a, section 6.7.4.3). Staff believes this represents a reasonably conservative scenario and reflects worst-case atmospheric conditions.

TERRAIN CHARACTERISTICS

The location of elevated terrain is often an important factor in assessing potential exposure. An emission plume from an accidental release may impact high elevations before it impacts lower elevations. The topography of the Victorville 2 site is essentially flat at about 2,800 feet above sea level, as are elevations to the north, west, and south. Elevations to the east slope down toward the Mojave River (Victorville 2007a, section 2.3.1). Because of the nature of the surrounding area, terrain above stack height is not of concern for the project.

LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. Sensitive receptors within a 6-mile radius of the project vicinity are shown on Figure 6.11-2 of the AFC Public Health section. The nearest sensitive receptor is the Oro Grande Elementary School, which is located approximately three miles south from the project site in city of Victorville. The Harold George Magnet Elementary and Harry Shepard Middle schools are located between three and four miles south from the site also in city of Victorville. The St. Mary Medical Center in the adjacent town of Adelanto is approximately 4.2 miles from the site (Victorville 2007a, section 6.7.2). The nearest residence is slightly more than one mile to the west.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

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

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

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

Staff reviewed and evaluated the proposed use of hazardous materials, as described by the applicant (Victorville 2007a, section 6.7.4). Staff's assessment followed the five steps listed below:

- Step 1: Staff reviewed the chemicals and amounts proposed for on-site use, as listed in Table 6.7-3 of the AFC (and revised Table 6.7-3 found in the applicant's responses to data requests), and determined the need and appropriateness of their use. Only those that are needed and appropriate are allowed to be used. If staff feels that a safer alternative chemical can be used, staff will recommend or require its use, depending upon the impacts posed.
- Step 2: Those chemicals, proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off the site and impact the public, were removed from further assessment.
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different size transfer-hose couplings and administrative controls such as worker training and safety management programs.
- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading, and administrative controls such as training emergency response crews.
- Step 5: Staff analyzed the theoretical impacts on the public of a worst-case spill of hazardous materials even with the mitigation measures proposed by the applicant. When mitigation methods proposed by the applicant are sufficient, no further mitigation is recommended. If the proposed mitigation is not sufficient to reduce the

potential for adverse impacts to an insignificant level, staff will propose additional prevention and response controls until the potential for causing harm to the public is reduced to an insignificant level. It is only at this point that staff can recommend that the project be allowed to use hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small Quantity Hazardous Materials

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

During the construction phase of the project, the only hazardous materials proposed for use include paint, cleaners, solvents, gasoline, diesel fuel, motor oil, and lubricants. Any impact of spills or other releases of these materials would be limited to the site because of the small quantities involved, the infrequent use and hence reduced chances of release, and/or the temporary containment berms used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuel all have very low volatility and would represent limited off-site hazards, even in larger quantities.

During operations, hazardous chemicals such as cleaning agents, lube oil, sulfuric acid, sodium hydroxide, sodium hypochlorite, ferric sulfate, and other various chemicals (see **Hazardous Materials Appendix B** for a list of all chemicals proposed to be used and stored at Victorville 2) would be used and stored on-site and represent limited off-site hazard due to their small quantities, low volatility, and/or low toxicity.

After removing from consideration those chemicals that pose no risk of off-site impact in Steps 1 and 2, staff continued with Steps 3, 4, and 5 to review the remaining hazardous materials: natural gas, aqueous ammonia, and the heat transfer fluid Therminol.

Large Quantity Hazardous Materials

Natural Gas

Natural gas poses a fire and/or possible explosion risk because of its flammability. Natural gas is composed mostly of methane, but it also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, tasteless, and lighter than air. Natural gas can cause asphyxiation when methane’s concentration exceeds 90%. Methane is flammable when mixed in air at concentrations of 5-14%, which is also its detonation range. Natural gas therefore poses a risk of fire and/or explosion if a release were to occur under certain specific conditions. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1998), natural gas is less likely to result in an unconfined vapor cloud explosion than many other fuel gases such as propane or liquefied petroleum gas although an unconfined vapor cloud of natural gas can explode under certain conditions (as demonstrated by the natural gas explosion in Belgium in July 2004).

While natural gas will be used in significant quantities, it will not be stored on-site. It will be delivered via an underground pipeline that currently delivers gas to the High Desert Power Plant approximately three miles from Victorville 2. The risk of a fire and/or explosion on-site can be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. The National Fire Protection Association (NFPA 85A) requires the use of double block and bleed valves for gas shut-off and automated combustion controls. These measures will significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures would require air purging of the gas turbines prior to start-up, thus precluding formation of an explosive mixture. The Safety Management Plan proposed by the applicant would address both the handling and use of natural gas and significantly reduce the potential for equipment failure due to either improper maintenance or human error.

Therminol VP-1

Therminol VP1 is the HTF that will be used in the solar panels to collect solar heat and transfer it in order to generate steam to run the steam turbine. Approximately 260,000 gallons of HTF will be contained in the pipes and heat exchanger. Therminol is a mixture of 73.5% diphenyl ether and 26.5% biphenyl, and is a solid at temperatures below ~54 °F. Because nighttime temperatures during the winter often drop below 54 °F in the high desert, auxiliary heating is provided to keep Therminol in a liquid state. Therminol can therefore be expected to remain liquid if a spill occurs. While the risk of off-site migration is minimal, Therminol is highly flammable and fires have occurred at other solar generating stations that use it. Staff has assessed the properties of Therminol, and reviewed the record of its use at Solar Electric Generating Stations 8 and 9 at Harper Lake, California. Past leaks, spills, and fires involving this HTF were examined and discussed. It appears that the placement of additional isolation valves in the HTF pipe loops throughout the solar array would add significantly to the safety and operational integrity of the entire system by allowing a loop to be closed if a leak develops in a ball joint, flex-hose, or pipe, instead of closing off the entire HTF system and shutting down the plant. Staff therefore proposes Condition of Certification **HAZ-7,** which would require the project owner to install a sufficient number of isolation valves that can be either manually or remotely activated.

Aqueous Ammonia

Aqueous ammonia will be used to control the emission of oxides of nitrogen (NO_X) from the combustion of natural gas at Victorville 2. The accidental release of aqueous ammonia, without proper mitigation, can cause significant down-wind concentrations of ammonia gas. Victorville 2 will have 19% aqueous ammonia solution in a stationary aboveground storage tank, with an approximate 30,000-gallon capacity (Victorville 2007a, section 6.7.4.2).

Based on staff's analysis, aqueous ammonia is the only hazardous material that may pose a significant off-site risk. The use of aqueous ammonia can result in the formation and release of toxic gases in the event of a spill, even without interaction with other chemicals. This is the result of its moderate vapor pressure and the large amounts of aqueous ammonia to be used and stored on-site. However, as with the example of using aqueous sodium hypochlorite as a substitute for the very hazardous chlorine gas, the use of aqueous ammonia instead of the much more hazardous anhydrous ammonia (in other words, ammonia that is not diluted with water) poses far less risk.

To assess the potential impacts of an accidental release of aqueous ammonia, staff uses four “bench mark” exposure levels of ammonia gas These include: 1) the lowest concentration that poses a lethal risk, 2,000 ppm; 2) the Immediately Dangerous to Life and Health (IDLH) level of 300 ppm; 3) the Emergency Response Planning Guideline l(ERPG) level 2 of 150 ppm, which is also the RMP level 1 criterion used by US EPA and California; and 4) the level considered by Energy Commission staff to be without serious adverse effects to the public for a one-time exposure of 75 ppm (considered by staff to be a *level of significance*). If exposure to a potential release exceeds 75 ppm at any public receptor, staff presumes that that release poses a risk of significant impact. However, staff will also assess the probability of occurrence of the release and/or the nature of the potentially exposed population in determining if the likelihood and extent of potential exposure are sufficient to support a finding of potentially significant impact. A detailed discussion of the exposure criteria considered by staff, and their applicability to different populations and exposure-specific conditions, is provided in **Hazardous Materials Appendix A**.

Section 6.7.4.3 of the AFC (Victorville 2007a) describes the modeling parameters used for the worst-case accidental releases of aqueous ammonia in the applicant’s Off-site Consequence Analysis (OCA). The OCA was conducted by the applicant and based on the final design configuration for the Victorville 2 ammonia storage tank. The OCA considered tank size, the surface area of the containment structure, the location of the storage area relative to potential off-site receptors, local climatology, and the type of release. Pursuant to the California Accidental Release Program (CalARP) regulations (federal Risk Management Plan regulations do not apply to sources that store/use aqueous ammonia solutions below 20%), the OCA was performed for the worst-case release scenario, which involved the failure and complete discharge of the storage tanks, as well as an alternative release scenario which assumed a contained 10-minute release from a loading hose separation during ammonia delivery. Ammonia emissions from two potential release scenarios were calculated, following methods provided in the RMP *Offsite Consequence Analysis Guidance*, US EPA, April 1999. The default meteorological data necessary for emission and dispersion calculations were supplemented with daily temperature data, as required by Title 19, California Code of Regulations, section 2750.2. The maximum temperature recorded in the area in the past three years was used for emission and dispersion calculations.

Results from the OCA were tabulated showing the distance from the point of release (the source) to the downwind concentrations of 150 ppm and 75 ppm for both release scenarios, and are summarized in Table 6.7-4 of the AFC. **Hazardous Materials Management Table 2** shows the applicant’s modeled distance to the four benchmark criteria concentrations at an elevation of 5.25 feet above ground level.

Hazardous Materials Management Table 2
Distance to EPA/CalARP and CEC Toxic Endpoints

Scenario Distance in Feet to 2,000 ppm	Distance in Feet to IDLH (300 ppm)	Distance in Feet to AIHA's ERPG-2 (150 ppm)	Distance in Feet to CEC level (75 ppm)
~46	~125	~197	~279

(Source: Victorville 2007a, Table 6.7-4)

Due to the remote location of the proposed power plant, the distance to the nearest resident of greater than one mile, and the results of the applicant's OCA showing that staff's level of concern (75 ppm) was not reached beyond 85 meters (~279 feet) from the aqueous ammonia storage tank, staff did not conduct its own modeling. Staff believes that the engineering controls proposed by the applicant are adequate and will ensure that no significant risk would be posed to off-site receptors should a spill of aqueous ammonia occur.

Mitigation

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

Engineering Controls

Engineering controls help prevent accidents and releases (spills) from moving off-site and impacting the community by incorporating engineering safety design criteria into the project's design. Engineering safety features proposed by the applicant include:

- Construction of secondary containment areas surrounding each of the hazardous materials storage areas, designed to contain accidental releases during storage or delivery;
- Physical separation of stored chemicals in isolated containment areas, separated by a noncombustible partition in order to prevent the accidental mixing of incompatible materials, which may in turn cause the formation and release of toxic gases or fumes;
- Construction of a more specific and detailed concrete secondary containment area surrounding the aqueous ammonia storage tank;
- Construction of a bermed containment area surrounding the truck unloading area; and
- Process protective systems, including continuous tank level monitors, temperature and pressure monitors, alarms, check valves, and emergency block valves.

Administrative Controls

Administrative controls help prevent accidents and releases (spills) from moving off-site and impacting the community by establishing worker training programs and process safety management programs.

A Worker Health and Safety Program will be prepared by the applicant and include (but not be limited to) the following elements (see the **WORKER SAFETY/FIRE PROTECTION** section in this PSA for specific regulatory requirements):

- Worker training on chemical hazards, health and safety issues, and hazard communication;
- Procedures to ensure the proper use of personal protective equipment;
- Safety operating procedures for the operation and maintenance of systems that use hazardous materials;
- Fire safety and prevention; and
- Emergency response actions including facility evacuation, hazardous material spill cleanup, and fire prevention.

At Victorville 2, the project owner will be required to designate an individual who will have the responsibility and authority to ensure a safe and healthful workplace. This project health and safety official will oversee the health and safety program and will have the authority to halt any action or modify any work practice in order to protect the workers, facility, and the surrounding community in the event that the health and safety program is violated.

The applicant will also prepare a Risk Management Plan (RMP) for aqueous ammonia as required by CalARP regulations and Condition of Certification **HAZ-2** that would include a program for prevention of accidental releases and responding to an accidental release of aqueous ammonia. A Hazardous Materials Business Plan (HMBP) will also be prepared by the applicant that would incorporate state requirements for the handling of hazardous materials (Victorville 2007a, section 6.7.1.1).

On-site Spill Response

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

The VFD HazMat Team is currently based at Fire Station No. 314, which is located approximately 15 miles from the project site. For emergency spills, all VFD personnel are trained as first responders, and assist with both evacuation and fire containment; but they are not responsible for hazardous materials cleanup. If a spill is identifiable, and easily contained and cleaned up, the VFD HazMat team will use the proper absorbents to contain and clean up the spill. If the spill is large, unidentifiable, or VFD personnel are unable to contain or clean up the spill, the VFD will draw on its partnership agreement with San Bernardino County for containment and cleanup. The VFD response time to a hazmat emergency call from Victorville 2 is approximately 30 to 45 minutes (Becker 2007).

Staff concludes that the hazardous material response time is acceptable, and that the VFD HazMat Response Team is adequately trained and equipped to respond to an emergency at Victorville 2 in a timely manner. The remote location lengthens the response but, at the same time, eliminates the risk of off-site consequences to the public.

Transportation of Hazardous Materials

Hazardous materials including aqueous ammonia, sulfuric acid, and cleaning chemicals, will be transported to the facility via tanker truck. While many types of hazardous materials will be transported to the site, staff believes that the transport of aqueous ammonia poses the predominant risk associated with hazardous materials transport. Previous modeling of the spills involving aqueous hypochlorite and 93% sulfuric acid - two hazardous materials that will be used, stored, and transported at the proposed power plant – has demonstrated that minimal airborne concentrations would occur at short distances from the spill.

The applicant has not selected one route for the delivery of hazardous materials during either the construction or the commercial operation of the project, and has instead identified three alternate routes. The first route is from the south via I-15 to US-395, to Air Expressway to Phantom East Street to the new Perimeter Road (to be completed after construction starts but before commercial operation begins), and then to the plant site (Victorville 2007a, p.6.13-18). Subsequently, in response to a data request from intervener CURE, the applicant has indicated that the hazardous materials transportation route could be I-15 to the D Street exit, to National Trails Highway to Airport Air Expressway, to Adelanto Road to Colusa Road to the new Perimeter Road, and then onto the project site. Finally, the third option would be I-15 to US-395 to Air Expressway, to Adelanto Road to Colusa Road, to the new Perimeter Road and then onto the project site (ENSR 2007d). The applicant indicates that a school is located on the Southern California Logistics Airport land about a quarter mile north of Air Expressway and nearly two miles east of Adelanto Road. Staff has reviewed these three alternative routes and determined that, for commissioning and commercial operations, the best route is for all vehicles transporting hazardous materials to remain on I-15 for as long as possible and exit at D Street, which becomes National Trails Highway north of I-15, and take that road north to Airport Air Expressway, then west to Phantom East Street, then north to Perimeter Road and on to the new section of Perimeter Road to the power plant site. This route involves the shortest distance on surface streets and avoids passing any sensitive receptors, including the school mentioned above. During construction and prior to the new Perimeter Road extension, staff believes that minimal amounts and types of hazardous materials (paint, cleaners, solvents, gasoline, diesel fuel, motor oil, lubricants, and welding gases in standard-sized cylinders) do not pose a significant risk of either spills or public impacts along any transportation route. Staff therefore does not recommend a specific route during this period. However, the route preferred by staff must be used for the transport of any hazardous material (found in **Appendix B** of this assessment) used during construction or commercial operations.

Ammonia or other liquid hazardous materials can be released during a transportation accident, and the extent of their impact in the event of a release would depend on the location of the accident and the rate of vapor dispersion from the surface of the spilled pool. The likelihood of an accidental release during transport is dependent upon three factors:

- The skill of the tanker truck driver;
- The type of vehicle used for transport; and
- Accident rates.

To address this concern, staff evaluated the risk of an accidental transportation release in the project area. Staff's analysis focused on the project area after the delivery vehicle leaves the main Interstate highway (I-15). Staff believes it is appropriate to rely upon the extensive regulatory program that applies to shipment of hazardous materials on California Highways to ensure safe handling in general transportation (see the Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, the U.S. Department of Transportation Regulations 49 CFR Subpart H, §172-700, and the California DMV Regulations on Hazardous Cargo). These regulations also address issues of driver competence. See AFC section 6.13.1 for additional information on regulations governing the transportation of hazardous materials.

To address tank truck safety, aqueous ammonia will be delivered to the proposed facility in Department of Transportation (DOT) certified vehicles with a design capacity of 6,500 gallons. These vehicles will be designed to DOT Code MC-307. These are high-integrity vehicles designed for hauling caustic materials such as ammonia. Staff has, therefore, proposed Condition of Certification **HAZ-5** to ensure that, regardless of which vendor supplies the aqueous ammonia, delivery will be made in a tanker that meets or exceeds the specifications described in these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific literature on hazardous materials transportation (including tanker trucks) accident rates in both the United States and California. Staff relied on six references and three federal government databases to assess the risks of a hazardous materials transportation accident. Staff used the data from the Davies and Lees (1992) article, which references the 1990 Harwood et al., study, to determine that the frequency of release of all transportation of hazardous materials (not just from tanker trucks) in the U.S. is between 0.06 and 0.19 releases per million miles traveled on well-designed roads and highways. The maximum annual use of aqueous ammonia for operation of the proposed Victorville 2 will require about 14 deliveries each month (Victorville 2007a, p.6.13-18), for a total of 168 annual tanker truck deliveries of aqueous ammonia, with each delivering about 6,000 gallons. Each delivery will travel approximately 10.6 miles from I-15 via National Trails Highway, Air Expressway, Phantom East, and Perimeter Road en route to the project.

This would result in an estimated 1,780 miles of delivery tanker truck travel in the project area per year (with a full load). Staff believes that the risk over this distance is insignificant over a period of one year or over the expected 30-year life of the power plant (0.003 accidents predicted over a 30-year period). Data from the U.S. DOT show that the actual risk of a fatality (not an accident) over the past five years from all modes of hazardous material transportation (rail, air, boat, and truck) is approximately 0.1 in one million with many of the fatalities due to the physical impact of the accident itself rather than from exposure to spilled hazardous materials.

Staff therefore believes that the risk of exposure to significant concentrations of aqueous ammonia during transportation to the facility is insignificant because of the remote possibility of accidental release of a sufficient quantity to present a danger to the public. The transportation of similar volumes of hazardous materials on the nation's highways is neither unique nor an infrequent occurrence. Staff's analysis of the transportation of aqueous ammonia to the proposed facility (along with data from the DOT) demonstrates that the risk of accident and exposure are less than significant.

Based on the environmental mobility, toxicity, quantities present, and frequency of delivery, it is staff's opinion that aqueous ammonia poses the predominate risk associated with hazardous materials transportation and use at the proposed facility. Staff concludes that the risk associated with the transportation of other hazardous materials to the proposed facility does not significantly increase the risk of impact beyond that associated with ammonia transportation.

Seismic Issues

The possibility exists that an earthquake could cause the failure of a hazardous materials storage tank. A quake could also cause the failure of the secondary containment system (berms and dikes), as well as electrically controlled valves and pumps. The failure of all these preventive control measures might then result in a vapor cloud of hazardous materials that could move off-site and impact residents and workers in the surrounding community. The effects of the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan, in January 1995, heighten concerns about earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused to several large and small storage tanks at the water treatment system of a cogeneration facility. The tanks with the greatest damage, including seam leakage, were older tanks, while newer tanks sustained lesser damage with displacements and attached line failures. Therefore, staff conducted an analysis of the codes and standards, which should be followed to adequately design and build storage tanks and containment areas that could withstand a large earthquake. Staff also reviewed the impacts of the February 2001 Nisqually earthquake near Olympia, Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks were impacted by this quake. Referring to the sections on **GEOLOGIC RESOURCES AND HAZARDS** and **FACILITY DESIGN** in the AFC, staff notes that the proposed facility will be designed and constructed to the applicable standards of the 2007 California Building Code for Seismic Zone 4 (Victorville 2007a, Appendix D, section D.2). Therefore, on the basis of occurrences at Northridge with older tanks and the lack of failures during the Nisqually earthquake with newer tanks, staff determined that tank failures during seismic events are not likely and do not represent a significant risk to the public.

Site Security

Victorville 2 proposes to use hazardous materials identified by the US EPA as materials where special site security measures should be developed and implemented to prevent unauthorized access. US EPA published a *Chemical Accident Prevention Alert* regarding site security (EPA 2000a), the U.S. Department of Justice published a special report on Chemical Facility Vulnerability Assessment Methodology (US DOJ 2002), the North American Electric Reliability Corporation (NERC) published *Security Guidelines for the Electricity Sector* in 2002 (NERC 2002), and the U.S. Department of Energy published a draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE 2002). The energy generation sector is one of 14 areas of critical Infrastructure listed by the U.S. Department of Homeland Security. On April 9, 2007, the U.S Department of Homeland Security published, in the Federal Register (6 CFR Part 27), an Interim Final Rule requiring facilities that use or store certain hazardous materials to conduct vulnerability assessments and implement certain specified security measures. This rule was implemented with the publication of Appendix A, the list of chemicals, on November 2, 2007. While the rule applies to aqueous ammonia solutions of 20% or greater and this proposed facility plans to utilize less than 20% aqueous ammonia, staff still believes that all power plants under the jurisdiction of the Energy Commission should implement a minimum level of security consistent with the guidelines listed here.

In order to ensure that this facility (or a shipment of hazardous material) is not the target of unauthorized access, staff's proposed conditions of certification **HAZ-8** and **HAZ-9** address both construction security and operations security plans. These plans would require the implementation of site security measures that are consistent with both the above-referenced documents and Energy Commission guidelines.

The goal of these conditions of certification is to provide the minimum level of security for power plants needed to protect California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for this power plant is dependent upon the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of consequences of that event. The results of the off-site consequence analysis prepared as part of the RMP will be used, in part, to determine the severity of the consequences of a catastrophic event.

In order to determine the level of security, the Energy Commission staff used an internal vulnerability assessment decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the NERC 2002 guidelines, the U.S. Department of Energy VAM-CF model, and U.S. Department of Homeland Security regulations published in the Federal Register (Interim Final Rule 6 CFR Part 27). Staff determined that Victorville 2 would fall into the "low vulnerability" category, so staff proposes that certain security measures be implemented but does not propose that the project owner conduct its own vulnerability assessment.

These security measures include perimeter fencing and breach detectors, possibly guards, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contact in the event of a security breach. Site access for vendors will be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleets and employ only drivers who are properly licensed and trained. The project owner will be required, through its contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. DOT requirements that hazardous materials vendors prepare and implement security plans per 49 CFR 172.800 and ensure that all hazardous materials drivers are in compliance with personnel background security checks per 49 CFR Part 1572, Subparts A and B. The compliance project manager (CPM) may authorize modifications to these measures, or may require additional measures in response to additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or NERC, after consultation with appropriate law enforcement agencies and the applicant.

CUMULATIVE IMPACTS AND MITIGATION

Staff considered the potential for impacts due to a simultaneous release of aqueous ammonia from the proposed Victorville 2 and the High Desert Power Plant, both of which would use and store aqueous ammonia. Staff determined that, even in the highly unlikely event of a simultaneous failure in both tanks with resultant loss of their entire contents, the projects are far enough apart that vapor plumes would not mingle (combine) to produce an airborne concentration that would present a significant risk.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of Victorville 2 would be in compliance with all applicable LORS for both long-term and short-term project impacts in the area of hazardous materials management.

CONCLUSIONS

Staff's evaluation of the proposed project (with proposed mitigation measures) indicates that hazardous material use, storage, and transportation will not pose a significant impact on the public. Staff's analysis also shows that there will be no significant cumulative impact. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable LORS. In response to Health and Safety Code, section 25531 et seq., the applicant will be required to develop an RMP. To ensure adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by US EPA, the Hazardous Materials Division of the Victorville Fire Department, and Energy Commission staff. In addition, staff's proposed conditions of certification require the review and approval by staff of the RMP prior to delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issues of the transportation, storage, and use of aqueous ammonia, and other site security matters.

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

Staff proposes seven conditions of certification, some of which are mentioned in the text (above), and listed below. **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in the AFC, unless there is prior approval by the Energy Commission Compliance Project Manager. **HAZ-2** requires that an RMP be prepared and submitted prior to the delivery of aqueous ammonia.

Staff believes that an accidental release of aqueous ammonia during transfer from the delivery tanker to the storage tank is the most probable accident scenario, and therefore proposes Condition of Certification **HAZ-3**, which requires the development of a Safety Management Plan for the delivery of all liquid hazardous materials, including aqueous ammonia. The development of a Safety Management Plan that addresses the delivery of all liquid hazardous materials during the construction, commissioning, and operation of the project will further reduce the risk of any accidental release not specifically addressed by the proposed spill prevention mitigation measures and the required RMP, and further prevent the mixing of incompatible materials that could result in the generation of toxic vapors. **HAZ-4** requires that the aqueous ammonia storage tank be designed to certain rigid specifications, and that the secondary containment structure be subsurface or covered, and that ammonia sensors be placed around the tank and transfer pad. The transportation of hazardous materials is addressed in **HAZ-5** and **6**. The placement of isolation valves in the HTF loops near the solar panels is addressed in **HAZ-7**. Site security during both the construction and operation phases is addressed in **HAZ-8** and **HAZ-9.**

PROPOSED CONDITIONS OF CERTIFICATION

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

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

HAZ-2 The project owner shall concurrently provide a Business Plan and a Risk Management Plan (RMP) to the Hazardous Materials Division of the City of Victorville Fire Department and the CPM for review. After receiving comments from the Hazardous Materials Division of the Victorville Fire Department and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final Business Plan and RMP shall then be provided to the Hazardous Materials Division of the City of Victorville Fire Department for information and to the CPM for approval.

Verification: At least 60 days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Business Plan to the CPM for approval. At least sixty (60) days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the CUPA for information and to the CPM for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for delivery of aqueous ammonia and other liquid hazardous materials. The plan shall include procedures, protective equipment requirements, training and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials including provisions to maintain lockout control by a power plant employee not involved in the delivery or transfer operation. This plan shall be applicable during construction, commissioning, and operation of the power plant.

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

HAZ-4 The aqueous ammonia storage tank shall be designed to either the ASME Pressure Vessel Code and ANSI K61.6, or to API 620. In either case, the storage tank and the tanker truck transfer pad shall include a subsurface or covered secondary containment basin capable of holding 125% of the storage volume or the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm. The tank and transfer pad shall also be equipped with ammonia sensors. The final design drawings and specifications for the ammonia storage tank, secondary containment structure, and the number, location, and specifications of the ammonia sensors shall be submitted to the CPM for review and approval prior to commencement of construction of the storage tank and secondary containment structure.

Verification: At least sixty (60) days prior to delivery of aqueous ammonia to the facility, the project owner shall submit final design drawings and specifications for the ammonia storage tank, the secondary containment structure, and the number, location, and specifications of ammonia sensors to the CPM for review and approval.

HAZ-5 The project owner shall direct all vendors delivering aqueous ammonia to the site to use only tanker truck transport vehicles which meet or exceed the specifications of DOT Code MC-307.

Verification: At least sixty (60) days prior to receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

HAZ-6 The project owner shall direct all vendors delivering any hazardous material to the site for use during commissioning and commercial operations to use only the route approved by the CPM. Trucks and tankers will travel on I-15 to D Street to National Trails Highway to Air Expressway to Phantom East Street to Perimeter Road and then to the plant site. If the route must be changed for any reason, the project owner shall obtain the review and approval of the CPM not later than ten (10) days before the next shipment of hazardous materials is due to arrive at the facility and shall notify the Victorville Fire Department at the same time a request for route change is submitted to the CPM.

Verification: At least sixty (60) days prior to receipt of any hazardous materials on site, the project owner shall submit copies of the required transportation route limitation direction to the CPM for review and approval. Any change to the route must be reviewed and approved by the CPM and must be made in writing not less than ten (10) days prior to the next shipment of hazardous materials to the facility.

HAZ-7 The project owner shall place an adequate number of isolation valves in the Heat transfer Fluid (HTF) pipe loops so as to be able to isolate a solar panel loop in the event of a leak of fluid. These valves shall be actuated manually and remotely. The engineering design drawings showing the number, location, and type of isolation valves shall be provided to the CPM for review and approval prior to the commencement of the solar array construction.

Verification: At least sixty (60) days prior to the commencement of solar array construction, the project owner shall provide the design drawings as described above to the CPM for review and approval.

HAZ-8 At least thirty (30) days prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the CPM for review and approval. The Construction Security Plan shall include the following:

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

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

HAZ-9 The project owner shall prepare a site-specific Security Plan for the operational phase and shall be made available to the CPM for review and approval. The project owner shall implement site security measures addressing physical site security and hazardous materials storage. The level of security to be implemented will be determined by the results of the Vulnerability Assessment but in no case shall the level of security be less than that described as below (as per NERC 2002).

The Operation Security Plan shall include the following:

1. Permanent full perimeter fence or wall, at least eight feet high around the Power Block and Solar Field and extend below ground surface consistent with the Desert Tortoise exclusion fencing requirements specified in Condition of Certification **BIO-11**;

2. Main entrance security gate, either hand operable or motorized;

3. Evacuation procedures;

4. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;

5. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on-site or off-site;

6. a. A statement (refer to sample, attachment "A") signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to ascertain the accuracy of employee identity and employment history, and shall be conducted in accordance with state and federal law regarding security and privacy;

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

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

8. A statement(s) (refer to sample, attachment "C") signed by the owners or authorized representative of hazardous materials transport vendors certifying that they have prepared and implemented security plans in conformity with 49 CFR 172.880, and that they have conducted employee background investigations in accordance with 49 CFR Part 1572, subparts A and B;

9. Closed Circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the control room) capable of viewing, at a minimum, the main entrance gate and the ammonia storage tank; and

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

    a. Security guard present 24 hours per day, seven days per week, **OR**

    b. Power plant personnel on-site 24 hours per day, seven days per week and **all** of the following:

        1) The CCTV monitoring system required in number 9 above shall include cameras that are able to pan, tilt, and zoom (PTZ), have low-light capability, are recordable, and are able to view 100% of the perimeter fence, the ammonia storage tank, the outside entrance to the control room, and the front gate from a monitor in the power plant control room; **AND**

        2) Perimeter breach detectors **<u>or</u>** on-site motion detectors.

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to the security plans. The CPM may authorize modifications to these measures, or may require additional measures, such as protective barriers for critical power pant components (e.g., transformers, gas lines, compressors, etc.) depending on circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Council, after consultation with appropriate law enforcement agencies and the applicant.

<u>Verification:</u> At least 30 days prior to the initial receipt of hazardous materials on-site, the project owner shall notify the CPM that a site-specific Vulnerability Assessment and Operations Site Security Plan are available for review and approval. In the Annual Compliance Report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed, and updated certification statements are appended to the Operations Security Plan. In the Annual Compliance Report, the project owner shall include a statement that the Operations Security Plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

SAMPLE CERTIFICATION (Attachment "A")

Affidavit of Compliance for Project Owners

I, ____

(Name of person signing affidavit)(Title)

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

____

(Company Name)

for employment at

____

(Project name and location)

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

____

(Signature of Officer or Agent)

Dated this ____________________ day of ____________________, 20 _______.

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

SAMPLE CERTIFICATION (Attachment "B")

Affidavit of Compliance for Contractors

I, ____
(Name of person signing affidavit)(Title)

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

____
(Company Name)

for contract work at

____
(Project name and location)

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

____
(Signature of Officer or Agent)

Dated this ____________________ day of ____________________, 20 _______.

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

SAMPLE CERTIFICATION (Attachment "C")

Affidavit of Compliance for Hazardous Materials Transport Vendors

I, ____
(Name of person signing affidavit)(Title)

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

____
(Company Name)

for hazardous materials delivery to

____
(Project name and location)

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

____
(Signature of Officer or Agent)

Dated this __________________ day of __________________, 20 ______.

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

REFERENCES

AIChE (American Institute of Chemical Engineers). 1989. *Guidelines for Technical Management of* Chemical *Process Safety*, AIChE, New York, NY 10017.

AIChE (American Institute of Chemical Engineers). 1994. *Guidelines for Implementing Process Safety* Management *Systems*, AIChE, New York, NY 10017.

API (American Petroleum Institute). 1990. *Management of Process Hazards, API Recommended* Practice *750*; American Petroleum Institute, First Edition, Washington, DC, 1990.

Becker, John 2007. Telephone communication with VFD Chief, June 27th.

Davies, P.A. and Lees, F.P. 1992. *The Assessment of Major Hazards: The Road Transport* Environment *for Conveyance of Hazardous Materials in Great Britain*. Journal of Hazardous Materials, 32: 41-79.

ENSR 2007d – ENSR/S. Head (tn:42131). Response to CURE's Data Request Set 2. 8/28/07. Received 8/29/07.

Environmental Protection Agency (US EPA). 2000a. *Chemical Accident Prevention: Site Security*. Environmental Protection Agency, Office of Solid Waste and Emergency Response. February 2000.

Harwood, D.W., Viner, J.G., and E.R. Russell. 1990. *Truck Accident Rate Model for Hazardous Materials Routing*. Transportation Research Record. 1264: 12-23.

Harwood, D.W., Viner, J.G., and E.R. Russell. 1993. *Procedure for Developing Truck Accident and Release Rates for Hazmat Routing*. Journal of Transportation Engineering. 119(2): 189-199.

Lees, F.P. 1998). *Loss* Prevention *in the Process Industries*, Vols. I, II and III. Second Edition, Butterworths.

National Response Center Database. U.S. Coast Guard. 2002

National Transportation Safety Board Database. U.S. Department of Transportation. 2001

North American Electric Reliability Corporation (NERC) 2002. *Security Guidelines for the Electricity* Sector*,* version 1.0, June 14, 2002.

NRC (National Research Council). 1979. *Ammonia. Subcommittee on Ammonia. Committee on* Medical *and Biologic Effects of Environmental Pollutants*. Division of Medical Sciences, Assembly of Life Sciences, National Research Council (NRC), Baltimore, Maryland, University Park Press (NTIS No. PB 278-027).

Pet-Armacost, J.J., Sepulveda, J. and M. Sakude. 1999. *Monte Carlo Sensitivity Analysis of Unknown Parameters in Hazardous Materials Transportation Risk Assessment.* Risk Analysis. 19(6): 1173-1184.

Rhyne, W.R. 1994. Hazardous Materials Transportation Risk Analysis. Quantitative Approaches for Truck and Train. Chapter 2: Transportation Quantitative Risk Analysis; and Chapter 3: Databases

U.S. Department of Energy (US DOE) 2002. Draft Vulnerability Assessment Methodology, Electric Power Infrastructure. Office of Energy Assurance, September 30, 2002.

U.S. Department of Justice (U.S. DOJ) 2002. *Special Report: Chemical Facility Vulnerability* Assessment *Methodology*. Office of Justice Programs, Washington, D.C. July 2002.

OSHA (United States Occupational Safety and Health Administration). 1993*. Process Safety* Management */ Process Safety Management Guidelines for Compliance*. U.S. Department of Labor, Washington, DC.

Victorville 2007a – City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vols. 1 and 2. 2/27/07. Received 2/28/07.

Vilchez, J.A., Sevilla, S., Montiel, H. and J. Casal. 1995*. Historical Analysis of Accidents in Chemical Plants and in the Transportation of Hazardous Materials*. J. Loss Prev. Process Ind. 8(2): 87-96.

Walker, Hamilton G. Jr. and James J. Ferrigan.2003*. Ammonia-On-Demand*^{TM} *Installations at American Electric Power's Clifty Creek and Kyger Creek Plants Provide 100% Availability and Safe Operation*. Presented at the 2003 DOE NETL CSR/CNSR Conference.

Hazardous Materials
Appendix A

Basis for Staff’s Use of 75 PPM Ammonia Exposure Criteria

September 2004

BASIS FOR STAFF'S USE OF 75 PPM AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 PPM to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this level is not consistent with the 200-ppm level used by EPA and Cal/EPA in evaluating such releases pursuant to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's analysis of the proposed project. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines (ERPGs) states that "these values have been derived as planning and emergency response guidelines, **not** exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. CEQA requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through feasible changes or alternatives to the proposed project.

Staff has chosen to use the National Research Council's 30-minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events, and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm STPEL. **Hazardous Materials Appendix B** provides a summary of adverse effects, which might be expected to occur at various airborne concentrations of ammonia

Hazardous Materials Appendix A Table-1
Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH[2]	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 min.	Exposure above this level requires the use of "highly reliable" respiratory protection and poses the risk of death, serious irreversible injury or impairment of the ability to escape.
IDLH/10[1]	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 min.	Protects nearly all segments of general population from irreversible effects
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 min. four times per 8 hr day	No toxicity, including avoidance of irritation
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 min.	Significant irritation but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one time exposure
STPEL[4]	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 min. 30 min. 10 min.	Significant irritation but protects nearly all segments of general population from irreversible acute or late effects. One time accidental exposure
TWA[2]	NIOSH	Adult healthy male workers	25 ppm	8 hr.	No toxicity or irritation on continuous exposure for repeated 8 hr. Work shifts
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 min.	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin)

1) (EPA 1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)

* The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.

** The (NRC 1979) describes a study involving young animals, which suggests greater sensitivity to acute exposure in young animals. The (WHO 1986) warns that the young, elderly, asthmatics, those with bronchitis and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.

REFERENCES

AIHA. 1989. American Industrial Hygienists Association, Emergency Response Planning Guideline, Ammonia, (and Preface) AIHA, Akron, OH.

EPA. 1987. U.S. Environmental Protection Agency, Technical Guidance for Hazards Analysis, EPA, Washington, D.C.

NRC. 1985. National Research Council, Criteria and Methods for Preparing Emergency Exposure Guidance Levels (EEGL), short-term Public Emergency Guidance Level (SPEGL), and Continuous Exposure Guidance Level (CEGL) Documents, NRC, Washington, D.C.

NRC. 1972. Guideline for short-term Exposure of The Public To Air Pollutants. IV. Guide for Ammonia, NRC, Washington, D.C.

NIOSH. 1994. National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Washington D.C., Publication numbers 94-116.

WHO. 1986. World health Organization, Environmental Health Criteria 54, Ammonia, WHO, Geneva, Switzerland.

Abbreviations for Hazardous Materials Appendix A, Table 1

ACGIH	American Conference of Governmental and Industrial Hygienists
AIHA	American Industrial Hygienists Association
EEGL	Emergency Exposure Guidance Level
EPA	Environmental Protection Agency
ERPG	Emergency Response Planning Guidelines
IDLH	Immediately Dangerous to Life and Health Level
NIOSH	National Institute of Occupational Safety and Health
NRC	National Research Council
STEL	Short Term Exposure Limit
STPEL	Short Term Public Emergency Limit
TLV	Threshold Limit Value
WHO	World Health Organization

Hazardous Materials
Appendix B

Hazardous Materials Proposed for Use
At the
Victorville 2 Hybrid Power Project

September 2007

Hazardous Materials Appendix B
Hazardous Materials Proposed for Use at Victorville 2[a]

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site
Amine Nalco 352 (morpholine)	110-91-8	Boiler water treatment	Low toxicity	75 gal plastic tote
Aqueous Ammonia <20% solution	1336-21-6	NO_X Emissions Control	Health: irritation to permanent damage from inhalation, ingestion, and skin contact Physical: reactive, vapor is combustible	30,000 gallons
Calcium Oxide (Lime)	1305-78-8	pH Adjustment	Low toxicity	4,000 lb
Carbon Dioxide	124-38-9	Fire suppression	Low toxicity; non-flammable gas	24 tons
Detergent (ZOK or equivalent)	None	Periodic cleaning of turbines	Health: various Physical: various	Up to 330 gallons, only temporarily on-site
Diesel Fuel	None	Black-start generator fuel, fire-water pump engine	Eye and skin irritation	1,500 gallons
Ferric Sulfate, 35% solution	10028-22-5/ 7720-78-7	Boiler Water treatment	Moderate toxicity	8,000 gal
Hydrogen Gas	1333-74-0	Generator coolant	Low toxicity; Flammable gas	320 lb in generator plus 650 lb storage
Insulating Oil	8012-95-1	Electrical transformers	Health: hazardous if ingested Physical: may be flammable/combustible	65,000 gallons
Lubrication Oil	7440-66-6	Lubricate rotating equipment	Health: hazardous if ingested Physical: may be flammable/ combustible	4,000 gallons
Magnesium Chloride, 31% solution	7786-30-3/ 7791-18-6		Low toxicity	10,000 gal
Oxygen Scavenger Nalco Eliminox (carbohydrazide)	497-18-7	Boiler water treatment	Low toxicity	200 gal plastic tote
Phosphate Feed, Nalco BT 3000	None	Boiler water treatment	Low toxicity	400 gal plastic tote
Sodium Hydroxide (50%)	1310-73-2	pH control	High toxicity, corrosive	7,500 gal
Sodium Hypochlorite (12.5%)	7681-52-9	biocide	Corrosive, reactive with acids and amines	2,500 gal
Sulfur hexafluoride gas	2551-62-4	Gaseous dielectric	Low toxicity; non-flammable gas	960 lb used in switchgear

Sulfuric Acid (93%)	7664-93-9	pH control	Health: strong irritant to all tissues, may cause minor burns to permanent damage Physical: highly reactive	10,000 gal
Therminol VP-1 Diphenyl ether Biphenyl	 101-84-8 92-52-4	Heat transfer fluid	Moderate toxicity and flammability	260,000 gal

a. Source: Victorville 2007a, Tables 8.12-2, 8.12-3, and CH2MHill 2007a revised Table 6.7-3

LAND USE

Shaelyn Strattan and David Flores

SUMMARY OF CONCLUSIONS

As provided in this land use analysis, some project equipment would exceed the city of Victorville Municipal Code height ordinance limit. Staff has provided findings of conformity and conditions of certification that would bring the Victorville 2 project in conformity with the city of Victorville municipal code.

Energy Commission staff concludes that Victorville 2 project would not:

- Result in any impacts to existing agricultural operations or future use; convert farmland to non-agricultural use; or conflict with existing agricultural zoning or Williamson Act contracts;
- Physically disrupt or divide an established community;
- Conflict with any applicable habitat conservation plan or natural community conservation plan; or
- Result in unmitigated project-related impacts on surrounding land uses.

INTRODUCTION

The land use analysis of the Victorville 2 project focuses on the project's consistency with land use plans, ordinances, regulations, and policies, and the project's compatibility with existing or reasonably foreseeable[1] land uses. In addition, a power plant and its related facilities generally have the potential to create impacts in the areas of air quality, noise, dust, public health, traffic and transportation, and visual resources. These individual resource areas are discussed in detail in separate sections of this document.

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[1] "Reasonably foreseeable" is defined in the California Environmental Quality Act (CEQA) as approved projects under construction; approved related projects not yet under construction; unapproved (planned) projects, with related impacts, currently under environmental review; and projects under review by the Lead Agency or other relevant public agencies. Planned developments, such as those identified in an airport Master Plan, may also be considered, provided there is evidence that measures are actually being taken to implement the plans. The analysis must also take into consideration the most probable development patterns and future activities that are a reasonably foreseeable consequence of the initial project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following table contains all land use LORS applicable to the proposed project.

Land Use Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	**Description**
Federal	None
State	None
Local	
City of Victorville	
Southern California International Airport (SCIA) Comprehensive Airport Land Use Plan (CALUP)	The SCIA CALUP provides for the orderly growth of the Southern California Logistics Airport (SCLA; formerly SCIA) and the area surrounding it, excluding existing land uses. Its primary function is to protect the public's health, safety, and welfare by promoting orderly expansion of the airport and adoption of land use measures by local public agencies that minimize exposure to excessive noise and safety hazards near airports. The SCIA/SCLA CALUP works in concert with the city of Victorville General Plan and Municipal Code.
General Plan (revised July 13, 2007)	The city of Victorville General Plan was certified by Resolution #97-63 on July 15, 1997 and revised on July 13, 2007. Goals, policies, and implementation measures and programs are projected for implementation by 2015, consistent with the regional planning efforts of the Southern California Association of Governments (SCAG), as contained in the Regional Comprehensive Plan and Guide. References to land use are included in all elements of the Victorville General Plan. However, development of the SCLA is specifically addressed in the SCLA Community Plan Element (see below).
General Plan - Southern California Logistics Airport Community Plan Element	The Southern California Logistics Airport Community Plan Element (SCLA Community Plan) is intended to promote the development of compatible land uses in the area influenced by airport operations and safeguard the general welfare of the inhabitants within the vicinity of the airport. The SCLA Community Plan incorporates and consolidates applicable portions of the city of Victorville General Plan Land Use, Housing, Circulation, Safety, Resource, and Noise Elements and adapts them, as necessary, to support the reuse of the former George Air Force Base (AFB) and development of adjoining properties within the SCLA boundaries.

Municipal Code	The city of Victorville Municipal Code contains ordinances that deal with planning, building, subdivision, permitting, and zoning standards, requirements, and restrictions. Title 18, also known as the Zoning Ordinance of the city of Victorville, specifically provides regulations that implement the goals, objectives, and policies of the Victorville General Plan, pursuant to the mandated provisions of State Planning and Zoning Law, California Environmental Quality Act (CEQA), and other applicable state and local requirements (VVMC). The SCLA Specific Plan references and incorporates applicable portions of the Victorville Municipal Code as it relates to development within the SCLA Specific Plan boundaries (see discussion below). The following sections are specifically applicable to the proposed project: • §13.33 Preservation and Removal of Joshua Trees • §17.92 Subdivision Ordinance • §18.44 Heavy Industrial (M-2) Zoning District • §18.60 Off-street Parking Ordinance • §18.68 Temporary Uses • §18.74 Conditional Use Permits
Southern California Logistics Airport Specific Plan (February 2004)	The SCLA Specific Plan serves as a tool for implementing the reuse plan established by the Victor Valley Economic Development Authority (VVEDA), pursuant to the Base Closure and Realignment Act (BCRA), as well as provisions of the city of Victorville Municipal Code and related policies of the city of Victorville General Plan. The main intent of the SCLA Specific Plan is to enable the city of Victorville to more adequately assess the detailed planning and environmental review procedures for development within the SCLA Specific Plan Area.
Industrial Design Guidelines (Planning Commission Policy PCP-07-005)	Establishes industrial design guidelines for development in areas zoned Industrial District within the city of Victorville's jurisdiction.
City of Hesperia General Plan	The City of Hesperia General Plan was approved in August of 2006 and specifically provides regulations that implement the goals, objectives, and policies of the Hesperia General Plan, pursuant to the mandated provisions of State Planning and Zoning Law, California Environmental Quality Act (CEQA), and other applicable state and local requirements.
City of Hesperia Municipal Code	The City of Hesperia Zoning Regulations, specifically Section 16.16.075 allows for the construction of public utilities and public service uses, which includes electrical substations and towers.

SETTING

The proposed site for the Victorville 2 project is located in the northeastern corner of the city of Victorville, in San Bernardino County. The city of Victorville is located within the Mojave River Region of the southwestern Mojave Desert, known as Victor Valley and is surrounded by the cities of Adelanto and Hesperia and the Town of Apple Valley. With a population of approximately 95,000, Victorville is a growing urban area situated along a primary transportation route between the Los Angeles Basin and Las Vegas.

The primary project site is approximately 0.75 miles north of the Southern California Logistics Airport (SCLA) and within the boundaries of the SCLA Specific Plan Area, which is being developed as a major multi-modal regional aviation and rail cargo distribution center. The SCLA Specific Plan Area encompasses the former George Air Force Base (AFB) and an additional 3,350± acres to the north and east. The plant site would encompass approximately 275 acres of the 8,703 acres within the SCLA Specific Plan Area boundaries, but was not part of the George AFB property. Land surrounding the project site, and the project site itself, is largely vacant, undeveloped, flat, desert terrain, with widely scattered residences to the west and the Mojave River to the east. The closest residence is a horse ranch located on the north side of Colusa Road, approximately one mile west from the project site boundary. Existing SCLA structures and aviation facilities begin approximately 0.75-mile southwest of the project's southern boundary. The Mojave River runs north/south, approximately one-half mile east of the project's eastern boundary (see **Land Use Figure 1**).

The Victorville 2 project site lies approximately 3.5 miles east of U.S. Highway 395 (U.S. 395). Access to the project site is via Interstate 15 (I-15), U.S. 395, or State Route 18 (Palmdale Road) to Air Expressway. Village Drive and National Trails Highway connect I-15 to Air Expressway. From Air Expressway, the project site can be accessed via Adelanto Road to Colusa Road and Helendale Road (unpaved public roadways). (see **Land Use Figure 6**).

The project's proposed transmission route extends south from the plant site approximately 21 miles to the Lugo Substation on the southern edge of Victorville. Segment 1 of the transmission line corridor extends 4.3 miles south of the plant site and connects the project to the existing transmission facilities. Segment 1, along with the project's water, wastewater, and natural gas lines, would be located within the SCLA Specific Plan Area. The remainder of the transmission line route would be along the existing Southern California Edison (SCE) rights-of-way (ROWs), primarily within the city of Victorville boundaries. However, a small portion of the route would be within or immediately adjacent to the boundaries of the nearby cities of Hesperia and Adelanto and unincorporated portions of San Bernardino County (see **Land Use Figure 2**).

GENERAL PLAN LAND USE DESIGNATIONS AND ZONING WITHIN THE ONE-MILE RADIUS OF THE PROJECT STUDY AREA

The Victorville 2 plant site, construction laydown locations, and Segment 1 of the transmission line route are all located within the SCLA Specific Plan Area boundaries and zoned Specific Plan (SP), with a General Plan land use designation of Industrial (I), as defined in the SCLA Community Plan Element of the city of Victorville General Plan.

Land Use Tables 2 and **3** and **Land Use Figures 3 and 4** show the general plan and zoning designations within a one-mile radius of the proposed project site, excluding the transmission line corridor.

Land Use Table 2
General Plan Land Use Designations within the One-Mile Radius Project Study Area

Direction	Jurisdiction	Designation
North	City of Adelanto	Desert Living (2.5 and 9.0 acre net) Open Space/Public Facility
	San Bernardino County	Rural Living (one dwelling unit per five acres)
South	City of Victorville	Industrial (I) Airport and Support Facilities (ASF) Runway Protection Zone (RPZ)
East	City of Victorville	Rural Residential (1 dwelling unit per acre) Open Space
	San Bernardino County	Floodway (FW) Agriculture (AG) Rural Living (RL)
West	City of Victorville	Industrial (I)
	City of Adelanto	Rural Living

Source: Victorville 2007a, Figures 6.8-3, 6.8-4, and 6.8-6 (Mapsheets 1 & 2); Victorville 2007b, AFC Supplement Land Use and Zoning Legend

Land Use Table 3
Zoning Designations within the One-Mile Radius Project Study Area

Direction	Jurisdiction	Designation
North	City of Adelanto	Low Density Residential (DL2.5)
	San Bernardino County	Single Family Residential
South	City of Victorville	SCLA Specific Plan (SP) - Industrial
East	City of Victorville	Single Family Residential (R-1) Flood Plain (FP)
	San Bernardino County	Floodway Agriculture Single Family Residential
West	City of Victorville	SCLA Specific Plan (SP) - Industrial
	City of Adelanto	Single Family Residential (R-1) Airport Development District (ADD)

Source: Victorville 2007a, AFC Figures 6.8-3, 6.8-4, and 6.8-6 (Mapsheets 1 & 2); Victorville 2007b, AFC Supplement Land Use and Zoning Legend

AFC Section 2.2 (p.2.3) and Appendix B indicate that the proposed power plant and solar array consists of 68 parcels which are either already under city of Victorville control or in the process of being acquired. Additional lands within the Segment 1 transmission corridor needed for transmission line and pipeline easements are also being acquired. The AFC implies that the city will take all measures necessary, including the power of eminent domain, to acquire all properties needed for the project.

Two construction parking and laydown areas, a 30-acre site to the west of Helendale Road and a 20-acre area on the south side of Colusa Road, would be used to stage equipment and materials and provide parking for construction workers. The project owner would lease these properties during the construction phase of the proposed project. AFC Appendix B provides a list of the assessors parcel numbers for properties that would comprise the plant site and laydown areas.

The transmission line route is divided into three (3) segments and extends approximately 21 miles from the plant site to the Lugo Substation in an unincorporated portion of San Bernardino County, south of Victorville and west of the city of Hesperia. Segment 1 consists of approximately 4.3 miles of transmission line to be constructed within a newly designated ROW. The full length of this segment is within the boundaries of the SCLA Plan Area, in an area designated for Industrial development. The property along this portion of the transmission route is largely undeveloped, except for the Victor Valley Wastewater Reclamation Authority (VVWRA) Regional Wastewater Treatment Facility (VVWRA facility) on the eastern boundary and former George AFB structures at the southern end of the segment that are scheduled for demolition.

All portions of Segments 2 and 3 are within existing transmission ROWs. Segment 2 extends from the transmission line’s connection point with the existing High Desert Power Project (HDPP) transmission tower structure to the SCE Victor Substation, a distance of approximately 5.7 miles. This portion of the project includes upgrades to the existing transmission facilities and structures, as well as the construction of three new transmission towers. Segment 2 lies entirely within the city of Victorville jurisdiction, although it skirts the Victorville’s western boundary with the city of Adelanto just south of the SCLA Plan Area. Property along this segment is largely undeveloped, with residential pockets along the eastern side of the route.

Segment 3 is the final portion of the Victorville 2 project’s transmission line route and connects the Victor Substation to SCE’s Lugo Substation. The transmission line is also within an existing SCE ROW and land uses over this 11-mile segment have increased residential density, with pockets of commercial/industrial development and open space uses. This portion of the project includes upgrades to the existing transmission facilities and structures, as well as the construction of three new transmission towers. Except for the area immediately surrounding the Lugo Substation, the last five miles of the transmission route is within the city of Hesperia’s jurisdiction and zoned for varying levels of residential development. The property within a 1,000-foot radius of the Lugo Substation is in San Bernardino County and is zoned “OH/IN” (Institutional), which is reserved for public and quasi-public facilities and uses. It is also within the city of Hesperia’s sphere of influence, and has been pre-zoned a Public/Institutional District.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff has analyzed the information provided in the Application for Certification (AFC) and acquired from other sources to determine consistency of the Victorville 2 Hybrid Power Project (Victorville 2 project) with applicable federal, state, and local laws, ordinances, regulations, and standards and the potential for the Victorville 2 project to have significant adverse land use-related impacts. Staff has also assessed mitigation measures proposed by the applicant and conditions developed by staff to reduce any potential impacts to a less than significant level, as well as the feasibility and enforceability of those proposed mitigation measures and recommended conditions of certification.

METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

State/CEQA

Significance criteria used in this document are based on the CEQA Guidelines and LORS utilized by other governmental agencies. Land use impacts may be considered significant if the project would:

- Conversion of Farmland
    - Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
    - Conflict with existing zoning for agricultural use or a Williamson Act contract.
    - Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses.
- Physically disrupt or divide an established community.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.
- Preclude, interfere with, or unduly restrict existing or future permitted uses.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project. This includes, but is not limited to, a General Plan, community or specific plan, local coastal program, airport land use compatibility plan, or zoning ordinance.
- Have 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 it creates unmitigated noise, dust, or a public health or safety hazard or nuisance; or results in adverse traffic or visual impacts. Please see other sections of this document, as noted, for a detailed discussion of any additional potential project impacts, recommended mitigation, and conditions of certification.

Land Use Table 4 provides a summary of the consistency of the Victorville 2 project with the applicable land use LORS adopted by the federal government, the state of California, San Bernardino County, the cities of Victorville and Hesperia as identified in **Land Use Table 1**. Conditions of certification have been proposed to make the project consistent with the LORS, where necessary.

Based on Energy Commission staff's independent review of the AFC and local Municipal Code, staff has determined that the project would comply with all land use LORS for the cities of Victorville, Adelanto, Hesperia, and San Bernardino County. Energy Commission staff has proposed Condition of Certification **LAND-1** as a means of verifying that the project, if certified, would be built, in accordance with the city's minimum Industrial Zoning District standards.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Conversion of Farmland

The Victorville 2 Project site, offsite pipeline routes, and the transmission line corridor are designated as Grazing Land under the California Department of Conservation, Farmland Mapping and Monitoring Program and would not encroach on or impact Prime Farmland, Farmland of Statewide Importance, or Unique Farmland. None of the project sites are zoned Agricultural or designated for agricultural use under the city of Victorville's General Plan or the General Plan of any other jurisdictional authority. In addition, none of the project sites are subject to the restrictions of a Williamson Act contract or used for commercial agricultural purposes. There is a small area of Prime Farmland located approximately 0.6 mile east of the proposed project site and separated from the project site by the Mojave River, as depicted in **Land Use Figure 5a**. A second area of Prime Farmland, located approximately 1.1 miles northeast of the project site, is also on the east side of the Mojave River, and is adjacent to a small area of Farmland of Statewide Importance farther to the east. There is also a large area of Prime Farmland and small parcel of Unique Farmland approximately 0.4 miles east of Segment 1 of the transmission line route, also on the eastern side of the Mojave River, as shown in **Land Use Figure 5b**. Neither the construction nor operational activities of the proposed project would result in any impacts to existing agricultural operations or foreseeable future agricultural use. Therefore, the proposed project would not result in the conversion of Farmland to non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts. The project would have no impact with respect to farmland conversion.

Physical Division of an Existing Community

The proposed Victorville 2 project site is located in the northeastern corner of the city of Victorville and the SCLA Community Plan Area, a relatively undisturbed desert terrain, well to the north of the urbanized areas of Victorville. It is designated for development in the SCLA Community Plan Element of the Victorville General Plan and SCLA Specific Plan as an Industrial area, integral to the multi-modal regional aviation and rail cargo distribution center planned for this area. The power plant facilities would be located entirely on land owned or controlled by the city of Victorville, with access to the site and adjacent off-site construction parking and laydown areas from existing roadways or roads planned for construction in conjunction with the power plant and other nearby projects. No existing roadways or pathways would be blocked or removed from service. The new switchyard would be constructed entirely within the primary site boundaries and transmission lines would extend across vacant land or, along the existing SCE rights-of-way and transmission corridors. Reclaimed and backup water supply, wastewater disposal line and natural gas pipeline connections would be undergrounded within or immediately adjacent to the Segment 1 transmission corridor, entirely within the SCLA Community Plan Area boundaries. Neither the transmission nor utility lines would present a new physical barrier within the community. Activities associated with widening the existing rights-of-way and installation of the transmission pole upgrades would not block existing transportation corridors and would only result in limited road delays. Arrival and departure of construction personnel and delivery of materials and supplies would occur along existing roadways and would not significantly contribute to existing traffic congestion (see condition of certification **TRANS-1** in the **TRAFFIC AND TRANSPORTATION** section of this staff assessment). Therefore, implementation of the proposed project would have a less than significant impact on community transportation or interaction and would not divide the community.

Conflict with any Applicable Habitat or Natural Community Conservation Plan

The proposed project site is not subject to any Habitat or Natural Community Conservation Plan or within the boundaries of any wildlife preserve or critical habitat area. It is within the boundaries of the West Mojave Plan area, a Joint Habitat Conservation Plan (HCP) by the U.S. Bureau of Land Management (BLM), the County of San Bernardino, and the city of Barstow that encompasses 9.3 million acres in San Bernardino, Kern, Los Angeles, and Inyo counties. The HCP provides a comprehensive strategy to conserve and protect more than 100 listed or sensitive wildlife species and their habitats, including the desert tortoise and Mohave ground squirrel. The plan also provides a streamlined program for public agencies and private parties to comply with requirements of the State and Federal Endangered Species Acts. In addition to being a multi-agency HCP, it is also an amendment to BLM’s 1980 California Desert Conservation Area (CDCA) Plan. However, this plan currently applies only to federal lands. Therefore, the project would have no impact on any Habitat or Natural Community Conservation Plan. (Also see discussion regarding the preservation and removal of Joshua Trees under **City of Victorville Municipal Code §13.33** below.)

Conflict with any Applicable Land Use Plan, Policy, or Regulation

As required by California Code of Regulations, section 1744, Energy Commission staff evaluates the information provided by the applicant in the AFC 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. This includes all applicable federal, state, and local laws, ordinances, regulations, and standards, including those adopted by the cities of Victorville, Adelanto, and Hesperia, and San Bernardino County. From a CEQA perspective, the analysis places particular emphasis on any environmental effect that may be avoided or mitigated by conformity with the applicable LORS.

Southern California Logistics Airport Comprehensive Airport Land Use Plan

The SCLA Comprehensive Airport Land Use Plan was prepared in December 2005 by the city of Victorville. Its purpose was to provide a guide for the cities of Victorville, Adelanto, and the County of San Bernardino in adopting there own SCLA general plan element and in ensuring conformity with the 2005 comprehensive airport land use plan. The purpose of the plan is to promote compatible land uses and restrict incompatible development in the vicinity of the Southern California Logistics Airport.

Four elements of compatibility are considered in this plan:

- Compatibility of surrounding land uses with respect to aircraft noise;
- Compatibility of surrounding land uses considering the safety of persons on the ground, as well as those aboard aircraft in the event of an aircraft accident;
- Protection of airspace needed for safe air navigation near the airport; and
- General concerns pertaining to aircraft overflight.

Because of the industrial nature of the Victorville 2 project, aircraft noise will not require insulation for noise reduction. Conventional construction with closed windows and fresh air supply system or air conditioning system for the control room will suffice for the workers.

The project will be located in Compatibility Review Area 3, which is outside the flight paths into SCLA. The Victorville 2 project will ensure that the storage of explosive and flammable material is adequately situated on the project site to avoid aviation safety concerns, and meet the city's airport safety requirements. Please see the **HAZARDOUS MATERIALS** and **WASTE MANAGEMENT** sections for additional discussion on safety measures.

The SCLA is 1.5 miles northeast of the Victorville 2 project site. The existing flight pattern does bring aircraft at low altitude (1,500 feet above ground level) near the northern boundary of the project site. Aircraft approaching from the northeast on landing approach to RY-17 would fly over the northwest corner of the project site. Almost all of the aircraft using the SCLA are two or four engine cargo jet and staff has been advised that most of the small single engine aircraft will be transferred to the Apple Valley Airport (SCLA 2007a). The two combustion turbine generator stacks would be 145 feet high and the ten cell cooling tower would be 62 feet high (Aspen 2007,Table 1, pg. 2). The transmission line support towers would be 140 feet high. These structures would not penetrate navigable airspace (150 feet above ground level [AGL]) for the SCLA airport.

The project would generate thermal plumes from two turbine stacks and the ten-cell cooling tower (Aspen 2007a). Staff has predicted that turbine and cooling tower plumes at or exceeding the 4.3 meters per second threshold the staff uses could extend to about 1,000 feet and 900 feet AGL, respectively. Visible plumes from the exhaust stacks at the Victorville 2 project site are predicted to occur very infrequently when operating under full load, without duct firing or solar operation. 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. Please see the **VISUAL RESOURCES** section for additional discussion.

The turbulence caused by these plumes would not affect cargo jet aircraft on approach because heavier planes are not affected by plumes of this magnitude. Pattern altitude at 1.5 miles is 1,500 feet AGL, and the aircraft would not fly over the Victorville 2 project power block. Staff has been advised that the only aircraft that fly over the project area where the power block would be located and could be impacted by the Victorville 2 thermal plumes are Army helicopters departing the traffic pattern to the north at about 1,000 feet AGL. Staff has requested that the SCLA Manager work with the U.S. Army to change the helicopter departure or arrival route to avoid overflight of the Victorville 2 power block. This will be discussed at the PSA workshop and addressed more fully in the FSA (SCLA 2007d). Please see **TRAFFIC AND TRANSPORTATION** section for additional plume discussion.

The applicant mentions the issue of glare from the solar mirror collector array in the Application for Certification (AFC) and states that the visual distraction impact is not considered significant for SCLA operations. Staff has reviewed an analysis regarding a parabolic trough mirror design that indicates that all sun rays hitting the mirror or collector would be reflected at the heat reflecting element when tracking the sun correctly (Victorville 2 2007i). The element may glow as the reflected sun rays enter the collector. According to the analysis, a pilot could observe the glow if the aircraft were positioned at the right angle above the array but it would not be a bright source of glare. Staff will continue to gather information about this issue and expects it will be discussed at the PSA workshop and addressed more fully in the FSA. Please see **TRAFFIC AND TRANSPORTATION** section for further discussion on air navigation, thermal plume and glare concerns. Staff concludes that the project as mitigated would be consistent with the land use policies in the SCLA CLUP.

San Bernardino County General Plan

As shown in the AFC, the Lugo Substation and approximately 1,000 feet of Segment 3 of the project's transmission line immediately adjacent to the substation are located within the jurisdiction of San Bernardino County. Land use and zoning designations for this portion of the proposed transmission line include rural residential, and institutional, which include public or quasi-public facilities. (San Bernardino County General Plan March 2007). Construction of the transmission line will be within the existing SCE transmission line right of way. The project represents no change to the existing use of the property, therefore the existing land use for this quarter mile of transmission line is consistent with San Bernardino County's general plan policy which recognizes the need for utility rights-of-way within the County and makes the following recommendation in its Conservation Element: "the county will continue to coordinate with and share information with local utilities to recognize electric utility infrastructure is regulated by the California Public Utilities Commission and California Energy Commission (San Bernardino 2007).

City of Victorville General Plan

All properties that would make up the proposed Victorville 2 project site, including transmission corridors (except for Segment 3 within the city of Hesperia and San Bernardino County jurisdictions), utility and access easements, and construction parking and laydown areas, would be within the city of Victorville jurisdictional boundaries and would, therefore, be subject to the current city of Victorville LORS, including the city of Victorville General Plan (2007), Municipal (Zoning) Code, Southern California Logistics Airport (SCLA) Specific Plan, and permitting requirements, except for the Energy Commission's exclusive jurisdiction.

The Victorville General Plan contains the seven required elements, identified in Government Code, section 65302, including Land Use, Circulation, Housing, Noise, Safety, and Resources, which combines the Conservation and Open Space elements. It also contains three non-mandatory elements, including the Southern California Logistics Airport Community Plan Element. The Victorville General Plan is the basis for determining acceptable land uses and related park, road, and other infrastructure needs within the city of Victorville. The Land Use Element designates the general distribution, location and extent of various land uses, such as housing, business, industry, open space, including agriculture, natural resources, recreation, and enjoyment of scenic beauty, education, public buildings and grounds, solid and liquid waste disposal facilities, and other public and private uses of land. It also includes a statement of population density and building intensity for the various land use districts and identifies areas covered by the plan which are subject to flooding.

The general land use goals for the Victorville community are intended to guide the development of the city as a balanced community, with residential, commercial, and industrial development; a diversified economic base; adequate city services and infrastructure; and development standards which result in an aesthetically pleasing environment that reflects community needs (VVGP, Land Use Element, p.2). The Land Use Element also contains the following goals, policies, and implementation measures that directly affect land use and development of the SCLA Community Plan Area:

Goal 1: [Development of] Victorville as a balanced community with residential, commercial and industrial development.

Policy 1.5: The City will manage development in a manner that does not conflict with the operations of the Southern California Logistics Airport. (Addressed as Policy 1.1 and Implementation Measures 1-3 of the SCLA Community Plan Element.)

Policy 1.6: Victorville will make efforts to ensure that the integrity of each land use district is maintained.

Implementation 1: The City will carefully consider requests for determination so that they do not vary from the intent of zone districts.

Policy 1.7: Victorville will ensure that new development is compatible with existing developments and public infrastructure. (Also see SCLA Community Plan Goals 1 and 2.)

Implementation 1: The City will continue to require the use of walls and other buffers to ensure compatibility of new developments with existing developments. The buffers shall be installed by the new development.

*Verification of Compliance: The Victorville 2 project is zoned as Specific Plan (SP) and designated as Industrial (I), as provided in the SCLA Specific Plan Area. The Victorville 2 Project is located in the Safety Review Area 3, which classifies and identifies the degree of risk or level of exposure to aviation related hazards. Safety Review Area 3 designates an area with the lowest exposure to aircraft operations. This area allows "public utility" uses, which the city has determined includes power plants (*VMC §18.44.030). *No walls or buffers are proposed for the Victorville 2 project as there are no existing developments within close proximity, and no development proposals are anticipated in the coming years. Therefore the Victorville 2 project is consistent with Policy 1.7 in that the project will meet the appropriate setback requirements for the industrial zone, and security fencing will be appropriate in providing security to the Victorville 2 facility.*

Goal 2: [Development of] Victorville as a community with a diversified economic base. (Also see SCLA Community Plan Goal 4.)

Policy 2.1: Victorville will encourage the development of land uses which provide jobs for those who choose to both live and work within the planning area.

Verification of Compliance: The SCLA Community Plan Element and Specific Plan was prepared to provide a guide for the development and reuse of the deactivated George Air Force Base site as a commercial air facility. The goals and policies of these plans specifically promote the development of compatible land uses, which includes public utility uses such as Victorville 2 project.

Goal 3: [Development of] Victorville as a community which provides adequate city services and infrastructure. (Also see SCLA Community Plan Goal 2.)

Policy 3.1: Development will be permitted in areas where such uses are appropriate and provide for adequate roadways, infrastructure, and public services.

Verification of Compliance: The Victorville 2 project will improve the current roadway system within the area of the project site to city standards. In addition, with the development of new infrastructure (water, sewer, electrical transmission lines) to the area, this will encourage the construction of new commercial developments.

Southern California Logistics Airport Community Plan Element

The SCLA Community Plan Element addresses and adapts the general land use goals of the Victorville General Plan and applies them directly to the operation of the airport and lands contained therein, thereby promoting compatible land uses within those areas that may influence or be influenced by airport operations. It is also intended to safeguard the general welfare of those living and working in the vicinity of the airport. All elements of the general plan applicable to the SCLA Community Plan Area are addressed in a manner specific to those properties and supersede the county-wide land use designations, development standards, and goals, policies, and implementation measures and programs within the SCLA Community Plan boundaries.

Additionally, the SCLA Community Plan Element includes the following goals, policies, and implementation measures that relate specifically to development within the SCLA Community Plan boundaries (VVSP, pp.42-44):

Goal 1:	[Development of the] Southern California Logistics Airport as a commercial air facility, with associated uses integrated into, compatible with, and supportive of its operation.
Policy 1.1	The city [of Victorville] will promote the development of compatible land uses in the area affected by airport operations to ensure that there is no conflict or inconsistency between the operation of SCLA as a civilian airport and future land uses within the city and surrounding area.
Implementation 1:	The City will adopt the Comprehensive Airport Land Use Plan and coordinate its adoption by the County of San Bernardino and the City of Adelanto.
Implementation 2:	The City will coordinate with the County of San Bernardino and the City of Adelanto to ensure land uses surrounding Southern California Logistics Airport are compatible.
Implementation 3:	The City will continue to implement the Southern California Logistics Airport Specific Plan.

Verification of Compliance: The cities of Victorville, Adelanto, and County of San Bernardino have adopted a comprehensive airport land use plan which provides guidance for compatible uses within the designated zone districts of the airport specific plan. The Victorville 2 project will be located within the Safety Review Area 3. The SCLA Specific Plan designates the project site as industrial, but indicates that land uses are to be implemented consistent with the city's M-2 requirements, which allows utility facilities such as power plant facilities as a permitted use.

Goal 2:	[Development of the] Southern California Logistics Airport with infrastructure necessary to reach its operational and developmental objectives.
Policy 2.1:	The City, as part of the Victor Valley Economic Development Authority, will ensure an efficient and coordinated system of infrastructure is provided at Southern California Logistics Airport.
Implementation 1:	The City will continue to evaluate infrastructure needs at Southern California Logistics Airport to determine the best systematic

approach for its installation in conjunction with its membership with the Victor Valley Economic Development Authority.

Verification of Compliance: The Victorville 2 project will provide an additional source of energy resources not only to the SCLA, but also to the surrounding community. Additional infrastructure such as water, gas, wastewater, and electricity will provide a major step for commercial and industrial developments in this area, as part of the SCLA development objectives.

Goal 3: [Development of the] Southern California Logistics Airport with a minimal risk to public health and safety.

Policy 3.1: The City will make efforts to safeguard the general welfare of the inhabitants within the vicinity of the airport by minimizing exposure to crash hazards associated with aircraft operations.

Implementation 1: The City will utilize the Comprehensive Airport Land Use Plan, which identifies object-free areas and safety review areas which provide height, density, and use restrictions.

Implementation 2: The City will review projects within the area covered by the Comprehensive Airport Land Use Plan to ensure that the use of development is compatible with airport operations.

Policy 3.2: The City will make efforts to safeguard the general welfare of the inhabitants within the vicinity of the airport by minimizing the average noise levels deemed to be excessive.

Implementation 1: The City will utilize the Comprehensive Airport Land Use Plan to determine if a proposed use would be negatively impacted by excessive noise levels.

Implementation 2: The City will implement the Southern California Logistics Airport Specific Plan, which separates land uses based on, among other criteria, noise sensitivity.

*Verification of Compliance: The project is compatible with the comprehensive airport land use plan, and with airport operations occurring from SCLA. All safety concerns as to construction and operation of the Victorville2 project are addressed in this staff assessment, and measures will be taken to minimize airport operational conflicts (Please see the **TRAFFIC AND TRANSPORTATION** and **NOISE** sections for further discussion on noise and airport safety).*

Goal 4: [Development of the] Southern California Logistics Airport as a key element for job creation in the City.

Policy 4.1: The City will continue to make efforts to attract jobs to Southern California Logistics Airport.

Implementation 3: The City will continue to support the development of skilled employment-generating projects.

Verification of Compliance: The proposed project site is within the boundaries of the SCLA Community Plan Element and has a land use designation of Industrial (I). The Victorville 2 project will insure that future development in and around SCLA will be provided with sufficient energy needs, which will provide an incentive to attract new developments to the area.

City of Victorville Municipal Code – Planning and Zoning

Chapter 18 of the Victorville Municipal Code contains ordinances that deal with planning and zoning standards, requirements, and restrictions. Article 1 of this chapter, also known as the Victorville Zoning Ordinance, specifically provides regulations that implement the goals, objectives, and policies of the Victorville General Plan, pursuant to the mandated provisions of the State Planning and Zoning Law, CEQA, and other applicable state and local requirements. While the proposed project is subject to all applicable Victorville Municipal Code requirements, the sections of the Victorville Zoning Ordinance that apply specifically to the land use aspects of the proposed project are discussed below. Additional city of Victorville code requirements are addressed in other technical sections of this staff assessment.

Chapter 13.33 Preservation and Removal of Joshua Trees

This chapter of the municipal code requires that proper and necessary steps be taken in order to protect and preserve, to the greatest extent possible, Joshua trees in all areas of the city so as to preserve the unique natural desert environment throughout the city and for the health, safety and welfare of the community.

The applicant has indicated that healthy Joshua trees would be salvaged and replanted along the entrance to the power plant site to be in compliance with this Chapter. As reflected in the **VISUAL RESOURCES** section of the staff assessment, the applicant has proposed relocating 150 Joshua trees on the project site.

Chapter 17.92 Reversion to Acreage (Merger of Parcels)

The Victorville 2 project is situated on 275 acres which is currently undeveloped and consists of approximately 68 underlying parcels created in the past for future rural residential development. With the construction of the power plant and solar array, Energy Commission staff is requesting that the applicant merge the parcels so that all components of the Victorville 2 project are located on one parcel, and comply with all applicable provisions of this chapter and with the Subdivision Map Act. Commission staff has proposed condition of certification **LAND-2** requiring merger of these parcels to ensure compliance with this chapter.

Chapter 18.44 Heavy Industrial Zoning District (M-2)

Areas designated for industrial development within the SCLA plan boundaries are identified as Specific Plan (SP) - Industrial (I). The Industrial (I) designation is intended to accommodate a broad range of industrial activities and development consistent with the uses and regulations set forth in Chapter 18.44 of the Victorville Municipal Code.

The proposed project site is zoned Heavy Industrial [(M-2) (Data Adequacy Responses pg. 6.8-24)], which is consistent with the Industrial General Plan Land Use designation. Section §18.44.070 of the Victorville Municipal Code (VMC) identifies the uses allowed, development standards and restrictions, and minimum design and performance standards for projects within the Industrial Zoning District. This section also states that buildings in the M-2 zone have a height limitation of 50 feet. The SCLA Specific Plan designates the project site as industrial, but indicates that land uses are implemented consistent with the city's requirements for M-2 districts. Project structures whose height will exceed 50 feet include the following components:

- Two combustion turbines (height of 90 feet);
- Two HRSG stacks (145 feet);
- The top of the silencers (110 feet);
- Cooling tower (63 feet); and
- Four crystallizers (55 feet).

The city of Victorville planning staff indicated that based on the nature and location of the use, deviating from the maximum allowable height (50 feet) of the zone district is justified (Jon Roberts, 2007). The project structures that exceed the 50-foot height limitation are typical of the combined-cycle power plant facilities. The heights of the structures are consistent with FAA limitations with respect to proximity to SCLA runways and therefore, meet aviation safety-related requirements.

As noted in the SCLA Specific Plan [VVSP, III(B), p.52], a power-generating plant is identified as a conditionally permitted use in §18.44.030]. The following chapter identifies the findings that typically must be made by the Victorville's Planning commission to grant a Conditional Use Permit (CUP).

The applicant discussed the use permitting requirements with the city of Victorville planning staff. City of Victorville planning staff indicated that in evaluating the project, they would review the proposed use, the surrounding land uses, and any deviations to the development standards of the zone district (Data Adequacy pg. 6.8-24). The following use permit findings are required in order to approve any deviations to adopted development standards:

A. The proposed use is desirable for the public convenience or welfare;

Verification of Compliance: As discussed in this analysis, The Victorville 2 project would be consistent with the intent of the SCLA Logistics Airport Community Plan to promote an orderly expansion of the airport and establish a balanced and functional mix of land uses consistent with the goals and objectives of the airport operations. The project will provide an additional source of energy supply to the growing community of Victorville and immediate surrounding communities. In addition, the SCLA will continue to secure new development projects which would provide additional employment opportunities to the area. The Victorville 2 project would provide the energy needs to these new projects as they are developed.

B. The proposed use will not impair the character and integrity of the zoning district and surrounding area;

Verification of Compliance: The project site is located in a desert setting and does not currently adjoin an existing residential, interim residential, recreation, agricultural residential, interim agricultural zones, office-residential mix, commercial, or an office zone, therefore is not subject to the development standards under city of Victorville's Planning Commission policy PCP-07-005

Staff has proposed condition of certification ***LAND-1*** *to ensure compliance with the remaining property development regulations within the M2 Industrial Zone (Section 18.44).*

C. The proposed use will not be detrimental to the public health, safety, or general welfare;

Verification of Compliance: The public health analysis indicates that the construction and operation of the project is not expected to generate a significant adverse cancer or short- or long-term non-cancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed project uses a highly conservative methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the project would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area. For a more detailed discussion, see the ***PUBLIC HEALTH*** *section of this staff assessment.*

The purpose of the Energy Commission's conditions of certification is to prevent adverse affects that a project may generate to the public health, safety and welfare. The proposed project has conditions of certification from approximately twenty technical areas. In addition to the ***PUBLIC HEALTH*** *section, also see the* ***AIR QUALITY, SOIL AND WATER RESOURCES****, and* ***NOISE AND VIBRATION*** *sections of this staff assessment.*

D. The proposed use is in harmony with applicable City policies and the intent and purpose of the zoning district involved.

Verification of Compliance: The purpose of the Energy Commission's conditions of certification on a project is to prevent adverse affects to the public health, safety and welfare. Conditions of certification are basically comprised of two components; mitigation measures required by CEQA and requirements that the project comply with state or local LORS. For this project, Energy Commission staff reviewed county LORS for applicability to the project and proposed conditions of certification on the project to make the project comply or conform accordingly to the identified county LORS.

Chapter 18.60 Off-Street Parking Ordinance

As provided in this chapter, public utility facilities, including electrical substations must provide one space for each 500 square feet of office space and work area within a strucuture, and also, one space for each project vehicle. The applicant will comply with the off-street parking ordinance by providing sufficient parking for approximately 36 permanent employees. Staff has proposed condition of certification **LAND-1** to ensure compliance with the off-street parking ordinance (Chapter 18.60).

Southern California Logistics Airport Specific Plan (SCLASP)

The SCLA Specific Plan serves as tool for implementing the reuse plan established by the Victor Valley Economic Development Authority pursuant to the Base Closure and Realignment Act, as well as related policies of the city of Victorville General Plan. Although the Victorville project is outside the boundaries of the SCLA, it is within the SCLA Specific Plan Area, and is therefore required to conform to the following development standards:

- Parking: provide sufficient off-street parking to prevent traffic congestion;
- Loading: All required loading facilities must be located on the same site as the use requiring such facilities;
- Landscaping: Applicable landscaping requirements are those set forth in the applicable zone districts of the zoning portion of the Victorville Municipal Code;
- Fences and Walls: Fences shall not exceed a height of eight feet in rear and/or side yards and four feet in front yard for commercial, aviation, open space and industrial land uses;
- Exterior Lighting: Project lighting should be concentrated at the main entries and along major roadways or landscape features.
- Signage: Signs are to be used as purpose of identification and direction. Size and construction must be approved by the city of Victorville.

As indicate earlier in this analysis, the project site is located in a desert setting and does not currently adjoin residential, office-residential mix, or commercial developments, therefore the city of Victorville has determined the Victorville 2 project is not subject to the development standards under city of Victorville's Planning Commission Policy PCP-07-005. The applicant proposes security fencing around the perimeter of the site, limited landscaping at the entrance of the project site, lighting of the project site would be per Energy Commission requirements, and parking, loading and signage would be in accordance with city code requirements.

City of Hesperia Municipal Code – Planning and Zoning

Chapter 16 of the Hesperia Municipal Code contains ordinances that deal with planning and zoning standards, requirements, and restrictions. Title 1 of this chapter, also known as the Hesperia Zoning Ordinance, specifically provides regulations that implement the goals, objectives, and policies of the Hesperia General Plan, pursuant to the mandated provisions of the State Planning and Zoning Law, CEQA, and other applicable state and local requirements. As part of transmission line reconductoring, the last five miles, with the exception of a small portion within San Bernardino County (less than 1,000 feet) are within the jurisdiction of the city of Hesperia. This portion of the transmission line would be constructed within the existing SCE transmission ROW, and would not represent a change to the existing land use.

City of Hesperia General Plan

The City of Hesperia General Plan was approved in August of 2006 and specifically provides regulations that implement the goals, objectives, and policies of the Hesperia General Plan. There have been no recent amendments to the general plan or any specific plans within the City of Hesperia within this quarter-mile of linear ROW.

Land Use Compatibility

The project would be located within the city of Victorville SCLA Community Plan Element boundaries, in an area that supports both heavy and mixed industrial/commercial activities (see **Land Use Figure 1**). The proposed project site has a General Plan land use designation of SP-Industrial. The project is consistent with other uses currently permitted within that land use designation, provided all requirements for a conditional use permit are met. Surrounding properties are proposed primarily for manufacturing, warehousing, and aviation-related industrial. As noted in the discussion above, the primary purpose of the SCLA Specific Plan - Industrial Zoning District (SP-I) designation is to identify and encourage industrial development in areas suitable for this type of use.

When a jurisdictional authority, such as the city of Victorville, establishes zoning districts, it is that agency's responsibility to ensure the compatibility of adjacent zoning districts and permitted uses, and incorporate conditions and restrictions that ensure those uses will not result in a significant adverse impact ("minimum of detriment") to surrounding properties. Therefore, staff assumes that permitted industrial uses or those deemed equivalent to a permitted use sited on properties zoned SP-I are compatible with surrounding uses and zoning districts. Those uses operating under a valid use permit would also be considered compatible.

Energy Commission staff has determined that, as discussed in other sections of this document, the Victorville 2 project would not result in unmitigated project-related impacts to surrounding properties. (See the **AIR QUALITY, HAZARDOUS MATERIALS, NOISE, PUBLIC HEALTH, TRAFFIC AND TRANSPORTATION,** and **VISUAL RESOURCES** sections of this document for a complete discussion of noise, dust, public health hazards or nuisance; and adverse traffic or visual impacts.)

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, or 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, section 42301.6-9) or within 0.25 mile of a sensitive receptor, under CEQA. Proximity is not necessarily the deciding factor for a potentially significant impact, but is the threshold generally used to require further evaluation.

There are no schools, childcare, hospitals, or medical facilities, or residences within a one-mile radius of the Victorville 2 project site. Residences are not a permitted use in the SP/I Zoning District, except for on-site living quarters for security personnel. In addition, staff has concluded that the Victorville project would not pose a significant public health hazard to sensitive receptors in the general vicinity of the project site (please see the **PUBLIC HEALTH** section).

The Victorville 2 project would not adversely impact the airport users, residents, and visitors, and would not affect the operation of the airport. Given the uncertainty about changing the helicopter routes and glare from the solar thermal arrays, staff preparing the traffic and transportation analysis cannot make a consistency determination at this time. Please see the **TRAFFIC AND TRANSPORTATION** section for further discussion.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects [Cal. Code Regs., tit. 14, section 15065(a)(3)].

The Victorville 2 project is one of many projects associated with the multi-modal regional aviation and rail cargo distribution center planned for development surrounding the Victorville 2 project site and at other locations with the SCLA Planning Area.

The High Desert Power Project, a 678 megawatt (MW) plant with two 130-foot exhaust stacks, is already located within the SCLA Specific Plan Area.

The Victorville 2 project is coordinating its efforts with the SCLA management to ensure that the interests and needs of the development plans and projects in and around the surrounding area are met. The proposed expansion of the Victor Valley Wastewater Reclamation Authority Treatment Plant and the proposed SCLA development projects in the specific plan area represents substantial changes to the undeveloped land in the area. However, because they represent the implementation of planned uses, these changes are not considered significant adverse land use impacts and the project’s cumulative land use impacts are considered less than significant.

CONCLUSIONS AND RECOMMENDATIONS

The city of Victorville’s General Plan Land Use Element establishes the area that includes the Victorville 2 site as an area planned for industrial and commercial uses. The city of Victorville General Plan emphasizes the importance of industrial and commercial uses over other uses to improve the economic base of the city. Furthermore, the Victorville 2 project meets the following criterion:

- The Victorville 2 project would not physically disrupt or divide an established community or conflict with any applicable habitat conservation plan or natural community conservation plan; result in any impacts to existing agricultural operations or future use; convert farmland to non-agricultural use; or conflict with existing agricultural zoning or Williamson Act contracts.

- The proposed project is consistent with the applicable 2005 General Plan policies and strategies and the project's proposed location is zoned Specific Plan - Industrial, which is consistent with the Industrial land use designation.
- This project is consistent with the city of Victorville Comprehensive General Plan, the Comprehensive Airport Land Use Plan, the Southern California International Airport (SCIA) Community Plan Element, the SCIA Specific Plan and the City of Victorville Zoning Ordinances and Municipal Code.
- The city of Victorville will need to review staff's recommended conditions of certification in this and other sections of the PSA, and provide input if additional conditions are required of Victorville 2.
- Staff has evaluated the Victorville 2 project for compliance with the conditional use permit (CUP) requirements, and concluded the CUP could be granted.
- Full implementation of **LAND-1** would make the project consistent with applicable LORS.

Staff recommends that the Commission adopt the following conditions of certification if it approves the project.

PROPOSED CONDITION(S) OF CERTIFICATION

LAND-1 The project owner shall design and construct the project in accordance to the standards found in the M2 Zone ("Industrial") of the Victorville Municipal Code (Chapter 18.44.070) which includes the following:

- No minimum lot size, width, depth, and yard area;
- Off-street parking and loading spaces shall be provided as stipulated;
- Signage requirements;
- Loading requirements;
- Lighting requirements; and
- Fencing requirements.

Verification: At least 90 calendar days prior to the start of construction, including any grading or site remediation on the power plant project site or its associated easements, the project owner shall submit the proposed development plan to the city of Victorville Planning Department for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to the city of Victorville.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any comment letters received from the city of Victorville, along with any changes to the proposed development plan, to the CPM for review and approval.

LAND-2 The project owner shall adjust the boundaries of all parcels or portions of parcels that constitute the Victorville 2 project sites as necessary to merge all properties into a single parcel, under single ownership, within the city of Victorville jurisdiction, in accordance with provisions and procedures set forth in the city of Victorville's Municipal Code, Title 17 (Subdivision Ordinance).

Verification: At least 30 days prior to construction of the Victorville 2 project, the project owner shall submit evidence to the CPM, indicating approval of the merger of parcels by the city of Victorville. The submittal to the CPM shall include evidence of compliance with all conditions and requirements associated with the approval of the Certificate of Merger and/or Notice of Lot Line Adjustment by the city. If all parcels or portions of parcels are not owned by the project owner at the time of the merger, a separate deed shall be executed and recorded with the County recorder, as required by Municipal Code §§17.92. A copy of the recorded deed shall be submitted to the CPM, as part of the compliance package.

REFERENCES

BLM 2006a. West Mojave Plan, Amendment to the California Desert Conservation Area Plan, Final EIS/R; March 2006.

Caltrans 2002. California Airport Land Use Planning Handbook. California Division of Aeronautics, Department of Transportation (Caltrans Aeronautics); January 2002.

CALUP. Southern California International Airport (SCIA) Comprehensive Airport Land Use Plan (CALUP),1999

CCR 2006. California Code of Regulations, Chapter 3 (CEQA Guidelines), Article 17, §§15250-15253; as amended on July 11, 2006.

FAA(a). Federal Aviation Regulation (FAR) Part 77, Federal Aviation Administration, Title 14, CFR Part 77, Objects Affecting Navigable Airspace, Edition 1-1-04.

PRC 2005. Public Resources Code §25000 et seq (Division 15 - Warren-Alquist State Energy Resources Conservation and Development Act), Chapter 6 - Power Facility and Site Certification, §§25500-25543; September 2005.

SBC 2007. San Bernardino County General Plan, effective April 12, 2007.

Victorville 2004. Southern California Logistics Airport Specific Plan. City of Victorville Planning Department; February 2004.

Victorville 2007a. City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vol. 1&2. February 27, 2007. Received February 28, 2007.

Victorville 2007b. City of Victorville (tn: 39934). Application for Certification Data Adequacy Supplement. Vol. 3. April 6, 2007. Received April 9, 2007.

Victorville 2007c. Industrial Design Guidelines – Policy PCP-07-005 (Resolution No. P-07-111). Adopted by the Planning Commission, City of Victorville, on June 13, 2007.

Victorville 2007d. City of Victorville (tn: 41644). Applicant's Responses to CEC's Data Request Set 1, #s 1 – 110. July 23, 2007. Received July 23, 2007.

VVGP. City of Victorville General Plan, adopted June/July 1997; revised as of August 1, 2007.

VVSP. City of Victorville General Plan, Southern California Logistics Airport Community Plan Element; June/July 1997, most recent amendment adopted August 2, 2005.

VVMC. City of Victorville Municipal Code.

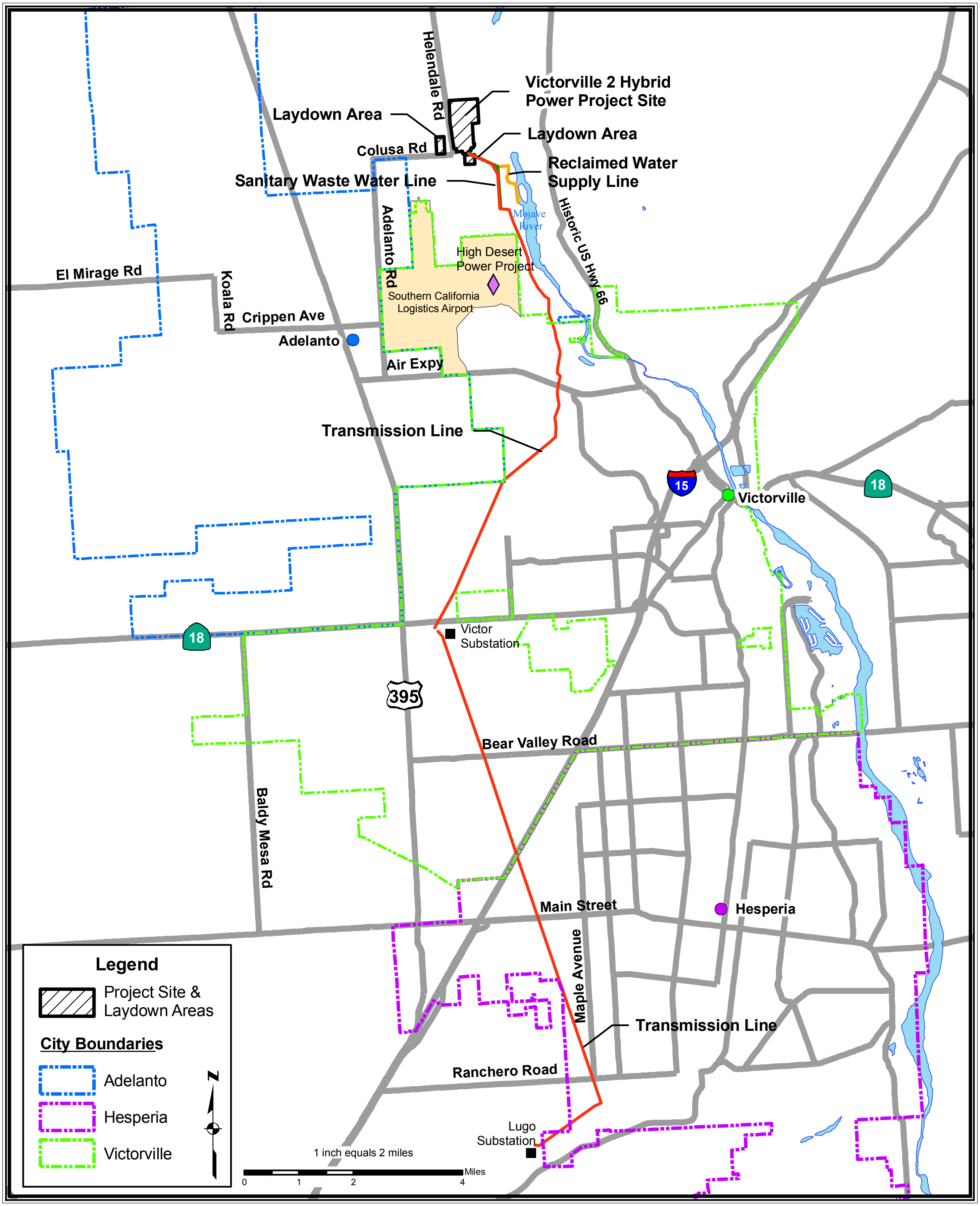
LAND USE - FIGURE 1

Victorville 2 Hybrid Power Project - Aerial View of Project Site with Simulated Project Facilities

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 2-3b

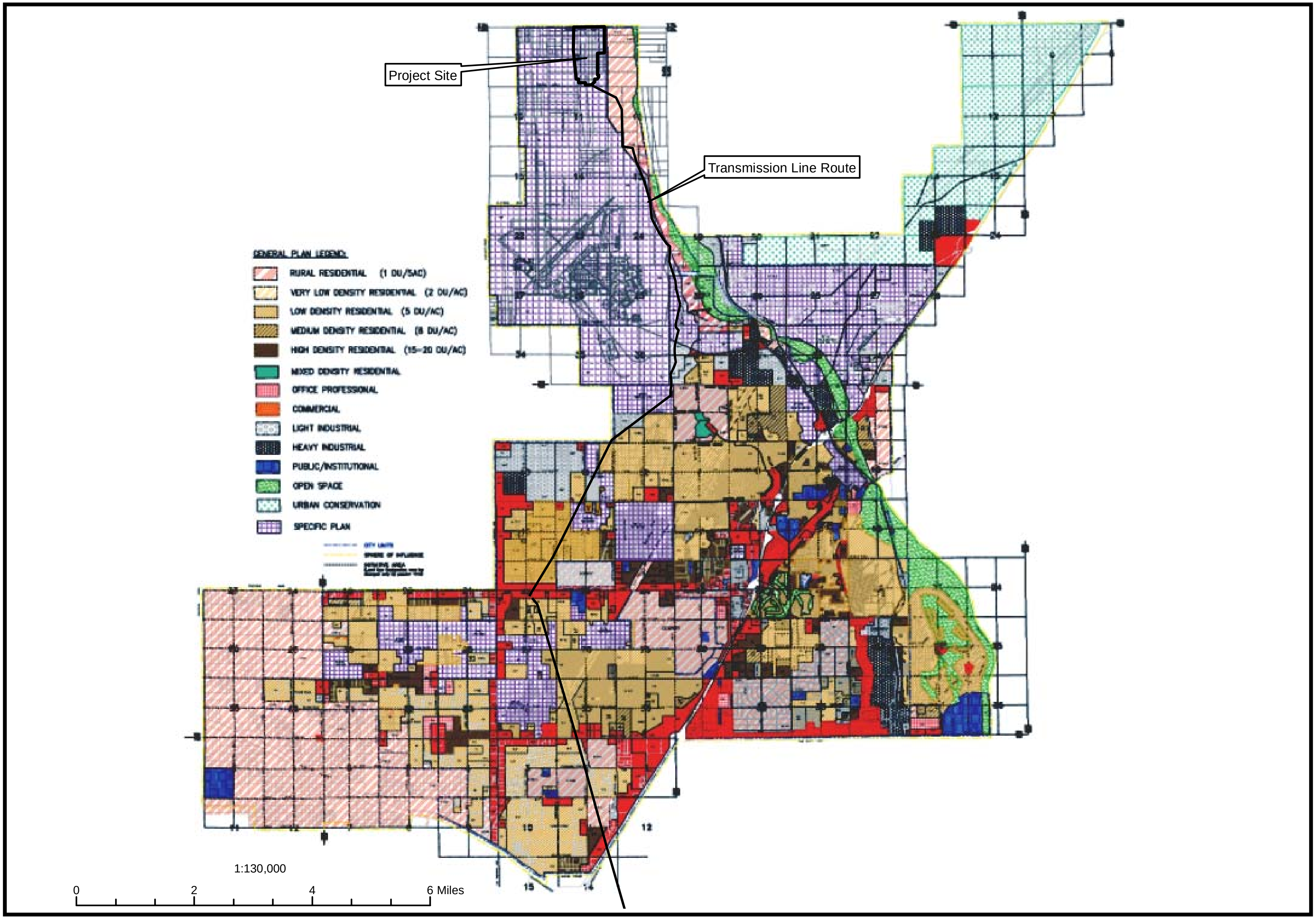
LAND USE - FIGURE 2
Victorville 2 Hybrid Power Project - Transmission Line Corridor



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: California Energy Commission

LAND USE - FIGURE 3

Victorville 2 Hybrid Power Project - City of Victorville Land Use Policy

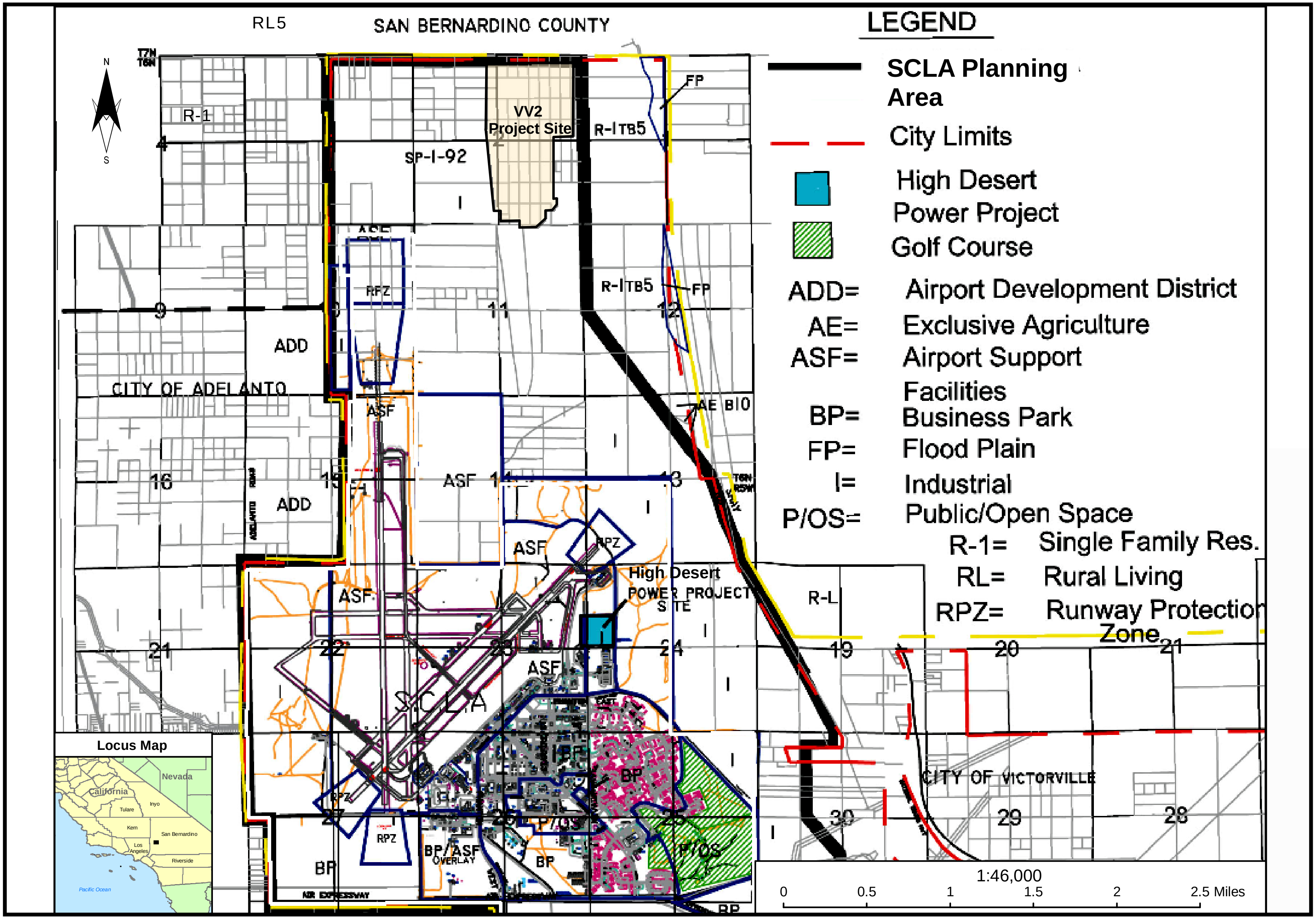


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 6.8-3

LAND USE - FIGURE 4

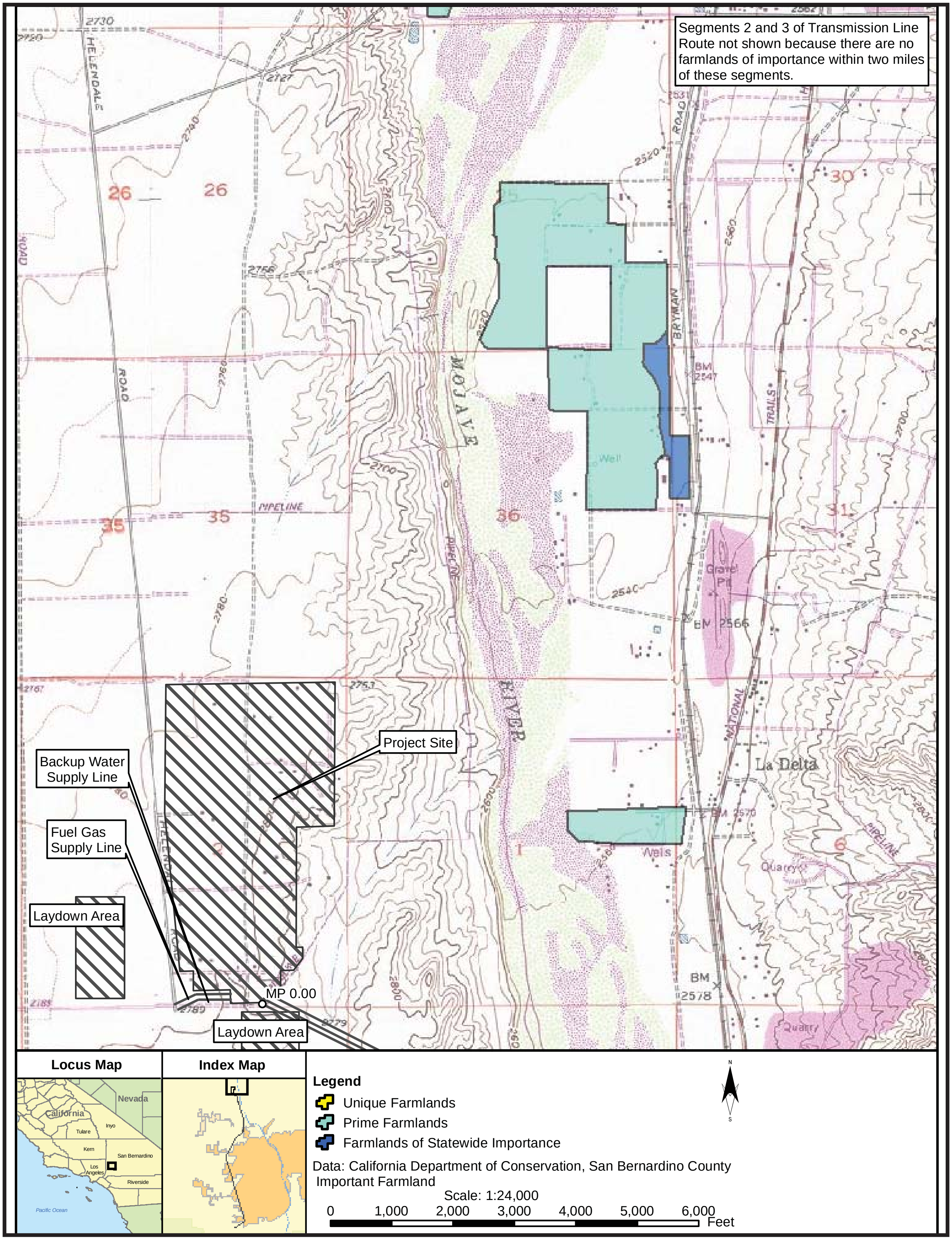
Victorville 2 Hybrid Power Project - Zoning Designations in the Immediate Vicinity of the Project Site



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 6.8-4

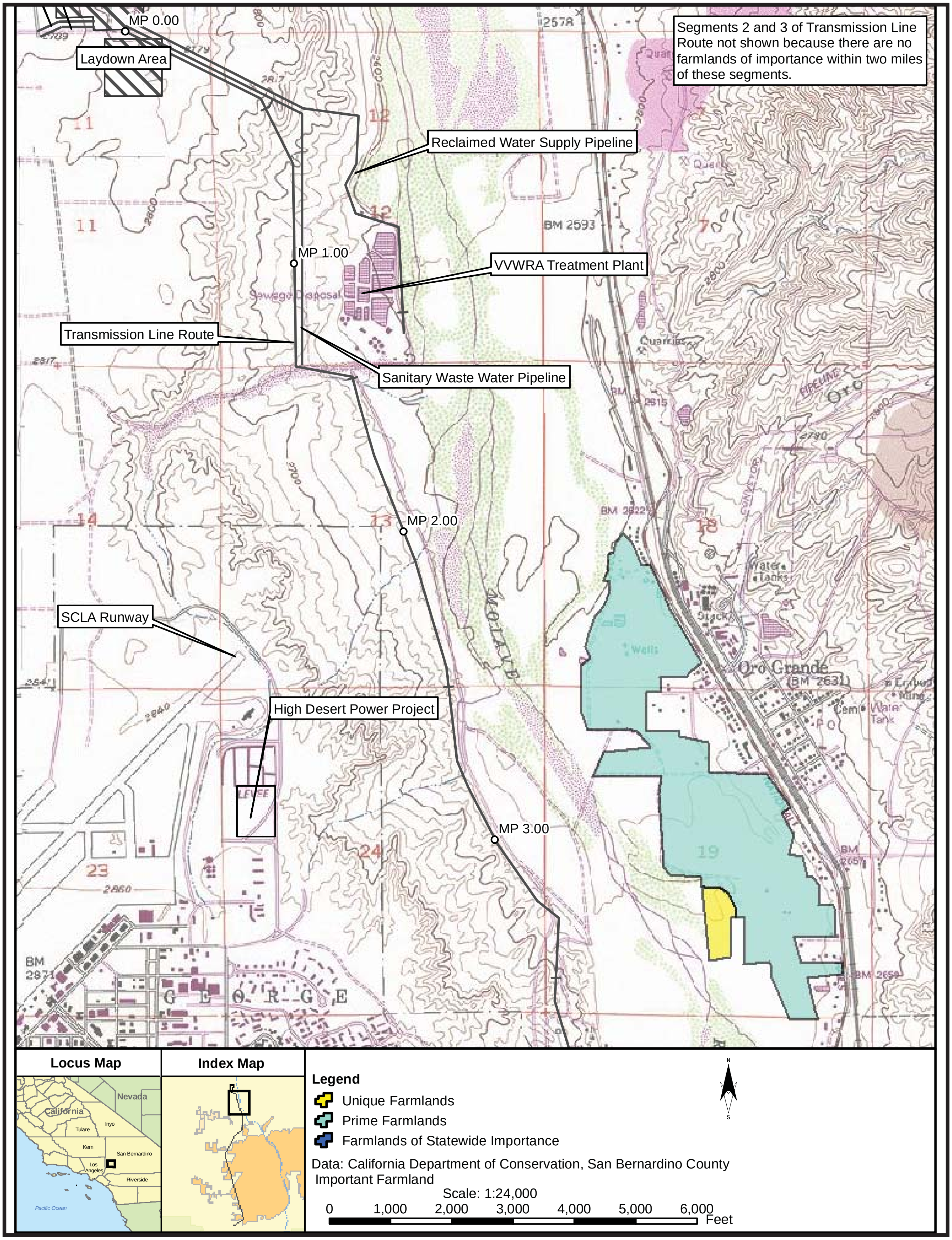
Victorville 2 Hybrid Power Project - Farmland in the Project Vicinity



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

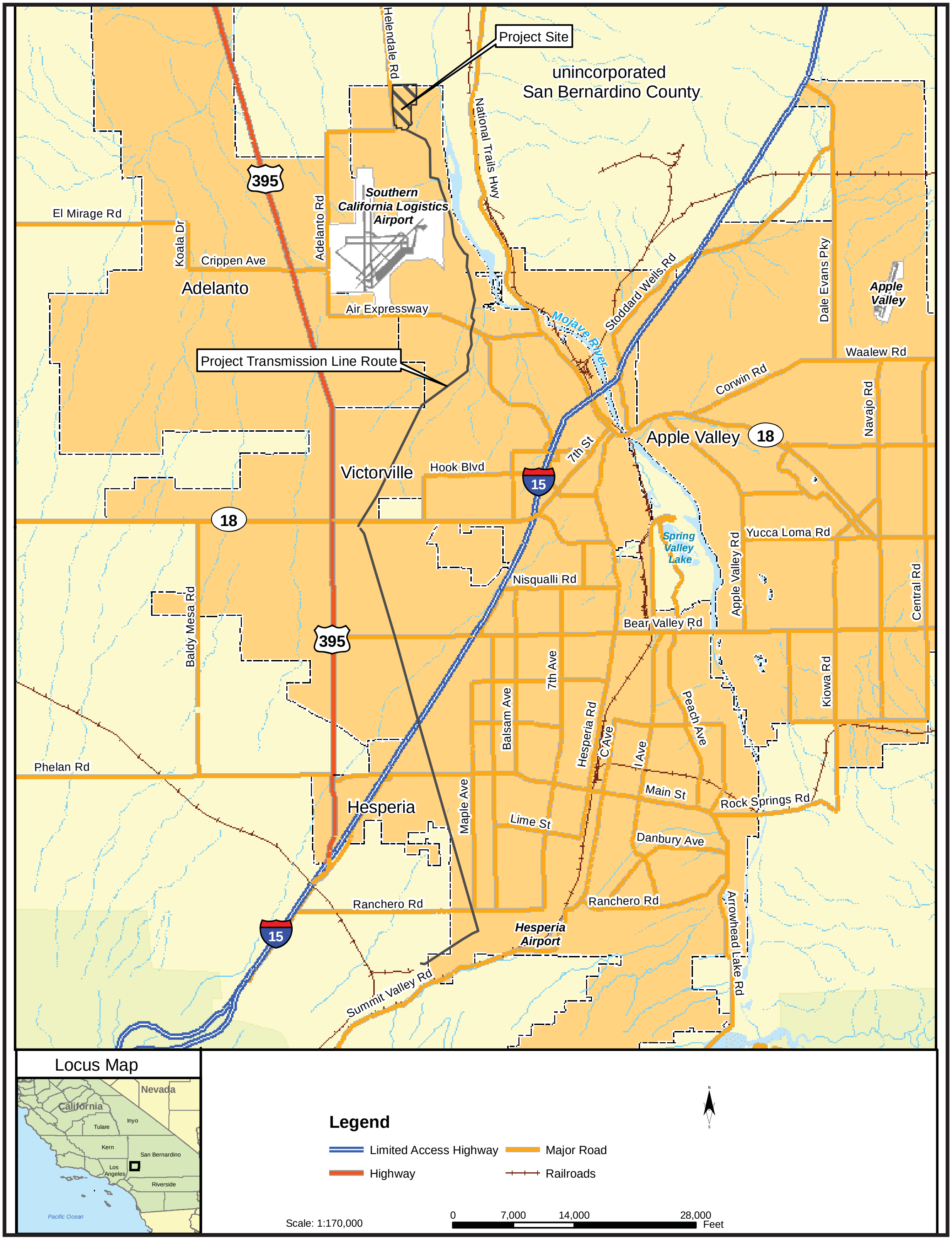
SOURCE: AFC Figure 6.2-1

LAND USE - FIGURE 5b
Victorville 2 Hybrid Power Project - Farmland in the Project Vicinity



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: AFC Figure 6.2-1

LAND USE - FIGURE 6
Victorville 2 Hybrid Power Project - Regional Transportation Access



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: AFC Figure 6.13-1

NOISE AND VIBRATION

Steve Baker

SUMMARY OF CONCLUSIONS

California Energy Commission (Energy Commission) staff concludes that the Victorville 2 Hybrid Power Project (Victorville 2) can be built and operated in compliance with all applicable noise and vibration laws, ordinances, regulations, and standards (LORS) and, if built in accordance with the conditions of certification proposed below, would produce no significant adverse noise impacts on people within the affected area, either direct or cumulative.

INTRODUCTION

The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances, and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices such as blasting or pile driving. The groundborne energy of vibration can potentially cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of Victorville 2 and recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to ensure compliance with applicable LORS and avoid creation of significant adverse noise or vibration impacts. For an explanation of technical terms and acronyms employed in this section, please refer to **NOISE APPENDIX A** immediately following.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Noise & Vibration Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure
State (Cal-OSHA): Cal. Code Regs., tit. 8, §§ 5095-5099	Protects workers from the effects of occupational noise exposure
Local	
San Bernardino County Ordinance – Title 8, Div. 7, Ch. 9, § 87.0905 Noise	Project noise at residential receptors is limited to 45 dBA nighttime and 55 dBA daytime. Construction noise exempt from 7 a.m.-7 p.m.
City of Victorville Municipal Code - Ch. 13.01 Noise Control	Project noise at residential receptors is limited to 60 dBA nighttime and 70 dBA daytime. Construction noise is exempt.
City of Victorville General Plan Noise Element	New residential development within 65 dBA contour would require a noise study.

FEDERAL

Under the Occupational Safety and Health Act of 1970 (29 USC § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) adopted regulations designed to protect workers against the effects of occupational noise exposure (29 CFR § 1910.95). These regulations define permissible noise exposure levels in terms of the amount of time a worker is exposed (see **NOISE APPENDIX A Table A4** immediately following this section). The regulations further specify a hearing conservation program that monitors the noise to which workers are exposed, assures that workers are made aware of overexposure to noise, and requires periodic testing of workers' hearing to detect any degradation.

There are no federal laws governing off-site (community) noise.

The only available guidance for the evaluation of power plant vibration is the guidelines published by the Federal Transit Administration (FTA) for assessing the impacts of groundborne vibration associated with the construction of rail projects. These guidelines have been used by other jurisdictions to assess the groundborne vibration of other types of projects. The FTA-recommended vibration standards are expressed in terms of "vibration level," which is calculated from the peak particle velocity measured from groundborne vibration. The FTA measure of the threshold of perception is 65 VdB,[1] which correlates to a peak particle velocity of about 0.002 inches per second (in/sec).

[1] VdB is the common measure of vibration energy.

The FTA measure of the threshold for architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

STATE

California Government Code section 65302(f) encourages local governmental entities to perform noise studies and implement a noise element as part of their respective general plans. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, including recommendations for evaluating the compatibility of various land uses with community noise exposure.

The California Occupational Safety and Health Administration (Cal-OSHA) has promulgated occupational noise exposure regulations (Cal. Code regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to federal OSHA standards (see the **WORKER SAFETY AND FIRE PROTECTION** section of this document, and **NOISE APPENDIX A, Table A4**).

LOCAL

San Bernardino County Ordinance

Title 8, Division 7, Chapter 9, section 87.0905 of the San Bernardino County Ordinance limits the noise that a project can produce at various types of receptors. Noise at residences must not exceed 45 dBA nighttime and 55 dBA daytime; noise at commercial receptors must not exceed 60 dBA anytime; and noise at industrial receptors may not exceed 70 dBA anytime. Construction noise is exempt from these restrictions between 7 a.m. and 7 p.m.

City of Victorville Municipal Code

Chapter 13.01 Noise Control of the City of Victorville Municipal Code limits the noise that a project can produce at various types of receptors. Noise at residences must not exceed 60 dBA nighttime and 70 dBA daytime; noise at commercial receptors must not exceed 75 dBA anytime; and noise at industrial receptors must not exceed 80 dBA anytime. If the existing ambient noise level exceeds these limits, the maximum allowable noise level is increased to reflect the ambient level.

City of Victorville General Plan Noise Element

The City of Victorville General Plan Noise Element requires that any new residential development in an area in which ambient noise levels exceed 65 dBA CNEL requires a noise study to determine noise insulation requirements.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA guidelines (Cal. Code regs., tit. 14, App. G) sets forth some characteristics that could indicate a potentially significant impact. Specifically, a significant effect from noise may exist if a project results in:

1. Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or in the applicable standards of other agencies;

2. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;

3. Substantial permanent increases in ambient noise levels in the project vicinity that are above existing levels without the project; or

4. Substantial temporary or periodic increases in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying item 3, above, to the analysis of this and other projects, concludes that the potential for a significant noise impact exists where the noise of the project, plus the background, exceeds background noise by 5 dBA or more at the nearest sensitive receptor.

Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA, on the other hand, is considered to be significant. An increase between 5 and 10 dBA should on the face of it be adverse, but could be either significant or insignificant, depending upon the particular circumstances of the case.

Factors to be considered in determining the significance of an adverse impact, as defined above, include:

1. The resulting combined noise level;[2]

2. The duration and frequency of the noise;

3. The number of people affected;

4. The land use designation of the affected receptor sites; and

5. Public concern or controversy, as demonstrated at workshops or hearings, or by correspondence.

[2] For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments, and with industrial noise regulations adopted by European jurisdictions. If the project would create an increase in ambient noise no greater than 10 dBA at nearby sensitive receptors, and the resulting noise level would be 40 dBA or less, the project noise level would likely be insignificant.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- The construction activity is temporary;
- The use of heavy equipment and noisy activities is limited to daytime hours; and
- All industry-standard noise abatement measures are implemented for noise-producing equipment.

Staff uses the above method and thresholds to protect the most sensitive populations.

SETTING

Victorville 2 would be located on a 275-acre site north of the Southern California Logistics Airport (SCLA) in the city of Victorville, San Bernardino County, approximately 3.5 miles east of Highway 395. The site and surrounding land are largely vacant (Victorville 2007a, AFC § 2.3.1).

The ambient noise regime in the project vicinity consists chiefly of local street traffic, occasional aircraft over flights from the SCLA, off-highway vehicles, wind noise, and bird and coyote sounds (Victorville 2007a, AFC § 6.9.2.2). The nearest sensitive noise receptor is a ranch residence approximately one mile west of the project site (Victorville 2007a, AFC § 6.9.2.2; Fig. 6.9-1).

Ambient Noise Monitoring

In order to establish a baseline for the comparison of predicted project noise to existing ambient noise, the applicant has presented the results of an ambient noise survey (Victorville 2007a, AFC § 6.9.2.2; Table 6.9-3). The survey was performed on May 11 and 12, 2006. The noise survey monitored existing noise levels at the following locations, shown in **Noise and Vibration, Figure 1**:

1. Measuring Location ML1: The southern boundary of the project site, along Colusa Road; and

2. Measuring Location ML2: A single home on ranch property approximately one mile west of the project site on Colusa Road. This location was monitored continuously from 11:00 a.m. on May 11, 2006, through 1:00 p.m. on May 12, 2006. Primary noise sources were vehicular traffic and aircraft over flights.

Noise & Vibration Table 2 summarizes ambient noise measurements (Victorville 2007a, AFC § 6.9.2.2; Table 6.9-3).

Noise & Vibration Table 2
Summary of Measured Ambient Noise Levels

Measurement Locations	Measured Noise Levels, dBA					
	L_{eq}		L_{50}		L_{90} [1]	L_{dn}
	Daytime	Nighttime	Daytime	Nighttime	Nighttime	
ML1 – South boundary of project site	44.1[2]	33.9[3]	35.9[2]	29.9[3]	26.1	47
ML2 – Ranch dwelling to W of site	54.4[2]	38.7[3]	36.6[2]	31.1[3]	27.2	60

Source: Victorville 2007a, AFC Table 6.9-3.
[1] Staff calculations of average of four quietest consecutive hours of the nighttime
[2] Staff calculations of average of 15 daytime hours
[3] Staff calculations of average of nine nighttime hours

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by both short-term construction activities and normal long-term operation of a power plant.

Construction Impacts and Mitigation

Construction noise is usually considered to be a temporary phenomenon. Construction of Victorville 2 is expected to take 27 months, which is fairly typical of other combined-cycle power plants with respect to schedule, equipment used, and other types of activities (Victorville 2007a, AFC § 2.4.8).

Compliance with LORS

The construction of an industrial facility like a power plant is typically noisier than allowable under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempted from local ordinance restrictions. The San Bernardino County Ordinance restricts noisy construction to the hours between 7:00 a.m. and 7:00 p.m. (see above). This limit applies both to construction on the northern portion of the site, where solar field construction noise is expected to be quieter, and to the construction of linear facilities such as water, natural gas, and electric transmission lines lying outside the city limits. There are few or no sensitive receptors near enough to be significantly affected by this noise; adhering to the specified hours of construction will ensure compliance with the county ordinance.

The southern portion of the project site, where the noisier power block construction will take place, lies within the city limits of the city of Victorville. The applicant has predicted power plant construction noise based on generally accepted values (Victorville 2007a, AFC Table 6.9-4; Fig. 6.9-2). Aggregate construction noise can be expected to reach levels of 62-70 dBA L_{eq} at a distance of 340 feet from the source. Extrapolating this to the nearest receptor, the residence at ML2, one mile away, yields noise levels of 54 dBA L_{eq} (Victorville 2007a, AFC § 6.9.3.1). No LORS limit the loudness of construction noise within the city of Victorville. In order to avoid annoying the sole residential neighbor, the applicant has offered to limit noisy construction to daytime hours (Victorville 2007a, AFC § 6.9.4). Staff agrees that this should provide adequate mitigation of construction noise, and proposes condition of certification **NOISE-6** to ensure that these hours of construction are adhered to. Power plant construction can therefore be expected to comply with the applicable LORS.

CEQA Impacts

Power Plant Site

To evaluate construction noise impacts, staff compares the projected noise levels to ambient noise levels. Since construction noise typically varies continually with time, it is most appropriately measured by, and compared to, the L_{eq} (energy average) metric.

As described above, aggregate construction noise can be expected to reach levels of 54 dBA L_{eq} at the residence at ML2. Comparing projected noise levels to the ambient noise levels at ML2 (see **Noise & Vibration Table 3**, below) shows an increase during the daytime of three dBA. Such an increase is barely noticeable and considered to be insignificant. Increase over nighttime ambient noise levels, however, would be approximately 15 dBA. Since this increase would be clearly audible, and at night when people are sleeping, this would typically be considered to be annoying.

Noise & Vibration Table 3
Predicted Power Plant Construction Noise Impacts

Receptor	Highest Construction Noise Level[1] (dBA L_{eq})	Measured Existing Ambient[2] (dBA L_{eq})	Cumulative (dBA L_{eq})	**Change (dBA)**
ML2 – Ranch dwelling to W of site	54	54.4 daytime	57 daytime	**+3 daytime**
		38.7 nighttime	**54 nighttime**	**+15 nighttime**

1 Source: Victorville 2007a, AFC § 6.9.3.1.
2 Source: Victorville 2007a, AFC Table 6.9-3; and staff calculations of average of daytime and nighttime hours.

As described above, the applicant commits to limiting noisy construction work to daytime hours. In order to avoid annoyance, staff proposes such a limit. Proposed Condition of Certification **NOISE-6**, below, would restrict noisy construction to between 7:00 a.m. and 7:00 p.m.

In the event that actual construction noise should annoy nearby residents, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish notification and noise complaint processes requiring the applicant to resolve any problems caused by noise from the project.

Linear Facilities

New off-site linear facilities would include a quarter-mile-long natural gas pipeline that would interconnect with the existing Kern River-High Desert lateral adjacent to the southwestern corner of the project site, a 1.5-mile-long potable water supply line from the City of Victorville's distribution system, a 1.5-mile-long reclaimed water supply connection to the Victor Valley Wastewater Reclamation Authority treatment plant to the southeast of the site, a 1.25-mile-long sanitary wastewater line to the wastewater plant, and a 21-mile-long connection to the existing SCE Victor Substation south-southwest of the site (Victorville 2007a, AFC §§ 1.1, 2.1, 2.4.5.2, 2.4.7.1, 2.4.7.4, 6.9.3.1).

The pipelines are all adjacent to the project site, so their construction noise impacts will be similar to those of the power plant itself. The transmission line interconnection passes primarily through undeveloped areas. Construction on linears proceeds rapidly, so no particular area is exposed to noise for more than a few days. Limiting noisy construction to daytime hours should provide adequate mitigation of these impacts. To ensure compliance with this restriction, staff proposes Condition of Certification **NOISE 6**.

Pile Driving

The applicant does not discuss whether pile driving would be necessary for construction of Victorville 2. If pile driving is required for construction of the project, the noise from this operation could be expected to reach 104 dBA at a distance of 50 feet. Pile driving noise would thus be projected to reach levels of 64 dBA at ML2, the nearest residential receptor (staff calculation). Added to the existing daytime ambient level of 54 dBA L_{eq}, this would combine to produce 64 dBA, an increase of 10 dBA over ambient noise levels (see **Noise & Vibration Table 4,** below). While this would produce a noticeable impact, staff believes that limiting pile driving to daytime hours, in conjunction with its temporary nature, would result in impacts tolerable to residents. Staff proposes condition of certification **NOISE-6** to ensure that pile driving noise, should it occur, would be limited to daytime hours.

Noise & Vibration Table 4
Pile Driving Noise Impacts

Receptor	Pile Driving Noise Level (dBA L_{eq})	Daytime Ambient Noise Level (dBA L_{eq})	Cumulative Level (dBA)	**Change (dBA)**
ML2	**64**	**54.4**	**64**	**+10**

Source: Application for certification, Vernon Power Plant Project (06-AFC-4), Table 8.5-10; and staff calculations.

Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project that includes a steam turbine, is created by the steam blows. After erection and assembly of the feed water and steam systems, the piping and tubing comprising the steam path has accumulated dirt, rust, scale, and construction debris such as weld spatter, dropped welding rods, and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine and quickly destroy the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. Traditionally, high pressure steam is then raised in the heat recovery steam generator, or a temporary boiler, and is allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a “high pressure steam blow,” is quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, is performed several times daily over a period of two or three weeks. At the end of this procedure, the steam lines are connected to the steam turbine, which is then ready for operation. Alternatively, high pressure compressed air can be substituted for steam.

High pressure steam blows, if not silenced, can typically produce noise levels as high as 129 dBA at a distance of 50 feet; this would amount to roughly 89 dBA at ML2, the nearest sensitive receptor. With a silencer installed on the steam blow piping, noise levels are commonly attenuated to 89 dBA at 50 feet; this would yield approximately 49 dBA at ML2.

No LORS would prohibit the noise from a high pressure steam blow that wasn't silenced, but the San Bernardino County ordinance limits noisy construction work like this to the hours between 7 a.m. and 7 p.m. This level of noise, however, would likely be extremely annoying at ML2, even during the daytime. A silenced blow would not and, in fact, would probably be unnoticeable compared to typical daytime ambient noise levels (see **Noise & Vibration Table 5,** below).

A more modern, quieter steam blow process, referred to as low pressure steam blow and marketed under names such as QuietBlow™ or Silentsteam™, is also popular. This method utilizes lower pressure steam or compressed air over a continuous period of 36 hours or so. Resulting noise levels reach about 80 dBA at 100 feet; such a process would yield noise levels of approximately 40 dBA at ML2.

Noise from a low pressure continuous steam blow at ML2, 4 dBA greater than the nighttime ambient background level, would not likely disturb people trying to sleep and would not constitute a significant impact.

Noise & Vibration Table 5
Steam Blow Noise Impacts

Receptor	High Pressure Steam Blow Noise Level (silenced) (dBA L_{eq})	Daytime Ambient Noise Level (dBA L_{eq})[1]	Cumulative Level (dBA L_{eq})	Change (dBA)
ML2	49	54.4	55.4	+1
Receptor	Low Pressure Steam Blow Noise Level (dBA L_{eq})	Nighttime Ambient Noise Level (dBA L_{90})[1]	Cumulative Level (dBA L_{eq})	Change (dBA)
ML2	40	38.7	43	+4

[1] See **NOISE Table 2**, above

In order to ensure that steam blow noise does not produce significant adverse impacts, staff has proposed condition of certification **NOISE-7,** below.

Vibration

The only construction operation likely to produce vibration that could be perceived off-site would be pile driving, should it be employed. Vibration attenuates rapidly; it is unlikely that vibration would be perceptible at any appreciable distance from the project site. Staff therefore believes there would be no significant impacts from construction vibration.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized applicable LORS that would protect construction workers (Victorville 2007a, AFC § 6.9.3.1). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**.

Operation Impacts and Mitigation

The primary noise sources of Victorville 2 include the gas turbine generators, gas turbine air inlets, heat recovery steam generators and their exhaust stacks, the steam turbine, cooling tower fans, electrical transformers, fuel gas metering equipment, and various pumps and fans (Victorville 2007a, AFC § 6.9.3.2). Staff compares the projected noise with applicable LORS. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

The applicant included the following noise mitigation measures in performing computer modeling of the noise impacts from project operation (Victorville 2007a, AFC § 2.4.3.1):

- Metal acoustical gas turbine enclosures; and
- Inlet air filter silencers.

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (Victorville 2007a, AFC § 6.9.3.2). Project operating noise at ML2 (the nearest noise-sensitive residence, one mile west of the project site) is predicted to be approximately 39 dBA L_{eq}. This figure complies with the LORS limits; see **Noise & Vibration Table 6**.

Noise & Vibration Table 6
Plant Operating Noise LORS Compliance

Receptor	LORS	LORS Limit	**Projected Noise Level[1]**
ML2	San Bernardino County Ordinance	45 dBA L_{eq} nighttime 55 dBA L_{eq} daytime	**39 dBA L_{eq}**
	City of Victorville Municipal Code	**60 dBA L_{eq} nighttime 70 dBA L_{eq} daytime**	

[1] Source: Victorville 2007a, AFC § 6.9.3.2

CEQA Impacts

Power plant noise is unique. Essentially, a power plant operates as a steady, continuous, broadband noise source, unlike the intermittent sounds that make up the majority of the noise environment. Power plant noise therefore contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it tends to define the background noise level. For this reason, staff compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated within the project to reduce or remove that impact.

In most cases, a power plant will be intended to operate around the clock for much of the year. Staff evaluates project noise emissions by comparing them to the nighttime ambient background level; this assumes that the potential for annoyance from power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than daytime levels; differences of 5-10 dBA are common. Staff believes it is prudent to average the lowest nighttime hourly background noise level values to arrive at a reasonable baseline for comparison with the project's predicted noise level.

Power plant noise levels at ML2 are predicted to reach 39 dBA L_{eq}. See **Noise & Vibration Table 7**.

Noise & Vibration Table 7
Power Plant Noise Impacts at Sensitive Receptor

Receptor	Power Plant Noise Level, dBA L_{eq}[1]	Ambient Background Level, dBA L_{90}[2]	Cumulative Noise Level, dBA	**Change from Ambient Background Level**
ML2	**39**	**27.2**	**39**	**+12**

[1] Source: Victorville 2007a, AFC § 6.9.3.2.
[2] Source: Victorville 2007a, AFC Table 6.9-3; and staff calculations of average of four quietest consecutive nighttime hours.

As explained above, when evaluating noise impacts on residences, staff compares project noise to the average of the four quietest consecutive nighttime hours. At ML2, this is the span from 11:00 p.m.-3:00 a.m. (see AFC, Table 9.3-2). This value is 27.2 dBA L_{90} (see **Noise & Vibration Table 7**).

When projected plant noise is added to the ambient value (as calculated by staff), the cumulative level is 12 dBA above the ambient value at ML2 (see **Noise & Vibration Table 7**). This increase is within the range that staff considers to be a significant adverse impact. To ensure this noise level is not further exceeded, staff proposes Condition of Certification **NOISE-4,** below.

An increase in the noise level at a residence of 12 dBA during the quietest hours of the nighttime might be expected to be annoying during the mild seasons of the year, when people commonly sleep with their windows open. When the weather is less mild (cold in winter, or hot enough in summer to cause people to run their air conditioners all night long), such an increase would probably not be annoying and might even be unnoticeable. Mitigating such a significant impact by quieting the power plant is extremely expensive; such mitigation can cost many millions of dollars. This is often regarded as rendering such mitigation infeasible. When the number of potentially affected residences is small (one at ML2), staff typically does not suggest further mitigation to quiet the power plant. Rather, staff commonly proposes a condition of certification requiring the project owner to offer noise mitigation measures at the affected residences, if the residents request it, to reduce the impacts to a level of insignificance. This mitigation can include upgrading the dwelling with double-pane windows and solid-core exterior doors, installing exterior wall insulation, installing air conditioning if it is not already in place, or erecting a sound wall near the residence. Staff recommends such an approach in this case; see proposed condition of certification **NOISE-8,** below.

Tonal Noises

One possible source of annoyance could be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant plans to avoid the creation of annoying tonal (pure tone) noises by balancing the noise emissions of various power plant features in the plant's design (Victorville 2007a, AFC § 6.9.3.2). To ensure that tonal noises do not cause annoyance, staff proposes Condition of Certification **NOISE-4**.

Linear Facilities

All water and gas piping would lie underground and be silent during operation. Noise effects from the electrical interconnection line typically do not extend beyond the right-of-way easement of the line, and would therefore be inaudible to any receptors (Victorville 2007a, AFC § 6.9.3.2).

Vibration

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration) and through the air (airborne vibration).

The operating components of a combined-cycle power plant consist of high-speed gas and steam turbine generators, compressors, and various pumps. All of this equipment must be carefully balanced in order to operate, and permanent vibration sensors are attached to the turbines and generators. Based on experience with numerous previous projects with similar equipment, Energy Commission staff believes that groundborne vibration from Victorville 2 would be undetectable by any likely receptor.

Airborne vibration, or low frequency noise, can rattle windows and objects on shelves and the walls of lightweight structures. In staff's experience, airborne vibration impacts from a plant like Victorville 2 are typically imperceptible 1,000 feet from the plant. This project's chief source of airborne vibration would be the gas turbines' exhaust. In this type of power plant, however, the exhaust must pass through the heat recovery steam generators (HRSG) before reaching the atmosphere. HRSGs act as efficient mufflers; this makes it highly unlikely that Victorville 2 would cause perceptible airborne vibration.

Worker Effects

The applicant acknowledges the need to protect plant operating and maintenance workers from noise hazards, and has committed to comply with applicable LORS (Victorville 2007a, AFC § 6.9.3.2). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required. To ensure that plant operation and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed condition of certification **NOISE-5**.

CUMULATIVE IMPACTS AND MITIGATION

Section 15130 of the CEQA guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, are either considerable or could compound or increase other environmental impacts. The CEQA guidelines require that this discussion reflect the severity and likelihood of the impacts, but need not provide as much detail as the discussion of impacts attributable to the project alone.

Staff is unaware of any projects in the region that could combine with this project to create cumulative impacts. Only noise from SCLA flight operations is likely to combine with power plant noise. This noise has been accounted for in ambient noise measurements. Staff therefore believes that there would be no cumulative noise impacts involving Victorville 2 either during construction or operation.

FACILITY CLOSURE

In the future, upon closure of Victorville 2, all operational noise from the project would cease, and no further adverse noise impacts from operation of the project would be possible. The remaining potential temporary noise source would be the dismantling of the structures and equipment, in addition to any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it can be similarly treated. That is, noisy work could be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS that were in existence at that time would apply. Applicable conditions of certification included in the Energy Commission decision would also apply unless modified.

CONCLUSIONS AND RECOMMENDATIONS

Victorville 2, if built and operated in conformance with these proposed conditions of certification, would comply with all applicable noise and vibration LORS for both operation and construction, and would produce no significant adverse noise impacts on people within the affected area, including the minority population, directly, indirectly, or cumulatively.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one and one-half miles of the site and one-quarter mile of the linear facilities, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project and include that telephone number in the above notice. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the Compliance Project Manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed and describing the method of that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of the Victorville 2, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- Take all feasible measures to reduce the noise at its source if the noise is project related; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts, and if obtainable, a signed statement by the complainant stating that the noise problem has been resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form with the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a three-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program and a statement, signed by the project owner's project manager, verifying that the noise control program will be implemented throughout construction of the project. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal-OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program and the project owner's project manager's signed statement. The project owner shall make the program available to Cal-OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include noise mitigation measures adequate to ensure that operation of the project will not cause noise levels due to plant operation to exceed an average of 39 dBA L_{eq} measured at monitoring location ML2, the residence one mile west of the project site. No new pure tone components may be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

The measurement of power plant noise for the purposes of demonstrating compliance with this condition of certification may alternatively be made at a location, acceptable to the CPM, closer to the plant (for example, 400 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected residential locations to determine the presence of pure tones or other dominant sources of plant noise.

A. When the project first achieves a sustained output of 80% or greater of rated capacity, the project owner shall conduct a community noise survey at monitoring location ML2, or at closer locations acceptable to the CPM. This survey shall be performed during power plant operation and shall also include the measurement of one-third octave band sound pressure levels to determine whether new pure tone noise components have been caused by the project.

B. If the results from the noise survey indicate that the power plant average noise level (L_{eq}) at ML2 exceeds the above value, mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

C. If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate those pure tones.

<u>**Verification:**</u> The survey shall take place within 30 days after the project first achieves a sustained output of 80% or greater of rated capacity. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report will be a description of any additional mitigation measures necessary to achieve compliance with the above-listed noise limit and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey.

Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

NOISE-5 Following the project's first achievement of a sustained output of 80% or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations sections 5095–5099 and Title 29, Code of Federal Regulations section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures to comply with the applicable state and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

CONSTRUCTION TIME RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times of day shown below:

Any Day	7:00 a.m.-7:00 p.m.

Haul trucks and other engine-powered equipment shall be equipped with mufflers that meet all applicable regulations. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout construction of the project.

STEAM BLOW RESTRICTIONS

NOISE-7 If a high-pressure steam blow is employed, the project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 89 dBA measured at a distance of 50 feet. The project owner shall conduct steam blows only during the hours of 7:00 a.m.-7:00 p.m.

If a low-pressure continuous steam blow or air blow process is employed, the project owner shall submit a description of this process, with expected noise levels and projected hours of execution, to the CPM, who shall review the proposal with the objective of ensuring that the resulting noise levels from the steam or air blows alone will not exceed 40 dBA $L_{eq,}$ measured at the residence at ML2.

Verification: At least fifteen (15) days prior to the first steam blow, the project owner shall submit to the CPM drawings or other information describing the temporary steam blow silencer and the noise levels expected and a description of the steam blow schedule.

At least 15 days prior to any low-pressure continuous steam blow, the project owner shall submit to the CPM drawings or other information describing the process, including the noise levels expected and the projected time schedule for execution of the process.

NOISE-8 In the event legitimate noise complaints under condition of certification **NOISE-2** are made by the owners or occupants of the residence at ML2, the project owner shall offer to pay for the following noise attenuating upgrades to the residence:

- Exterior sound barriers;
- Replacement of single-pane windows with dual-pane windows;
- Replacement of hollow-core exterior doors with solid-core doors and weather stripping;
- Air conditioning (if not already present); and/or
- Additional sound insulation in exterior walls.

The owner of the residence may select any or all of the above upgrades that the residence owner decides (at his or her sole discretion, but following consultation with the project owner) are appropriate. The residence owner and the project owner shall select a mutually acceptable contractor to perform the upgrades. The project owner shall pay the cost of the upgrades.

A “legitimate complaint” refers to a complaint about noise caused by the project, as opposed to another source, as verified by the CPM. A legitimate complaint constitutes either: a violation by the project of any noise condition of certification, which is documented by another individual or entity affected by such noise; or a minimum of three complaints over a 24-hour period that are confirmed as legitimate by the CPM, the project owner, or any local or state agency that would, but for the exclusive jurisdiction of the Energy Commission, otherwise have the responsibility for investigating noise complaints or enforcing noise restrictions.

Verification: Upgrades shall (unless impossible due to circumstances beyond the project owner’s control) be installed within six months of receipt of the complaint. In the first annual compliance report after the receipt of a complaint, the project owner shall include documentation certifying that: 1) the noise-attenuating upgrades were installed on the specified residence at the project owner’s expense; 2) the noise attenuating upgrades were already a feature of the residence; 3) installation was offered but refused by the owner; or 4) residential use by the complainant ceased. In the event noise-attenuating upgrades are not complete at the time the annual compliance report is issued, the report shall include a schedule for the completion of the upgrades and the documentation listed above shall be included in the next annual compliance report.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Victorville 2 Hybrid Power Project
(07-AFC-1)

NOISE COMPLAINT LOG NUMBER ________________________

Complainant's name and address:

Phone number: ________________________

Date complaint received: ________________________

Time complaint received: ________________________

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: ________________________

Initial noise levels at three feet from noise source: _________dBA Date: __________

Initial noise levels at complainant's property: _________dBA Date: __________

Final noise levels at three feet from noise source: _________dBA Date: __________

Final noise levels at complainant's property: _________dBA Date: __________

Description of corrective measures taken:

Complainant's signature: _____________________________ Date: __________

Approximate installed cost of corrective measures: $____________

Date installation completed: ____________

Date first letter sent to complainant: ____________ (copy attached)

Date final letter sent to complainant: ____________ (copy attached)

This information is certified to be correct:

Plant Manager's Signature: ________________________

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

REFERENCES

Victorville 2007a — City of Victorville (tn:39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vols. 1 and 2. 2/27/07. Received 2/28/07.

NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that “A-weighting” of sound intensities best reflects the human ear’s reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Noise & Vibration Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45-60 dBA range, and high above 60 dBA. Outdoor day/night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65-75 dBA for a major metropolis downtown (for example, San Francisco), and 80-85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential/commercial zones, those higher levels nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (*Effects of Noise on People*, U.S. Environmental Protection Agency, December 31, 1971).

To help the reader understand the concept of noise in decibels (dBA), **Noise & Vibration Table A2** illustrates common noises and their associated sound levels, in dBA.

Noise & Vibration Table A1 Definition of Some Technical Terms Related to Noise	
Terms	**Definitions**
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the Noise Level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m-10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

Noise & Vibration Table A2 Typical Environmental and Industry Sound Levels			
Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction;
- Interference with activities such as speech, sleep, and learning; and
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.

2. Outside of the laboratory, a three-dB change is considered a barely noticeable difference.

3. A change in level of at least five dB is required before any noticeable change in community response would be expected.

4. A 10-dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response (Kryter, Karl D., The Effects of Noise on Man, 1970).

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three-dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). **Noise & Vibration Table A3** indicates the rules for decibel addition used in community noise prediction.

Noise & Vibration Table A3
Addition of Decibel Values

When two decibel values differ by:	Add the following amount to the larger value
0-1 dB	3 dB
2-3 dB	2 dB
4-9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Architectural Acoustics, M. David Egan, 1988.

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by six dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure and list permissible noise level exposure as a function of the amount of time to which the worker is exposed, as shown in **Noise & Vibration Table A4**.

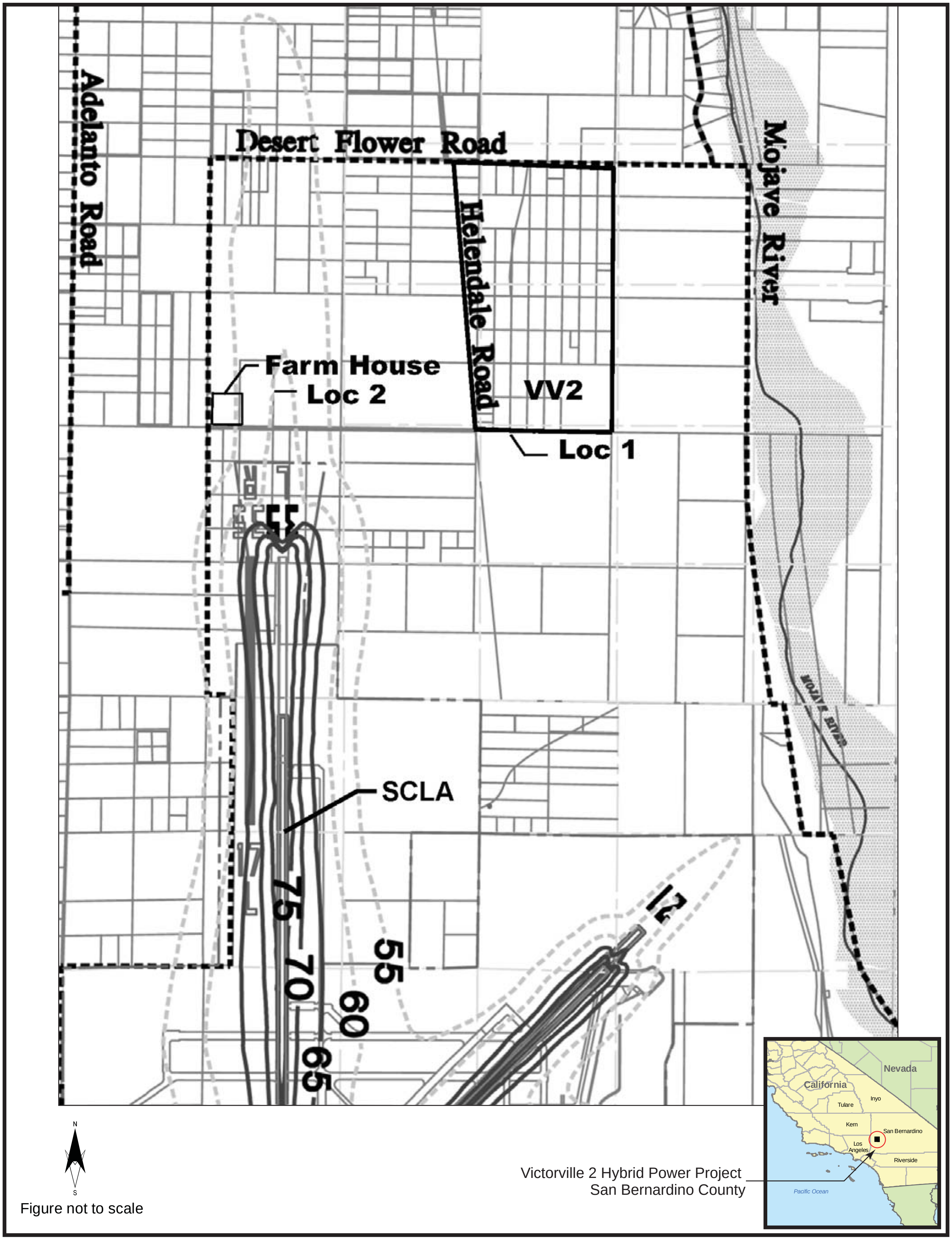
Noise & Vibration Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 CFR §1910.95.

NOISE AND VIBRATION - FIGURE 1

Victorville 2 Hybrid Power Project - SCLA Land Noise Contours and Noise Measurement Locations



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: 07- AFC -1: Figure 6.9-1

PUBLIC HEALTH

Obed Odoemelam, Ph.D.

SUMMARY AND CONCLUSIONS

Staff has analyzed the potential public health risks from the toxic air pollutants associated with construction and operation of the proposed Victorville 2 Hybrid Power Project (Victorville 2) and does not expect there to be any significant cancer or either short- or long-term non-cancer health effects if the proposed condition of certification in this section is implemented. The toxic (non-criteria) pollutants considered in this analysis are pollutants for which there are no established air quality standards. The potential for significant public health impacts from emissions of other groups of pollutants for which there are specific air quality standards (criteria pollutants) is addressed in the **AIR QUALITY** section of this report. The recommended **AIR QUALITY** conditions of certifications are intended to ensure this compliance.

INTRODUCTION

The purpose of this **PUBLIC HEALTH** analysis is to determine if toxic emissions from the proposed Victorville 2 project could potentially cause significant adverse public health impacts or violate standards for public health protection in the project area. Toxic pollutants (or non-criteria pollutants) are pollutants for which there are no specific air quality standards. The other pollutants for which there are specific air quality standards are known as criteria pollutants. If potentially significant health impacts are identified for the non-criteria pollutants considered in this analysis, staff would evaluate mitigation measures to reduce those impacts to less-than-significant levels.

Although the emission and exposure levels for criteria air pollutants are addressed in the **AIR QUALITY** section, staff has included **ATTACHMENT A** at the end of this **PUBLIC HEALTH** section to provide specific information on the nature of their respective health effects. The discussion in the **AIR QUALITY** section mainly focuses on the potential for above-standard exposure and the regulatory measures necessary to mitigate that exposure, with particular emphasis on ozone and particulate matter where existing area levels exceed air quality standards. Staff considers it necessary to mitigate the impacts of these and non-criteria pollutants to ensure overall public health protection while the project is operating. The impacts on public and worker health from accidental releases of hazardous materials are examined in the **HAZARDOUS MATERIALS MANAGEMENT** section, while health effects from electric and magnetic fields are addressed in the **TRANSMISSION LINE SAFETY AND NUISANCE** section. Pollutants released from the project in wastewater streams are discussed in the **SOILS AND WATER RESOURCES** section. Facility releases in the form of hazardous and non-hazardous wastes are addressed in the **WASTE MANAGEMENT** section.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Public Health Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Clean Air Act section 112 (42 U.S. Code section 7412)	Requires new sources which emit more than 10 tons per year of any specified hazardous air pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology (MACT).
State	
California Health and Safety Code sections 39650 et seq.	These sections mandate the California Air Resources Board (CARB) and the Department of Health Services to establish safe exposure limits for toxic air pollutants and identify pertinent best available control technologies (BACT). They also require that the new source review rule for each air pollution control district include regulations that require new or modified procedures for controlling the emission of toxic air contaminants.
California Health and Safety Code section 41700	This section states that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Code of Regulations, Title 22, section 60306	Requires that whenever a cooling system uses recycled water in conjunction with an air conditioning facility and a cooling tower that creates a mist that could come into contact with employees or members of the public, a drift eliminator shall be used and chlorine, or other, biocides shall be used to treat the cooling system re-circulating water to minimize the growth of Legionella and other micro-organisms.
Local	
Mojave Desert Air Quality Management District Rule 1320	Requires safe exposure limits for Toxic Air Pollutants (TACs), use of best-available control technology and new sources review (NSR).

ASSESSMENT OF IMPACTS

This section describes staff's method of analyzing the potential health impacts of toxic pollutants, together with the criteria used to determine their significance.

METHOD OF ANALYSIS

The toxic emissions addressed in this **PUBLIC HEALTH** section are those to which the public could be exposed during both project construction and routine operation. If these toxic contaminants are released into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Ambient air quality standards for the criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide ensure the safety of everyone, including those with heightened sensitivity to the effects of environmental pollution. Since non-criteria pollutants do not have such standards, a process known as a health risk assessment is used to determine if people could be exposed to them at unhealthy levels. The risk assessment procedure consists of the following steps:

- Identification of the types and amounts of hazardous substances that a source could release to the environment;
- Estimation of worst-case concentrations of project emissions into the environment, using dispersion modeling;
- Estimation of the amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact; and
- Characterization of the potential health risks by comparing worst-case exposures to safe standards, based on known health effects.

For Victorville 2 and other sources, a screening-level risk assessment is initially performed using simplified assumptions intentionally biased toward protection of public health. In other words, the analysis is designed to overestimate the public health impacts from exposure to emissions. Therefore, in reality, it is likely that the actual risks from the project will be much lower than the risks estimated by the screening level assessment. This overestimation is generated by identifying conditions that could lead to the highest, or worst-case risks, and then assuming their presence in the study. This process involves the following:

- Using the highest levels of pollutants that could be emitted from the source;
- Assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- Using the type of air quality computer models that predict the greatest plausible impacts;
- Calculating health risks at the location where the pollutant concentrations are estimated to be highest;
- Using health-based standards designed to protect the most sensitive members of the population - including the young, elderly, and those with respiratory illnesses; and
- Assuming an individual’s exposure to cancer-causing agents would occur over a 70-year lifetime.

A screening-level risk assessment will, at a minimum, include the potential health effects of inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from non-inhalation pathways of exposure (see California Air Pollution Control Officers Association (CAPCOA) 1993, Table III-5). When these substances are found in emissions, a screening-level analysis is conducted to include the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (CAPCOA 1993, p. III-19).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) non-cancer effects, and cancer risk (also long-term). Acute health effects result from short-term (one-hour) exposure to relatively high concentrations of pollutants. Acute effects are temporary in nature, and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects result from long-term exposure to lower concentrations of pollutants. This exposure period is defined as approximately from 10 to 100% of a lifetime (from 7 to 70 years). Chronic health effects include reduced lung function and heart disease.

The analysis for non-cancer health effects compares maximum project contaminant levels to safe levels called reference exposure levels (RELs). These are amounts of toxic substances to which even sensitive people can be exposed without suffering adverse health effects (CAPCOA 1993, p. III-36). This means that these exposure limits would serve to protect even sensitive individuals including infants, school pupils, the aged, and people suffering from illnesses or diseases (which make them more susceptible to the effects of toxic substance exposure). The RELs are based on the most sensitive adverse health effects reported in the medical and toxicological literature, and include specific margins of safety that address the uncertainties associated with inconclusive scientific and technical information available at the time standards were set. They are, therefore, intended to provide a reasonable degree of protection against hazards that research has yet to identify. Each margin of safety is designed to prevent pollution levels demonstrated to be harmful, as well as to prevent lower pollutant exposures that may pose an unacceptable risk of harm, even when the risk is not precisely identified by nature or degree. Health protection can be expected if the estimated worst-case exposure is below the relevant REL. In such a case, an adequate margin of safety is assumed to exist between the predicted exposure and the estimated threshold of toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformance with CAPCOA guidelines, the health risk assessment assumes that the effects of the individual substances are additive for a given organ system (CAPCOA 1993, p. III-37). In cases where the actions could be synergistic (where the effects are greater than their sum), this approach may underestimate the health impact in question.

For carcinogenic substances, the health assessment considers the risk of developing cancer and conservatively includes the previously noted assumption that the individual would have continuous exposure over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in chances per million of developing cancer, and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (known as its potency factor and established by the California Office of Environmental Health Hazard Assessment), and the length of the exposure period. Cancer risks for individual carcinogens are added together to yield the total cancer risk from the source being considered. The conservative nature of these screening assumptions means that actual cancer risks are likely to be considerably lower than their estimates.

The screening-level analysis is performed to assess worst-case public health risks associated with a proposed project. If the screening analysis were to predict a risk of no significance, no further analysis would be necessary. However, if the risk were to be above the significance level, further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate estimate of public health risk.

SIGNIFICANCE CRITERIA

Commission staff assesses the health effects of exposure to toxic emissions by first considering their impact on the maximally exposed individual. This individual is a person who is hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above. If the potential risk to this individual is below established levels of significance, staff would consider the potential risk to be less than significant anywhere else in the project area. As described earlier, non-criteria pollutants are evaluated for short-term (acute) and long-term (chronic) non-cancer health effects, as well as for cancer (long-term) health effects. The potential significance of project health impacts is determined separately for each of the three categories of health effects.

Acute and Chronic Non-Cancer Health Effects

Staff assesses the significance of non-cancer health effects by calculating a "hazard index" for the exposure being considered. A hazard index is a ratio obtained by comparing the exposure from facility emissions to the reference (safe) exposure level for a specific toxicant. A ratio of less than one signifies a worst-case exposure below the safe level. The hazard indices for all toxic substances with the same types of health effects are then added together to yield a total hazard index for the source being evaluated. This total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than one indicates that the cumulative worst-case exposure would be within safe levels. Under these conditions, health protection would be assumed even for sensitive members of the population. In that case, staff would assume that there would be no significant non-cancer public health impacts from project operations.

Cancer Risk

Staff relies upon the regulations developed to implement provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, §§ 25249.5 et seq.) for guidance in establishing the level of significance for assessed cancer risks. Title 22, California Code of Regulations, section 12703(b) states that "the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure." This risk level is equivalent to a cancer risk of 10 in 1,000,000, which is often written as $10x10^{-6}$. An important distinction from the provisions in Proposition 65 is that its significance level applies separately to each cancer-causing substance, while staff determines significance based on the total risk from all cancer-causing chemicals from the source in question. The manner in which the significance level is applied by staff is therefore more conservative (or health-protective) than under the provisions of Proposition 65.

As noted earlier, the initial risk analysis for a project is normally performed at the screening level, which is designed to overstate actual risks. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more representative risk estimate. If facility risk, based upon refined assumptions, were to exceed the significance level of 10 in 1,000,000, staff would require appropriate measures to reduce that risk to less than significant. If, after all risk reduction measures have been considered, a refined analysis still identifies a cancer risk of greater than 10 in 1,000,000, staff would deem that risk to be significant, and would not recommend approval for the project.

SETTING

This section describes the environment in the vicinity of the proposed project site from a public health perspective. Features of the natural environment, such as meteorology and terrain, affect a project's potential to impact public health. An emission plume from a facility may affect elevated areas before lower areas because of a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often experience increased pollutant impacts. Also, the types of land use near a site influence population density and, therefore, the number of individuals potentially exposed to a project's emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

According to information from the applicant, the city of Victorville (Victorville 2007a, pp. 1-2, 1-2, 2-3, 6.3-17, 6.3-18, 6.8-8, 6.11-8 and 6.11-9), the proposed project site is on a 275-acre parcel in the northernmost portion of the city of Victorville. The site and the surrounding area are in a geographic sub-region separated from the urbanized areas in Southern California by the San Bernardino and San Gabriel Mountains. Los Angeles is located approximately 100 miles to the southwest and the city of San Bernardino 45 miles to the southeast. The site and the immediate vicinity are largely flat, but its western portion slopes eastward toward the Mojave River to the east. The elevation ranges from 2,780 feet to 2,820 feet above sea level - hence its designation as "high desert." The area is relatively undisturbed land zoned for industrial development, with very few residences. The nearest population center is the city of Victorville, seven miles to the southeast.

The nearest of the area's few rural residences is a horse ranch approximately one mile west of the project property boundaries. The applicant provided specific information (Victorville 2007a, p. 6.11-9 and Figure 6-11-2) identifying three sensitive receptor locations within a 6-mile radius of the site, along with their respective directions and distances from the site. Sensitive receptor locations are those that house sensitive individuals including the elderly, school pupils, and individuals with respiratory diseases who, as previously noted, are usually more sensitive to the effects of environmental pollutants than the general public. In most cases these locations include schools, pre-schools, daycare centers, nursing homes, medical centers, hospitals, and colleges. The nearest of these is the Oro Grande Elementary School, which is approximately three miles from the site. Only 12 residencies were identified within this 6-mile study area.

As noted in the **SOCIOECONOMICS** section, information from Census 2000 shows the area's minority population to vary from 0-63.65% within a six-mile radius of the proposed site pointing to the potential for environmental injustice in case of pollutant exposure at levels of potential health significance. The percentage of the poor was shown to vary from 0-45.27% and thus not pointing to the potential for disproportionate pollutant exposures on the basis of poverty.

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into the air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. An emission plume from a given facility may impact elevated areas before the lower-lying areas because of reduced opportunity for atmospheric mixing. When wind speeds are low and the atmosphere is stable, dispersion is reduced and localized exposure may be increased.

The proposed project's Mojave Desert location is an area of relatively high temperatures and low precipitation (less than four inches a year) and is strongly influenced by the large-scale warming and sinking of the air in the semi-permanent subtropical high-pressure center over the Pacific Ocean. This high-pressure system blocks out most mid-latitude storms except in the winter when most of the area's rainfall occurs. The mean July and August temperatures can exceed 100°F degrees while the winter temperatures are more moderate with mean daily temperatures ranging from the 60s to the low 30s. The presence of a low thermal pressure above the Mojave Desert promotes air movement that transports pollutants from the Los Angeles air basin to the project area. As discussed in the **AIR QUALITY** section, such pollution transport is largely responsible for the area's relatively high levels of ozone and particulate matter in the general absence of local sources.

Atmospheric stability is a measure of the turbulence that influences pollutant dispersion. Mixing heights (the height above ground level below which the air is well mixed and in which pollutants can be effectively dispersed) are lower during the morning hours because of temperature inversions, which are followed by temperature increases in the warmer afternoons. Staff's **AIR QUALITY** section presents a more detailed discussion of the area's meteorology as related to pollutant dispersion.

EXISTING AIR QUALITY

The proposed project site is within the jurisdiction of Mojave Desert Air Quality management District (MDAQMD). By examining average toxic concentration levels from representative air monitoring sites in California with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual is about 1 in 4, or 250,000 in one million.

As noted by the applicant (Victorville 2007a, p 6.11-32) there have been no specific studies within the Mojave Desert Air Quality Management District to measure the background levels of the area's toxic air pollutants. Such studies have been useful for identifying the toxic pollutants that pose the highest risk of cancer in each area in question. In the case of the nearby San Joaquin Valley Air Pollution Control District for example, the year 2000 background air toxics levels were reported as posing a background cancer risk of 225 in a million (CARB 2001). The pollutants 1, 3-butadiene and benzene, emitted primarily from mobile sources, were the two highest contributors to this risk and together accounted for over half of the total risk. The risk from 1, 3-butadiene was about 73 in one million, while the risk from benzene was about 68 in one million. Formaldehyde, which is emitted directly from vehicles and other combustion sources, accounted for about 12% of the ambient cancer risk with a risk of about 26 in one million.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease in ambient levels of air toxics and associated cancer risk in California over the past few years. For example, at the Fresno monitoring station, cancer risk was estimated to be 497 in 1,000,000, based on 1991 data, and 314 in 1,000,000, based on 1995 data.

The noted toxic pollutant-related background risk estimates can be compared with the previously noted normal background lifetime cancer risk (from all cancer causes) of 1 in 4, or 250,000 in 1,000,000. The potential risk from Victorville 2 and similar sources should be assessed within the context of their potential additions to these background risk levels.

The criteria pollutant-related air quality for the project area is assessed in the **AIR QUALITY** section by first adding existing levels (as measured at area monitoring stations), adding them to the project-related levels, then finally comparing the resulting levels with applicable air quality standards. Public health protection is achieved only through specific technical and administrative measures ensuring below-standard exposures when the project is operating. It is this combination of measures that is addressed in the **AIR QUALITY** section.

IMPACTS

POTENTIAL IMPACTS OF PROJECT'S NON-CRITERIA POLLUTANTS

The health impacts of the non-criteria pollutants of specific concern in this analysis can be assessed separately as either construction-phase impacts or operational-phase impacts.

Construction Phase Impacts

Possible construction-phase health impacts, as noted by the applicant (Victorville 2007a, pp. 6.3-47 through 6.3-49, and Appendix G), are from human exposure to wind-blown dust from site excavation and grading, and emissions from construction-related equipment. These dust-related impacts may result from either exposure to the dust itself as PM10, or PM 2.5, or exposure to any toxic contaminants that might be adsorbed on to it. As more fully discussed in the **WASTE MANAGEMENT** section, the results of the applicant's site contamination assessments (Victorville 2007a, pp 6.16-1, 6.16-7 through 6.16-9, and Appendix M) confirmed the presence of Trichloroethylene (TCE)-contaminated groundwater from past activities at the former George Air Force Base. This contamination led to the facility's designation as a superfund site, and is subject to specific remediation under existing federal and state regulations. As noted in this site assessment, the depth of the contaminated groundwater is much greater than could be reached during project construction. The applicant has provided a construction plan to ensure that no TCE or other soil contaminants that is unexpectedly encountered at the site is released. The recommended **WASTE MANAGEMENT** conditions of certification are intended to ensure implementation of this management plan.

The applicant has specified the mitigation measures necessary to minimize construction-related fugitive dust, as required by MDAQMD, Rules 403 and 403.2. The only soil-related construction impacts of potential significance would be from the possible impacts of PM10, or PM 2.5 as a criteria pollutant for the 27-month construction period. As mentioned earlier, the potential for significant impacts from criteria pollutants is assessed in the **AIR QUALITY** section, where the requirements for the identified mitigation measures are presented as specific conditions of certification.

The exhaust from diesel-fueled and other construction equipment has been established as a potent human carcinogen. Thus, construction-related emission levels could possibly add to the carcinogenic risk in this analysis. The applicant has presented the diesel emissions from the different types of equipment to be used in the construction phase (Victorville 2007a Pp 6.3-38 and 6.3-39 and Appendix M). Staff considers the recommended control measures specified in **AIR QUALITY** Conditions of Certification (AQ-SC3, and AQ-SC4) to be adequate to reduce any exposure to levels that would not pose a significant cancer risk especially in this relatively short construction period.

Operational Impacts

The main health risk from Victorville 2 would be associated with emissions from its combustion turbines, heat transfer fluid (Therminol VP-1), Therminol vapor, testing of the emergency diesel firewater pump engine, and the evaporative cooling tower. In addition to the toxic substances emitted from the cooling tower, there is specific concern that bacterial growth in the cooling tower could lead to potentially adverse human health effects. This is discussed below in the section on cooling tower operation and the risk of Legionnaires' disease.

Public Health Table 1 lists the project's toxic emissions and shows how each contributes to the risk estimated from the health risk analysis. For example, the first row shows that oral exposure to acetaldehyde is not of concern but, if inhaled, may have cancer and chronic (long-term) non-cancer health effects, but not acute (short-term) effects.

As noted in a publication by the South Coast Air Quality Management District (SCAQMD 2000, p 6), one property that differentiates the air toxics of concern from the criteria pollutants is their tendency to be highest in close proximity to the source and quickly drop off with distance. This means that the levels of Victorville 2's air toxics would be highest in the immediate area and decrease rapidly with distance.

The applicant's estimates of Victorville 2's potential contribution to the area's carcinogenic and non-carcinogenic pollutants were obtained from a screening-level health risk assessment conducted according to procedures specified in the 1993 CAPCOA guidelines. The results from this assessment (summarized in staff's **Public Health Table 2**) were provided to staff along with documentation of the assumptions used (Victorville 2007a pp 6.11-28, through 6.11-33 and Appendix-K). This documentation included:

- Pollutants considered;
- Emission levels assumed for the pollutants involved;
- Dispersion modeling used to estimate potential exposure levels;
- Exposure pathways considered;
- The cancer risk estimation process;
- The hazard index calculation; and
- Characterization of project-related risk estimates.

Staff finds these assumptions to be acceptable for use in this analysis, and validates the applicant's findings with regard to the numerical public health risk estimates expressed either in terms of the hazard index for each non-carcinogenic pollutant, or as a cancer risk for estimated levels of carcinogenic pollutants. These analyses were conducted to establish the maximum potential for acute and chronic effects on body systems such as the liver, central nervous system, the immune system, kidneys, the reproductive system, the skin, and the respiratory system.

Public Health Table 2
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

Substance	Oral Cancer	Oral Non-cancer	Inhalation Cancer	Non-cancer (Chronic)	Non-cancer (Acute)
Acetaldehyde			✔	✔	
Acrolein				✔	✔
Ammonia				✔	✔
Arsenic	✔	✔	✔	✔	✔
Benzene			✔	✔	✔
1,3-Butadiene			✔	✔	
Cadmium		✔	✔	✔	
Chromium			✔	✔	
Copper				✔	✔
Ethylbenzene				✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Lead	✔	✔	✔	✔	
Mercury		✔		✔	✔
Naphthalene		✔		✔	
Nickel			✔	✔	✔
Polynuclear Aromatic Hydrocarbons (PAHs)	✔	✔	✔	✔	
Propylene				✔	
Propylene oxide			✔	✔	✔
Toluene				✔	✔
Xylene				✔	✔
Zinc				✔	

Source: Prepared by staff using reference exposure levels and cancer unit risks from CAPCOA Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment guidelines, October 1993, SRP 1998, and Office of Environmental Health Hazard Assessment Air Toxics Hot Spots Program Risk Assessment guidelines.

As shown in **Public Health Table 3**, the chronic hazard index at the point of maximum impact is 0.015, while the maximum hazard index for acute effects is 0.11. These values are well below staff’s significance criterion of 1.0, suggesting that the pollutants in questions are unlikely to pose a significant risk of either chronic or acute non-cancer health effects anywhere in the project area.

Public Health Table 3
Victorville2 Project's Operation Hazard/Risk

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Non-cancer	0.11	1.0	No
Chronic Non-cancer	0.015	1.0	No
Individual Cancer	0.73×10^{-6} (a)	10.0×10^{-6}	No

Staff's summary of information from Victorville 2007a pp. 6.11-28 through 6.11-30, and Appendix K.
(a) Risk at the point of maximum impact

The cancer risk estimate for the point of maximum impact is 0.73 in 1,000,000, which is well below staff's significance criterion of 10 in 1,000,000 for this screening-level assessment. Thus, project-related cancer risk from project operations would be less than significant for all individuals in the project area. As with the non-cancer impacts, the point of maximum cancer risk is on elevated, uninhabitable terrain. Similar estimates for potentially habitable areas are much lower. Staff further notes that maximum risks from the assessed turbines and cooling towers occur at different locations at elevated terrain, with no potential occupants; so adding these risk estimates together (as done in this analysis) further adds to the conservatism in the assessment process.

The conservatism in these assessments is further reflected in the noted fact that (a) the individual considered is assumed to be exposed at the highest possible levels to all the carcinogenic pollutants from the project for a 70-year lifetime, (b) all the carcinogens are assumed to be equally potent in humans and experimental animals, even when their cancer-inducing abilities have not been established in humans, and (c) humans are assumed to be as susceptible as the most sensitive experimental animal, despite knowledge that cancer potencies often differ between humans and experimental animals. Only a relatively few of the many environmental chemicals identified so far as capable of inducing cancer in animals have been shown to also cause cancer in humans.

The Therminol for Victorville 2's solar heat collection system would be utilized within a closed loop, with constant monitoring to immediately detect any system leaks. Therminol is a chemical irritant of low toxicity, though its irritant quality would call for immediate remediation to prevent significant leaks and human exposure. The applicant has presented this information about its safe storage and handling in the project's solar heat collection unit (Victorville 2007a, pp 6.7-18 and 6.7-19 and Appendix E). With the adoption of Hazardous Materials Condition of Certification **HAZ-7** that would require installation of isolation valves in the Therminol fluid pipe loops to isolate a solar panel section in the event of a leak, staff is satisfied that this proposed use would not constitute a significant health hazard to humans.

Cooling Tower-Related Risk of Legionnaires' Disease

Legionella is a bacterium that is ubiquitous in natural aquatic environments and widely distributed in man-made water systems. It is the principal cause of legionellosis, more commonly known as Legionnaires' disease, which is similar to pneumonia. Transmission to people results mainly from the inhalation or aspiration of aerosolized contaminated water.

Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems, have been associated with outbreaks of legionellosis since cooling water systems and their components can amplify and disseminate aerosols that contain Legionella.

The State of California regulates recycled water used for cooling tower operations according to requirements in Title 22, section 60303, California Code of Regulations. These requirements mandate the use of chlorine or other biocides to minimize the growth of Legionella and other microorganisms.

Legionella can grow symbiotically with other bacteria and infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Staff notes that most cooling tower water treatment programs are designed to minimize scale, corrosion, and biofouling, but not necessarily to control Legionella.

Effective mitigation measures should include a cleaning and maintenance program to minimize the accumulation of bacteria, algae, and protozoa that may contribute to the nourishment of Legionella. The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE 1998) emphasizes the need for such programs in its specifications for Legionellosis prevention. Also, the Cooling Tower Institute has issued guidelines for the best practices for control of Legionella (CTI 2000). Preventive maintenance includes effective drift eliminators, periodically cleaning the system as appropriate, maintaining mechanical components, and maintaining an effective water treatment program with appropriate biocide concentrations.

Staff’s recommended Condition of Certification **PUBLIC HEALTH-1** is intended to ensure the effective maintenance and bactericidal action necessary during the operation of Victorville 2’s cooling, using reclaimed water from the Victor Valley Water Reclamation Authority. This condition would specifically require the project owner to prepare and implement a cooling water management plan to ensure that bacterial growth is kept to a minimum in the cooling tower. With the use of an aggressive antibacterial program, coupled with routine monitoring and biofilm removal, the chances of Legionella growth and dispersal would be reduced to less than significant.

CUMULATIVE IMPACTS

As previously noted, the maximum impact location would be the spot where pollutant concentrations for the proposed project would theoretically be highest. Even at this hypothetical location, staff does not expect any significant change in lifetime risk to any person, given the calculated incremental cancer risk of 0.73 in 1,000,000, which staff regards as not potentially contributing significantly to the previously noted average lifetime individual cancer risk of 250,000 in 1,000,000. Modeled facility-related risks are much lower for more distant locations. Given the previously noted conservatism in the calculation method used, the actual risks would likely be much smaller. Therefore, staff does not consider the incremental risk estimate for Victorville 2’s operation as suggesting a potentially significant contribution to the area’s overall cancer risk.

The worst-case long-term non-cancer health impact from the project (represented as a chronic hazard index of 0.015) is well below staff’s significance level of 1.0 at the location of maximum impact. At this level, staff does not expect any contribution to existing area non-cancer health impacts to be significant. As with cancer risk, long-term non-cancer hazard risk would be lower at all other locations. The applicant has identified reasonably foreseeable future area projects that could contribute to the cumulative effects toxic pollutants in the area. As noted by the applicant (Victorville 2007a, p 6.11-34), related environmental impact reports have not identified such projects as potentially contributing such pollutants at levels of health significance. Implementation of staff's proposed condition of certification to reduce the likelihood of Legionella growth would ensure that the risk of Legionella growth and dispersion is reduced to levels of insignificance.

Given the identified lack of significant public health impacts from Victorville 2's operation, the race-based environmental justice concerns that were noted in discussing the environmental setting for the project would not be an issue during operations.

COMPLIANCE WITH LORS

The toxic pollutant-related cancer and non-cancer risks from this project's operation reflect the effectiveness of control measures (including the use of cleaner-burning natural gas, and an oxidation catalyst which reduces hazardous air pollutant emissions) proposed by the applicant. Since these risk estimates are far below the significance levels in the applicable LORS, staff concludes that the related operational plan would comply with these LORS.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has not received any agency or public comments on the public health aspects of this proposed project.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the toxic air emissions from the construction and operation of this proposed solar-powered and natural gas-burning project are at levels that do not require mitigation beyond the specific emission control measures noted above. Implementation of staff's proposed condition of certification to reduce the likelihood of Legionella growth would ensure that the risk of Legionella growth and dispersion is reduced to levels of insignificance. If the proposed project is approved, staff would recommend the following condition of certification to address the risk from Legionella in the cooling tower.

The conditions for ensuring compliance with all applicable air quality standards are specified in the **AIR QUALITY** section for the area's criteria pollutants.

PROPOSED CONDITION OF CERTIFICATION

PUBLIC HEALTH-1 The project owner shall develop and implement a Cooling Water Management Plan that is consistent with either staff's *Cooling Water Management Program Guidelines* or the Cooling Technology Institute's *Best Practices for Control of Legionella* guidelines.

VERIFICATION: At least 30 days prior to the commencement of cooling tower operations, the Cooling Water Management Plan shall be provided to the Compliance Project Manager for review and approval.

REFERENCES

CARB (California Air Resources Board) 1996. California Toxic Emissions Factors (CATEF) Database for Natural Gas-Fired Combustion Turbine Cogeneration, 1996.

California Air Resource Board (CARB). 2002. California Air Quality Data, http://www.arb.ca.gov/aqd/aqd.htm.

CAPCOA (California Air Pollution Control Officers Association) 1993. Air Toxics "Hot Spots" Program, Revised 1992 Risk Assessment Guidelines. Prepared by the Toxics Committee, October 1993.

Cooling Tower Institute (CTI). 2000. Guidelines: *Best Practices for Control of* Legionella*.*

Victorville 2007a-City of Victorville. Application for certification of the Victorville 2 power project submitted to the California Energy Commission on February 28, 2007.

Scientific Review Panel on Toxic Air Contaminants (SRP) 1998. Findings of the Scientific Review Panel on the *Report on Diesel Exhaust* as adopted at the panel's April 22, 1998 meeting.

South Coast Air Quality Management District (SCAQMD) 2000*. An Air Toxics Control Plan for the Next Ten Years.* March 2000. South Coast Air Quality Management District publication, 2002.

Title 22, California Code of Regulations, March 20, 2001.

ATTACHMENT A - CRITERIA POLLUTANTS

OZONE (O_3)

Ozone is not directly emitted from specific sources but is formed when reactive organic compounds (VOCs) interact with nitrogen oxides in the presence of sunlight. Heat speeds up the reaction, typically leading to higher concentrations in the relatively hot summer months. Ozone is a colorless, reactive gas with oxidative properties that allow for tissue damage in the exposed individual. The effects of such damage could be experienced as respiratory irritation that could interfere with normal respiratory function. Ozone can also damage plants and other materials susceptible to oxidative damage.

The U.S. EPA revised its federal ozone standard on July 18, 1997 (62 Fed. Reg. 38856), based on health studies that had became available since the standard was last revised in 1979. These new studies showed that adverse health effects could occur at ambient concentrations much lower than reflected in the previous standard, which was based on acute health effects experienced during heavy exercise. In proposing the new standard, the EPA identified specific health effects known to have been caused by short-term exposures (of one to three hours) and prolonged exposure (of six to eight hours) (61 Fed. Reg. 65719). However, a 1999 federal court ruling blocked implementation of the ozone 8-hour standard, which is yet to be implemented.

Acute health effects from short-term exposures include a transient reduction in pulmonary function, and transient respiratory symptoms including cough, throat irritation, chest pain, nausea, and shortness of breath with associated effects on exercise performance. Other health effects of short-term or prolonged O_3 exposures include increased airway responsiveness (which predisposes the individual to bronchoconstriction induced by external stimuli such as pollen and dust), susceptibility to respiratory infection (through impairment of lung defense mechanisms), increased hospital admissions and emergency room visits, and transient pulmonary inflammation.

Generally, groups considered especially sensitive to the effects of air pollution include persons with existing respiratory diseases, children, pregnant women, and the elderly. However, controlled exposure data on people in clinical settings have indicated that the population at greatest risk of acute effects from ozone exposures as children and adults engaged in physical exercise. Children are most at risk because they are active outside, playing and exercising, during summer when ozone levels are highest. Adults who are outdoors and engaging in heavy exertion in the summer months are also among the individuals most at risk. This happens because such exertion increases the amount of O_3 entering the airways and can cause O_3 to penetrate to peripheral regions of the lung where lung tissue is more likely to be damaged. These individuals, as well as those with respiratory illnesses, such as asthma, can experience a reduction in lung function and increased respiratory symptoms, such as chest pain and cough, when exposed to relatively low ozone levels during periods of moderate exertion.

CARBON MONOXIDE (CO)

Carbon monoxide is a colorless, odorless gas, which is a product of inefficient combustion. It does not persist in the atmosphere, being quickly converted to carbon dioxide. However, it can reach high levels in localized areas, or "hot spots".

CO reduces the oxygen carrying capacity of the blood, thereby disrupting the delivery of oxygen to the body's organs and tissues. Persons sensitive to the effects of carbon monoxide include those whose oxygen supply or delivery is already compromised. Thus, groups potentially at risk to carbon monoxide exposure include persons with coronary artery disease, congestive heart failure, obstructive lung disease, vascular disease, and anemia, the elderly, newborn infants, and fetuses (CARB 1989, p. 9). In particular, people with coronary artery disease were found to be especially at risk from carbon monoxide exposure (CARB 1989, p. 9). Tests conducted on patients with confirmed coronary artery disease indicated that exposure to low levels of carbon monoxide during exercise can produce significant cardiac effects. These effects include chest pain (angina) and electrocardiographic changes indicative of effects on the heart muscle (CARB 1989, p. 6). Such changes can limit the ability of patients with coronary artery disease to exert themselves even moderately. Therefore, the statewide carbon monoxide one-hour and eight-hour standards were adopted in part to prevent aggravation of chest pain. Additionally, however, the standards are intended to prevent decreased exercise tolerance in persons with peripheral vascular disease and lung disease, impaired central nervous system functions, and effects on the fetus (Cal. Code Regs. Tit. 17, sec. 70200).

PARTICULATE MATTER (PM)

Particulate matter is a generic term for particles of various substances, which occur as either liquid droplets or small solids of a wide range of sizes. Particles with the most potential to adversely affect human health are those less than 10 micrometers (millionths of a meter) in diameter (known as PM10), which may be inhaled and deposited within the deep portions of the lung (PM10). PM may originate from anthropogenic or natural sources such as stationary or mobile combustion sources or windblown dust. Particles may be emitted directly to the atmosphere or result from the physical and chemical transformation of gaseous emissions such as sulfur oxides, nitrogen oxides, and volatile organic compounds. PM10 may be made up of elements such as carbon, lead, and nickel; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and soil fragments. The size, chemical composition, and concentration of ambient PM10 can vary considerably from area to area and from season to season within the same area.

PM10 can be grouped into two general sizes of particles, fine and coarse, which differ in formation mechanisms, chemical composition, sources, and potential health effects. Fine-mode particles are those with a diameter of 2.5 micrometers or less (PM2.5), while the coarse-mode fraction of PM consists of particles ranging from 10 micrometers down to 2.5 micrometers in diameter.

Coarse-mode PM10 is formed by crushing, grinding, and abrasion of surfaces, and in the course of reducing large pieces of materials to smaller pieces. Coarse particles consist mainly of soil dust containing oxides of silicon, aluminum, calcium, and iron; as well as fly ash, particles from tires, pollen, spores, and plant and insect fragments. Coarse particles normally have shorter lifetimes (minutes to hours) and only travel over short distances (of less than tens of kilometers). They tend to be unevenly distributed across urban areas and have more localized effects than the finer particles.

PM2.5 is derived both from combustion by-products, which have volatilized and condensed to form primary PM2.5, and from precursor gases reacting in the atmosphere to form secondary PM2.5. Components include nitrates, organic compounds, sulfates, ammonium compounds, and trace elements (including metals) as well as elemental carbon such as soot. Major sources of PM2.5 are fossil fuel combustion by electric utilities, industry and motor vehicles, vegetation burning, and the smelting or other processing of metals. Dry deposition of fine mode particles is slow allowing such particles to often exist for long periods of time (of from days to weeks) in the atmosphere and travel hundreds to thousands of kilometers. They tend to be uniformly distributed over urban areas and larger regions and are removed from the atmosphere primarily by forming cloud droplets and falling out within raindrops.

The health effects of PM10 from any given source usually depend on the toxicity of its constituent pollutants. The size of the inhaled material usually determines where it is deposited in the respiratory system. Coarse particles are deposited most readily in the nose and throat area while the finer particles are more likely to be deposited within the bronchial tubes and air sacs, with the greatest percentage deposited in the air sacs. Until recently, PM10 particles had been considered to be the major fraction of airborne particulates responsible for various adverse health effects. The PM10 fraction is known to be capable of penetrating the thoracic and alveolar regions of the human and animal lungs. The PM2.5 fraction, however, was found to pose a significantly higher risk for health. This is due to their size and associated deposition and retention characteristics in the respiratory tract, enabling it to penetrate and deposit within the deeper alveolar regions of the lung. The following aspects of PM2.5 deposition all contribute to the more serious health effects attributed to smaller particles:

- The deposition of PM2.5 favors the periphery of the lungs, which is especially vulnerable to injury for anatomical reasons.
- Clearance of the PM2.5 from within the deeper reaches of the lungs is a much slower process than from the upper regions. Consequently, the residence time is longer, implying longer exposure, and hence greater risk.
- The human anatomy further allows the penetration of the superficial tissues by PM2.5 and entry into the bodily circulation without much effort in the periphery of the lungs.

Many epidemiological studies have shown exposure to particulate matter capable of inducing a variety of health effects, including premature death, aggravation of respiratory and cardiovascular disease, changes in lung function and increases in existing respiratory symptoms, effects on lung tissue structure, and impacts on the body’s respiratory defense mechanisms. The underlying biological mechanisms are still poorly understood. Based on their review of a number of these epidemiological studies (as published after 1987 when the federal standards were revised), together with suggestion of PM2.5 concentrations as a more reliable surrogate for the health impacts of the finer fraction of PM than PM10, the U.S. EPA concluded that the then-current standards were not sufficiently stringent to protect against significant effects in exposed humans. Therefore, federal PM standards were revised on July 18, 1997 (62 Fed. Reg. 38652) to add new annual and 24-hour PM2.5 standards to the existing annual and 24-hour PM10 standards. Taken together, these new standards were meant to provide additional protection against a wide range of PM-related health effects, including premature death, increased hospital admissions and emergency room visits, primarily among sensitive individuals such as the elderly, children and individuals with cardiopulmonary diseases such as asthma. Other impacts include decreased lung function (particularly in children and asthmatics), and alterations in lung tissue and structure.

California has also had 24-hour and annual standards for PM10 (CARB 1982, pp. 81, 84). These studies were aimed at establishing the PM10 levels capable of inducing asthma, premature death and bronchitis-related symptoms. They were set to protect against such impacts in the general population as well as sensitive individuals such as patients with respiratory disease, declines in pulmonary function, especially as related to children (Tit. 17, Cal. Code Regs. §70200). These standards were set to be more stringent than the federal standard, which the CARB regarded as inadequate for the protection desired (CARB 1991, p. 26).

On June 20, 2002, the CARB approved the adoption of a lower annual state standard for PM10, as well as a new annual standard for PM2.5 (CARB 2002). The new standards took effect on July 5, 2003. The 24-hour PM10 standard was not changed. The standards were established to prevent excess death, illnesses such as respiratory symptoms, bronchitis, asthma exacerbation, and cardiac disease, and restrictions in activity from short- and long-term exposures (Title 17, Cal. Code Regs. §70200).

NITROGEN DIOXIDE (NO_2)

Nitrogen dioxide is formed either directly or indirectly when oxygen and nitrogen in the air combine together during the combustion. It is a relatively insoluble gas, which can penetrate deep into the lungs, its principal site of toxicity. Its toxicity is thought to be due to its capacity to initiate free radical-mediated reactions while oxidizing cellular proteins and other biomolecules (CARB 1992, Appendix A, p. 4).

Sub lethal exposures in animals usually produce inflammations and varying degrees of tissue injury characteristic of oxidant damage (Evans in CARB 1992, Appendix A, and p 5). The changes produced by low-level acute or sub chronic exposures appear to be reversible when the animal study subject is allowed to recover in clean air.
Health effects of particular concern in relation to low-level nitrogen dioxide exposure include: (1) effects of acute exposure on some asthmatics and possibly on some persons with chronic bronchitis, (2) effects on respiratory tract defenses against infection, (3) effects on the immune system, (4) initiation or facilitation of the development of chronic lung disease, and (5) interaction with other pollutants (CARB 1992, Appendix A, p. 5).

Several groups, which may be especially susceptible to nitrogen dioxide-related health effects have been identified from human studies (CARB 1992, Appendix A, and p. 3). These include asthmatics, persons with chronic bronchitis, infants and young children, cystic fibrosis and cancer patients, people with immune deficiencies, and the elderly.

Studies involving brief, controlled exposures on sensitive individuals have shown an increase in bronchial reactivity or airway responsiveness of some asthmatics, as well as decreased lung function in some patients with chronic obstructive lung disease

(CARB 1992, Appendix A, p. 2). In general, bronchial hyper reactivity (an increased tendency of the airways to constrict) is markedly greater in asthmatics than in non-asthmatics upon exposure to initiating respiratory irritants (CARB 1992a, p. 107). At exposure concentrations of specific relevance to the current one-hour ambient standard, there appears to be little, if any, effect on respiratory symptoms of asthmatics (CARB 1992a, p. 108).

SULFUR DIOXIDE (SO_2)

Sulfur dioxide is formed when any sulfur-containing fuel is burned. SO_2 is highly soluble and consequently absorbed in the moist passages of the upper respiratory system. Exposure to sulfur dioxide can lead to changes in lung cell structure and function that adversely affect a major lung defense mechanism known as mucociliary transport. This mechanism functions by trapping particles in mucus in the lung and sweeping them out via the cilia (fine hair-like structures) also in the lung. Slowed mucociliary transport is frequently associated with chronic bronchitis.

Exposure to sulfur dioxide can produce both short- and long-term health effects. Therefore, California has established sulfur dioxide standards to reflect both short- and long-term exposure concerns. Based on controlled exposure studies of human volunteers, investigators have found that asthmatics comprise the group most susceptible to adverse health effects from exposure to sulfur dioxide (CARB 1994, p. V 1).

The primary short-term effect is bronchoconstriction, a narrowing of the airways, which results in labored breathing, wheezing, and coughing. The short-term (one-hour) standard is based on bronchoconstriction and associated symptoms (such as wheezing and shortness of breath) in asthmatics and is designed to protect against adverse effects from five to ten minute exposures. In the opinion of the California Office of Environmental Health Hazard Assessment, the short-term ambient standard is likely to afford adequate protection to asthmatics engaged in short periods of vigorous activity (CARB 1994, Appendix A, p. 16).

Longer-term exposure is associated with increased incidence of respiratory symptoms (such as coughing and wheezing) or respiratory disease, decreases in pulmonary function, and an increased risk of premature mortality (CARB 1991a, p. 12). The long-term (24-hour) standard is based upon increased incidence of respiratory disease and premature mortality. The standard includes a margin of safety based on epidemiological studies, which have shown adverse respiratory effects at levels slightly above the standard. Some of the studies indicate a sulfur dioxide threshold for effects, suggesting that no significant effects are expected from exposures to concentrations at the state standard (Ibid.).

ATTACHMENT A - REFERENCES

CARB. 1982. California Air Resources Board. California Ambient Air Quality Standard for Particulate Matter (PM10). December 1982.

CARB. 1989. California Air Resources Board. Adequacy of the Statewide Carbon Monoxide Ambient Air Quality Standard: The Impact of Recent Health Effects Studies. Staff Report. December 1989.

CARB. 1991. California Air Resources Board. Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide. April 11, 1991.

CARB. 1991a. California Air Resources Board. Amendments to Regulations for the 24-Hour Ambient Air Quality Standard for Sulfur Dioxide. Staff Report, August 1991.

CARB. 1992. California Air Resources Board. Review of the One-Hour Ambient Air Quality Standard for Nitrogen Dioxide. Staff Report. December 1991.

CARB. 1992a. California Air Resources Board. Review of the One-Hour Ambient Air Quality Standard for Nitrogen Dioxide. Technical Support Document. December 1992.

CARB. 1994. California Air Resources Board. Review of the One-Hour Ambient Air Quality Standard for Sulfur Dioxide. Staff Report. December 27, 1994.

CARB. 2002. California Air Resources Board. Resolution 02-24. June 20, 2002.

FDA. 1985. United States Food and Drug Administration. Federal Register. Vol. 50, No. 243. December 18, 1985.

Kleinman et al. 1989. Effects on Human Health of Pollutants in the South Coast Air Basin. Final Report to the South Coast Air Quality Management District. June 1989.

SOCIOECONOMICS

Joseph Diamond Ph. D.

SUMMARY OF CONCLUSIONS

Staff concludes that the 563 MW Victorville 2 Hybrid Power Project (Victorville 2) would cause neither a significant adverse direct impact nor contribute to a cumulative socioeconomic impact on the area's housing, schools, parks and recreation, police, emergency services, or hospitals, since most of the project's construction and operation workforce currently resides in the regional or local labor market area, and its construction would be short-term. Gross public benefits from the project include capital costs, construction and operation payroll, and property and sales taxes.

INTRODUCTION

Staff's socioeconomics impact analysis evaluates project-induced changes on community services and/or infrastructure, and related community issues such as environmental justice. Staff discusses the estimated beneficial impacts of the construction and operation of the Victorville 2 project and other related economic impacts.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following table contains all applicable socioeconomic laws, ordinances, regulations, and standards (LORS).

Socioeconomics Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
<u>State</u> California Education Code, Section 17620	The governing board of any school district is authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities.
California Government Code, Sections 65996-65997	These sections include provisions for school district levies against development projects. As amended by Senate Bill (SB) 50 (stats. 1998, ch. 407, sec. 23), these sections state that, except for fees established under Education Code 17620, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost of school facilities.
The Local Agency Military Base Recovery Base Recovery Area (LAMBRA) Program (Assembly Bill (AB) 693)	The Local Agency Military Base Recovery Area (LAMBRA) program was created by legislation (AB 693) enacted in 1993 to promote business growth and create jobs at designated closed and realigned bases in California. Tenants may be eligible for state tax credits and benefits for qualified companies. Many LAMBRA communities may offer several of the following local incentives: • Reduction or elimination of local permit and construction related fees • Expeditious processing of plans and permits • Reduced utility rates • Low interest revolving loans
<u>Local</u> City of Victorville Ordinance 1301	City of Victorville Ordinance 1301 was enacted in accordance with the city of Victorville's General Plan to mitigate the overburdening of existing facilities. City of Victorville Ordinance 1301 establishes a development impact fee to be charged upon the issuance of all building permits for industrial projects to fund needed improvements.
City of Victorville Ordinance 1451	City of Victorville Ordinance 1451 was enacted in accordance with the city of Victorville's General Plan to provide street lighting, curbs, gutters, and fire hydrants where they are not otherwise provided. Infrastructure fees would be charged on all Victorville 2 building permits.

SETTING

The project site is located within the northeast portion of the Southern California Logistics Airport (SCLA) planning area, within the northernmost areas of the city of Victorville. The Victorville 2 project would require an average of 367 construction workers per month and 36 full-time employees to operate (Victorville 2007a).

The 2000 U.S. Census shows that California had a total population of 33,871,648, with a minority (non-white and white-Hispanic) population of 18,054,858 (53.3%) and a white population of 15,816,790, (46.7%). San Bernardino County had a total population of 1,709,434 with 752,222 (44.0%) white non-Hispanic. Los Angeles County had a total of 9,519,338 with 2,959,614 or 31.1% white non-Hispanic (California Department of Finance 2000). By 2010, projections show a California population of 39,246,767 and 2,059,420 residents in San Bernardino County and 10,718,007 for Los Angeles County (California Department of Finance 2000 and Victorville 2 2007).

The unemployment rate for the San Bernardino County was 5.0% in January 2007 (not seasonally adjusted). This is not full employment for San Bernardino County, but is close. Over the past few decades, full employment has been typically defined as approximately 4 to 5% unemployment. For California, the unemployment rate was 5.3% in January 2007 (not seasonally adjusted) (State of California 2007).

DEMOGRAPHIC SCREENING

The purpose of an environmental justice screening analysis is to determine whether a below-poverty-level and/or minority population exists within the potentially affected area of the proposed site. Staff conducted the demographic screening in accordance with the *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis* (guidance document) (US EPA 1998). People of color populations, as defined by this guidance document, are identified where:

- The minority population of the affected area is greater than 50% of the affected area's general population; or
- The minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis; or
- One or more census blocks in the affected area have a minority population greater than 50%.

In 1997, the President's Council on Environmental Quality issued environmental justice guidance defining "minority" as individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. Low-income populations are identified with the annual statistical poverty thresholds from the US Bureau of the Census's current population reports, Series P-60, on income and poverty (OMB 1978). The 2000 poverty level varies by age and size of family and number of related. So for example, the weighted average threshold for one person (unrelated individual) is $8,794 (US Census 2000).

Staff reviewed Census 2000 information showing the minority population by census block (the smallest geographic unit for which the Census Bureau collects and tabulates data) as 0% and 63.65% within a 1-mile and 6-mile radius of the proposed Victorville 2 site (see **SOCIOECONOMICS, Figure 1**). Census 2000 by census block group (a combination of census blocks and subdivision of a census tract) information shows that the below-poverty population is 45.27% within the 6-mile radius and 0% within the 1-mile radius[3]. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old.

ASSESSMENT OF IMPACTS

Staff reviewed the Victorville 2 socioeconomics section of the AFC and other socioeconomic data. Staff used the socioeconomic data provided and referenced from various governmental agencies, trade associations, and its own independent analysis to form the following socioeconomic analysis and conclusions.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

According to Appendix G of the California Environmental Quality Act (CEQA) guidelines, a project may have a significant effect on population, housing, and public services if the project will:

- Induce substantial population growth in an area, either directly or indirectly;
- Displace substantial numbers of people and/or existing housing, necessitating the construction of replacement housing elsewhere; or
- Adversely impact acceptable levels of service for fire and police protection, schools, parks and recreation, and other public facilities.

A socioeconomic analysis looks at beneficial impacts on local finances from property and sales taxes as well as potential adverse impacts on public services. In order to determine if a project would have any significant impacts, staff analyzes whether the current status of these community services and capacities can absorb the project-related impacts in each of these areas. A project's property taxes, sales tax, local school impact fees, or development fees can help local governments augment public services required to meet project needs. If the project's impacts could appreciably strain or degrade these services, staff considers this to be a significant adverse impact and would propose mitigation.

In this analysis, staff used fixed percentage criteria for evaluating environmental justice potential impacts. Impacts on housing, schools, medical services, law enforcement, parks and recreation, and cumulative impacts are based on subjective judgments or

3 For the 1-mile radius, there is 0% for minorities and poverty. The reason for this is that staff reported information based on a "center in" function rather than an "intersect" function. In other words, only those census blocks or census block groups that had their center within the 1-mile radius circle were included. Based on a review of the AFC and other sources, the area within a 1-mile radius only contains a few residences. So if staff had used the "intersect" function, the data would have shown 1,442 people (420 in poverty) residing within one mile of the site. However, information which extends beyond the 1- mile radius is captured in the 6-mile radius for both minorities and poverty.

input from local and state agencies. Substantial employment of people coming from regions outside the study area has the potential to create significant adverse socioeconomic impacts. Significance criteria for subject areas such as utilities, fire protection, water use, and wastewater disposal are identified in the **SOIL AND WATER RESOURCES**, **RELIABILITY**, **WORKER SAFETY AND FIRE PROTECTION**, and **WASTE MANAGEMENT** sections of this preliminary staff assessment (PSA).

DIRECT/INDIRECT/INDUCED IMPACTS

Population and Employment

Research shows that construction workers may commute as much as two hours one way from their communities rather than relocate (Electric Power Research Institute 1982). It was estimated that there were 209,080 construction and extraction workers in 2002 in the Los Angeles-Long Beach and Riverside-San Bernardino Metropolitan Statistical Areas (MSA) (State of California, Employment Development Department 2007b). Staff agrees with the applicant's conclusion that at least 70% of the construction workers would potentially be drawn from Victorville, Apple Valley, Hesperia, and Adelanto (Victor Valley), since this reflects a reasonable scenario by a senior planner from the Southern California Association of Governments in San Bernardino County (Victorville 2007a). Furthermore, about 1,800 of the construction workers in the Riverside-San Bernardino MSA resided in Victorville and Adelanto (San Bernardino County) in 2000. The rest of the construction workers would come from other parts of San Bernardino and Los Angeles counties, most of which are within a 2-hour commute of the project site. Construction workers beyond a 2-hour commute would relocate but most likely return to their families on the weekends. Most of the Victorville 2 operation work force is expected to come from San Bernardino County, but some workers with specialized technical or managerial skills may relocate to (most likely) the Victorville-Adelanto area (Victorville 2007a). Therefore, staff utilized the San Bernardino-Riverside and Los Angeles-Long Beach MSA labor market area for its evaluation of construction worker availability and San Bernardino County for community services and infrastructure impacts from construction of the Victorville 2 project.

Staff used San Bernardino County as the study area in identifying fiscal and non-fiscal (private sector) benefits and other potential socioeconomic impacts from the Victorville 2 project.

Project construction of the power generation facility, including gas and water supply pipelines, transmission lines, and its solar component, is expected to occur over a 27-month period. Assuming the Victorville 2 project is licensed by the Energy Commission by February 2008, the applicant proposes that construction of the project start in summer 2008. The greatest number of construction workers (peak) would occur in the 12th month of construction. The number of construction workers would range from about 99 in the last month of construction to 767 workers at peak construction. There would be an average of 367 workers per month during construction.

Socioeconomics Table 2 shows that total labor, by skill, in the Los Angeles-Long Beach and San Bernardino-Riverside MSAs, with annual averages for 2002, is adequate when compared to Victorville 2 project needs. The project's peak construction Los-Angeles-Long Beach MSAs labor market construction and extraction workforce of 209,080 (CAEDD 2007).

About 36 full-time workers would be needed to maintain and operate the project. Operational workers are expected to come mainly from San Bernardino County. This small increase in employment would have little effect on employment rates.

Socioeconomics Table 2
Total Labor in San Bernardino-Riverside and Los Angeles-Long Beach MSAs and By Skill for Construction and Operations

Occupational Title	Annual Average 2002	Maximum Needed Per Month By Victorville 2
Welders, Ironworkers, Millwrights, Boilermakers	16,850	91
Carpenters, Bricklayers, Masons	49,900	33
Electricians, I&C	16,400	61
Laborers (Construction)	200,260	45
Sheet Metal Workers	5,920	12
Pipefitters, Sprinklerfitters	13,780	65
Painters, Plasterers	18,800	6
Unskilled Labor	29,340	216
Equipment Operators, Operating Engineers	17,010	28
Surveyors/Designers	1,030	3
Insulation Workers	1,300	9
Supervisors, Planners, Management, Administration	38,750	70
Foremen	N/AV*	22
Apprentice Linemen	N/AV	18
Cement Truck Drivers	N/AV	20
Mechanics	N/AV	6
Skilled Laborers	N/AV	28

Source: Victorville 2007a and CAEDD 2007.
* Not Available (N/AV)

The Impact Analysis for Planning (IMPLAN) model (an input-output model) used by the applicant to estimate employment and income impacts from the Victorville 2 project on the study area, is acceptable to staff. The University of California at Berkeley uses the IMPLAN model for regional economic assessment; it has also been used to assess other generating projects in California and the U.S. IMPLAN is a disaggregated type of model that divides the regional economy into sectors and provides a multiplier for each sector (Lewis et al. 1979). Social Accounting Matrix (SAM)[4] multipliers were used for the

[4] Type SAM multipliers capture inter-institutional transfers and account for social security and income tax leakages, institutional savings, and commuting.

applicant's economic impact analysis. SAM multipliers are similar to Type II[5] multipliers because they both include the indirect and induced effects (secondary impacts). IMPLAN multipliers were used to calculate direct, indirect, and induced jobs and expenditures in the regional economy.

The IMPLAN runs for Los Angeles and San Bernardino counties estimate total construction employment at 622 total jobs and 255 secondary jobs, based on an average of 367 project-related construction jobs. The Victorville 2 project annual construction income of $51.3 million would create secondary impacts of approximately $36.01 million in secondary earnings and total impacts of approximately $87.4 million in 2007 dollars (Victorville 2007a and Kessler 2007). As reported by the applicant, the project's construction employment multiplier is approximately 1.7 and the construction income multiplier is approximately 1.7 (calculated by staff).

For operations, 36 direct operations jobs and 153 jobs as secondary impacts yield an estimated total of 189 jobs. An annual operations payroll of $5.4 million yields a secondary impact of approximately $23.4 million and a total income impact of approximately $28.8 million in 2007 dollars (Victorville 2007a and Kessler 2007). Theses are staff estimates based on information provided by the applicant correcting a calculation error. As reported by the applicant, the Victorville 2 project's operation employment multiplier is approximately 5.4 and the income multiplier is approximately 5.4 (calculated by staff).

Staff finds the economic impact analysis reasonably consistent with the economic literature cited by many economists (Moss et al. 1994 and Mulkey et al. 2000), and therefore finds these projected beneficial economic impacts close enough to the benchmarks to be reasonable.

Fiscal and Non-Fiscal Effects

Some fiscal (having to do with the public treasury) impacts of the Victorville 2 project include:

- Property taxes: None, since the project is within the city limits of Victorville and the property and project would be owned by the city;
- Construction total sales tax: $3.8 million;
- Operation sales tax: $240,000 annually; and
- School impact fee: $15,400 (Victorville 2007a).

Because the Victorville 2 project would not be located within the SCLA designated LAMBRA (it would be in the adjacent SCLA specific plan area) the project would not be

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[5] A Type I multiplier is the ratio of the direct plus indirect change to the direct change resulting from a unit increase in final demand for any given sector. A Type II multiplier is the ratio of the direct, indirect, and induced change to the direct change resulting from a unit increase in final demand. The Type II multiplier takes into account the Victorville 2 repercussionary effects of secondary rounds of consumer spending in addition to the direct and indirect inter-industry effects (Richardson 1972). Both multipliers can be of an income or employment type. Indirect changes are production changes in industries supplying the original industry (backward linkages). Induced changes are changes in regional household spending levels caused by regional employment impacts.

eligible for various sales and use tax credits, including hiring credits for wages paid, business expense deductions, and a 15-year net operation loss carryover. The city of Victorville's Ordinance 1301 allows the city to impose a development impact fee on industrial projects to cover public infrastructure improvement costs. However, because the city is also the owner of the Victorville 2 project, the project would not be subject to this development impact fee. Finally, the city of Victorville's Ordinance 1451 imposes fees on development projects to pay for public improvements such as street lights, curbs, and gutters. These fees would be waived since the Victorville 2 project is a city-owned project and the city of Victorville would essentially be charging itself fees to cover costs the city would incur anyway (Victorville 2007a and Barnett 2007).

Non-fiscal (private sector) impacts are described below.

- Total capital costs are estimated at $385-445 million (2008 dollars). The construction payroll is $115.6 million over 27 months in 2007 dollars. The annual operations payroll is $5.4 million in 2007 dollars.
- Approximately $49 million would be spent locally on construction materials and supplies; $3.1 million would also be spent locally for each operation year of the Victorville 2 project for locally purchased materials, as part of an operation and maintenance budget within San Bernardino County (Victorville 2007a, Kessler 2007, and Barnett 2007).

Housing

As of January 1, 2006, there were approximately 601,369 housing units in San Bernardino County. The vacancy rate for this housing averages about 12.1%, and includes single-family, multi-family, and mobile homes. There were 29,500 units in Victorville, with a vacancy rate of 2.3% (US Census Bureau 2005). According to the 2000 US Census, the city of Adelanto contains 5,547 housing units with a vacancy rate of 15% (Victorville 2007a).

There is an adequate supply of hotel/motel rooms in the cities of Adelanto and Victorville. For the construction workers who temporarily relocate to the project area, there are 19 hotel and motels with a total of more than 1,466 rooms in the Victorville-Adelanto area. The applicant estimates an average of approximately 352 rooms (a 24% vacancy rate) would be available (vacant) in the Victorville/Adelanto area (Barnett 2007).

Again, few if any construction workers would relocate to Victorville, Adelanto or the surrounding communities during project construction (Victorville 2007a). Staff finds the supply of available permanent and temporary housing adequate to accommodate the few construction workers expected to relocate. Staff does not expect the Victorville 2 project to cause any housing displacement as a result of this project.

The permanent operational workforce is expected to commute mostly from within San Bernardino County (Victorville 2007a).

Staff concludes that there would be no significant adverse socioeconomic impacts related to housing resources as a result of Victorville 2.

Schools

San Bernardino County had 512 schools and 427,631 students in 2005-2006. The Adelanto School District (ASD) and the Victor Valley Union High School District (VVUHSD) serve the Victorville 2 project site area. Both schools are slightly above the average teacher-pupil ratio when compared to the State of California average (CDE 2005-2006a-d).

For the ASD, total enrollment has grown from 6,813 students in 2004-2005 school year to a projected 9,300 students during the 2006-2007 school year. To meet this growth, new schools are being built in El Mirage and Victorville. Total enrollment in the VVUHSD was approximately 9,140 students for the 2005-2006 school year (Victorville 2007a). Most of the construction workforce (an estimated 70%) would be from San Bernardino and Los Angeles counties and would commute; the few that would not would temporarily relocate near the project site and return to their homes on the weekends.

Thirty-six workers would be required for operation of the Victorville 2 project, and are expected to come primarily from the San Bernardino County labor force (Victorville 2007a).

Education Code section 17620 authorizes school districts to levy a fee against construction within their districts. State and local agencies, however, cannot impose additional fees (or other required payments on development projects) to mitigate possible enrollment impacts to schools. School impact fees to ASD and VVUHSD are approximately $15,400 (Victorville 2007a). Staff has proposed condition of certification **SOCIO-1** to ensure payment of this one-time school impact fee, a requirement for LORS compliance.

Staff concludes that there would be no significant adverse socioeconomic impacts on educational resources as a result of the Victorville 2 project. This is because construction is short-term and no workers would likely relocate to the project site along with their children and during operations the workforce is small (36) and likely to commute from San Bernardino County.

Parks and Recreation

Most if not all of the construction labor force for this project should be drawn from the commuting labor markets. The operational workforce of 36 would be comprised mostly of local residents from San Bernardino County. Because construction is short-term and no workers would likely relocate to San Bernardino County along with their children and the operations workforce is small and likely to commute from within the County, there should be little or no additional demand on parks and recreation due to the project. Thus, staff concludes that the project would not have a significant adverse socioeconomic impact on parks and recreation.

Law Enforcement

The San Bernardino County Sheriff's Department is under contract to the city of Victorville to provide police protection and public safety services (traffic and neighborhood police control, emergency calls, and crime prevention). The Victorville

Police Station has 71 sworn deputies and 21 non-sworn employees. There is one full-time enforcement officer per 1,100 residents. The County Sheriff would respond to the project site from the station at 14200 Amargosa Road. The average response time varies depending on the incident and location of deputies. Average response time for an emergency call is about four to five minutes. In addition, the San Bernardino County Sheriff's Department is under contract with the City of Adelanto. It has a staff of 23

employees and a service ratio of one full time enforcement officer per 900 residents. Finally, the California Highway Patrol (CHP) is the primary law enforcement agency for state highways and roads (Victorville 2007a).

Victorville 2 should not significantly impact criminal activity, traffic, or crowd control, from a population perspective, since most of the construction labor force would commute. For the operations phase, the change in population is small (36), with most coming from San Bernardino County or from within commuting distance. Power plants typically have their own security forces. The facility would not need much if any law enforcement assistance under most circumstances. This has been typical for law enforcement in siting cases before the Energy Commission. Therefore, staff concludes that there would be no significant adverse socioeconomic impacts on law enforcement resources as a result of the Victorville 2 project.

Medical Services

Emergency medical services (EMS) in the project area are provided by the Victorville Fire Department, which employs 46 full-time firefighters and 17 other employees. There are four fire stations in Victorville, the closest approximately 2.5 miles from the project site, with a response time of five to six minutes.

There are three hospitals within a 12-mile radius of the project site:

- Victorville Valley Community Hospital in Victorville, with 119 beds and emergency service;
- Desert Valley Hospital in Victorville, with 76 beds and emergency service; and
- St. Mary's Medical Center in Apple Valley, about 12 miles from the project site, with 195 beds.

Additional emergency service is provided by Mercy Air in Adelanto, and the project site is 15 minutes from the closest trauma center in San Bernardino, by helicopter (Victorville 2007a).

Worker Safety staff reports that construction and in particular power plant construction is hazardous relative to other workplaces. Over the last 20 or more years, significant injury in power plants licensed by the Energy Commission has been infrequent but has significant potential if safety is not a top priority. The number of construction and operation workforce is relatively small. Also, the need for prompt response for a heart attack within a few minutes is well documented in the medical literature. An on-site automatic cardiac defibrillator as well as workers trained to use it would provide protection in the first few minutes of heart attack would be required for this project. Staff notes that the closest EMS response time is within a few minutes for a heart attack and other injuries i.e., five to six minutes and there are three hospitals within a 12-mile radius of the project site with 390 beds. Therefore, staff concludes that EMS and medical resources are adequate for the Victorville 2 project. Finally, the Victorville 2 project would not displace significant numbers of people or either directly or indirectly induces substantial population growth. Hence, there are no significant socioeconomic impacts that might trigger adverse physical impacts to emergency medical services. For additional discussion see the **WORKER SAFETY** section of this PSA.

CUMULATIVE IMPACTS

A project may result in significant adverse cumulative impacts when its effects are “cumulatively considerable.” Cumulatively considerable means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, or the effects of probable future projects. (Title 14, California Code of Regulations, section 15130).

Cumulative impacts could occur when more than one project has an overlapping construction schedule that creates a demand for workers that cannot be met by local labor, resulting in an influx of non-local workers and their dependents.

The Victorville 2 project would average 367 construction workers per month, 767 during its peak construction month, for 27 months, with construction occurring in the summer of 2008.

Other power projects in San Bernardino County include:

- Adjacent to the San Gabriel Generating Station (SGGS) site, Southern California Edison (SCE) is planning to construct a peaking turbine and a new switchyard, scheduled to be operational in the summer of 2007 and June 2009, respectively (SGGS 2007);
- The 656 MW SGGS in the city of Rancho Cucamonga, with a peak construction workforce of 1,014 in August 2009 (SGGS 2007);
- The 300 MW AES Highgrove project in the city of Grand Terrace, with a peak construction workforce of 172 in February 2009 (AES 2006 and 2007 and Diamond 2007).

Other projects include:

- Stirling Capital Investments announced plans for 350-acre, 6.3 million- square-foot development at the SCLA in the first quarter of 2007. Phase I will create an estimated 13,636 direct and ancillary jobs, and is expected to take over 30 months to complete (Little 2007a). In April 2007, construction began on the 407,612-square-foot Newell Rubbermaid Distribution Facility (Little 2007b). This project has been completed. No construction workforce information was available;

- Within the city of Rancho Cucamonga, in San Bernardino County, Ferromet, an automobile recycling business located north of the proposed project, is planning to re-equip its facility, and is currently undergoing a conditional use permitting process. Construction is scheduled to begin in approximately the fourth quarter of 2007 and continue for six to eight months or longer. No construction workforce information is available (SGGS 2007);
- Within the city of Fontana, in San Bernardino County, a major distribution
- Warehouse complex of three buildings totaling approximately 1,278,000 square feet of warehouse space is undergoing environmental review. No construction workforce information is available (SGGS 2007);
- The Outdoor Adventure Center in Grand Terrace estimates a construction workforce of 965 workers, beginning in early 2007 and lasting two years. The Town Square Shopping Center project in Grand Terrace has no schedule (AES 2006);
- A new high school in Grand Terrace will require an estimated peak construction workforce of 100 workers beginning in late summer 2006 and ending in fall 2008. Some of the workforce crafts for the Outdoor Center and the high school would be different from the crafts required for power plant construction, although they would also require crafts such as plumbers, electricians, and painters (AES 2006).

The worst-case peak construction workforce would be 3,018 for Victorville 2, the San Gabriel Generating Station, AES Highgrove, the Outdoor Adventure Center, and high school projects. The Riverside-San Bernardino, Los Angeles-Long Beach MSAs, and the Santa Ana-Anaheim-Irvine Metropolitan Division, in Orange County, have a total construction and extraction workforce of 351,570 in 2002/2004 (State of California Employment Development Department 2007b). Thus, the worst-case scenario yields needs of less than 1% of the total labor force. Since the Riverside-San Bernardino, Los Angeles-Long Beach, and Santa Ana-Anaheim-Irvine Metropolitan Division are so large, with a combined construction and extraction workforce of 351,570 in 2002/2004, staff concludes that there would be no significant adverse cumulative socioeconomic impacts from the Victorville 2 project.

NOTEWORTHY PUBLIC BENEFITS

Important public benefits discussed under the fiscal and non-fiscal effects section are: capital expenditures, construction payroll, and annual property and sales tax.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received from agencies or members of the public regarding the socioeconomic aspects of the Victorville 2 project.

CONCLUSIONS

Staff concludes that construction and operation of the Victorville 2 project would not cause a significant direct or cumulative adverse socioeconomic impact on the study area’s housing, schools, parks and recreation, law enforcement, emergency services, or hospitals. Hence, there are no socioeconomic environmental justice issues related to this project. The Victorville 2 project, as proposed, is consistent with applicable LORS.

Estimated gross public benefits from the Victorville 2 project include increases in property and sales taxes, employment, and income for the city of Victorville and San Bernardino County. For example, there is an estimated average of 367 direct project-related construction jobs for the 27 months of construction. Victorville 2 is estimated to have total capital costs of $385-$445 million, in 2008 dollars. Victorville 2 construction payroll is estimated to be $115.6 million for 27 months, and the operation payroll is $5.4 million annually, in 2007 dollars. There are no property taxes, and school impact fees would be $15,400. Total sales and use taxes during construction are estimated to be $3.8 million, and during operation the local sales tax is estimated to be $240,000 annually over the life of the project. An estimated $49 million would be spent locally for materials and equipment during construction, and an additional $3.1 million would be spent annually for the project’s operations and maintenance budget.

Finally, the following **SOCIOECONOMICS Table 3,** below, provides a summary of socioeconomic data and information from this analysis, with emphasis on the economic benefits of Victorville 2.

Socioeconomics Table 3
Data and Information[3]

Estimated Project Capital Costs	$385-$445 million (2008 dollars)
Estimate of Locally Purchased Materials	
Construction	$49 million
Operation (Operation and Maintenance)	$3.1 million annually
Estimated Annual Property Taxes	None, because the city of Victorville owns the project and parcels and the project is within the boundaries of the city of Victorville.
Estimated School Impact Fees	$15,400
Estimated Direct Employment	
Construction (average)	376 jobs (average per month)
Operation	36 jobs
Estimated Secondary Employment	
Construction	255
Operation	153
Estimated Local Direct Expenditure	
Construction-Annual Local Construction Payroll (Disposable) and Expenditures	$43 million annually
Operation-Annual Local Operation Payroll	$4.5 million annually
Estimated Local Secondary Income	
Construction	$30.2 million
Operation	$19.7 million
Estimated Payroll	
Construction	$115.6 million total, $51.3 million annually (2007 dollars)
Operation	Average: $5.4 million annually (2007 dollars)
Estimated Sales Taxes	
Construction	$3.8 million
Operation	$240,000 annually
Existing Unemployment Rates	Existing – 5.0% in January 2007, for San Bernardino County (Not Seasonally Adjusted) and 5.3% in January 2007 for California (Not Seasonally Adjusted)
Percent Minority Population (6-mile radius)	63.5%
Percent Poverty Population (6-mile radius & beyond)	45.27%
Percent Minority Population (1-mile radius)	0%
Percent Poverty Population (1-mile radius)	0%

[3] **Table 3** uses 2008 dollars for capital costs, construction would be for 27 months and the project's life is planned for 30 years. Economic (non-fiscal and fiscal) impacts and unemployment is for San Bernardino County, the study area. The results of the IMPLAN/Input-Output modeling are for Los Angeles and San Bernardino counties and show secondary, indirect and induced impacts, as well as direct impacts. Population is for a 6- and 1-mile radius from the power plant, except as noted.

PROPOSED CONDITION OF CERTIFICATION

SOCIO-1 The project owner shall pay the one-time statutory school development fee to the Adelanto Elementary School District and the Victor Valley Union High School District, as required by Education Code, section 17620.

<u>Verification:</u> At least 30 days prior to the start of project construction, the project owner shall provide the Compliance Project Manager (CPM) proof of payment of the statutory development fee.

REFERENCES

AES 2006. AES Highgrove, LLC. (tn: 37018). Application for certification for the Highgrove Project. Volumes 1 and 2. Submitted to the California Energy Commission, May 2006.

AES 2007. AES Highgrove, LLC. (tn: 41209). Supplement C to the application for certification for the Highgrove Project. Submitted to the California Energy Commission, June 26, 2007.

Barnett, Thomas M. 2007. Executive Vice President Inland Energy, Inc., e-mail communication docket (07-AFC-01) with John Kessler, May 15.

California Department of Finance. 2000. Demographic Research Unit, California State Census Data Center Census 2000 PL94-171, Table Two Population by Race/Ethnicity Incorporated Cities by County.

California Energy Commission statewide transmission and power plant maps 2006, Census 2000 PL-171 Data-Matrix PL2.

California Department of Education (CDE). 2005-6a. California Profile fiscal year 2005-2006.

California Department of Education (CDE). 2005-2006b. San Bernardino County Profile fiscal year 2005-2006.

California Department of Education (CDE). 2005-2006c. Adelanto Elementary School District Profile fiscal year 2005-2006.

California Department of Education (CDE). 2005-2006d Victor Valley Union High School District Profile fiscal year 2005-2006.

Diamond, Joseph. 2007. Socioeconomics, Highgrove Project. August 2007.

Electric Power Research Institute. 1982. *Socioeconomics of Power Plants*.

Kessler, John. 2007. Joe Diamond Informal Data Request, Victorville 2 Hybrid Power Project (07-AFC-1). Submitted to the California Energy Commission, August 3.

Lewis, Eugene, Russell Youmans, George Goldman, Garnet Premer. 1979. *Economic Multipliers: Can a Rural Community Use Them?* Western Rural Development Center 24.

Little, Jennifer. 2007a. Stirling Capital Investments Announces Plans for 350-Acre, 6.3 Million-Square-Foot Phase I Development at Southern California Logistics Airport in Victorville, CA. March 5.

http://www.ci.victorville.ca.us/news/07stories/03-05airport.html

Little, Jennifer. 2007b. Officials Break Ground on 350-Acre, 6.5 Million Square-Foot Phase I Development at Southern California Logistics Center in Victorville, CA. April 11.

http:www.ci.victorville.ca.us/news/07_stories/04-11-groundbreaking.html

Moss, Steven J., Richard McCann, and Marvin Feldman. 1994. *A Guide For Reviewing Environmental Policy Studies*. Spring 1994.

Mulkey, David and Alan W. Hodges. 2000. *Using Implan to Assess Economic Impacts.* University of Florida IFAS Extension FE 168.

Richardson, Harry W. 1972. *Input-Output and Regional Economics*.

SGGS. 2007. San Gabriel Generating Station Project AFC Vol. 1&2.

State of California, Employment Development Department. 2007a. Report 400C Monthly Labor Force Data for Counties. January 2007.

State of California, Employment Development Department 2007b. Labor market information occupational employment projections 2002-2012 Los Angeles-Long Beach Metropolitan Statistical Area and Riverside-San Bernardino Metropolitan Statistical Area and 2004-2014 Santa Ana-Anaheim-Irvine Metropolitan Division (Orange County).

www.edd.cahwnet.gov/.

US Census Bureau. 2000. Poverty Thresholds 2000.

http://www/census.gov/hhes/www/poverty/threshold/thresh00.html

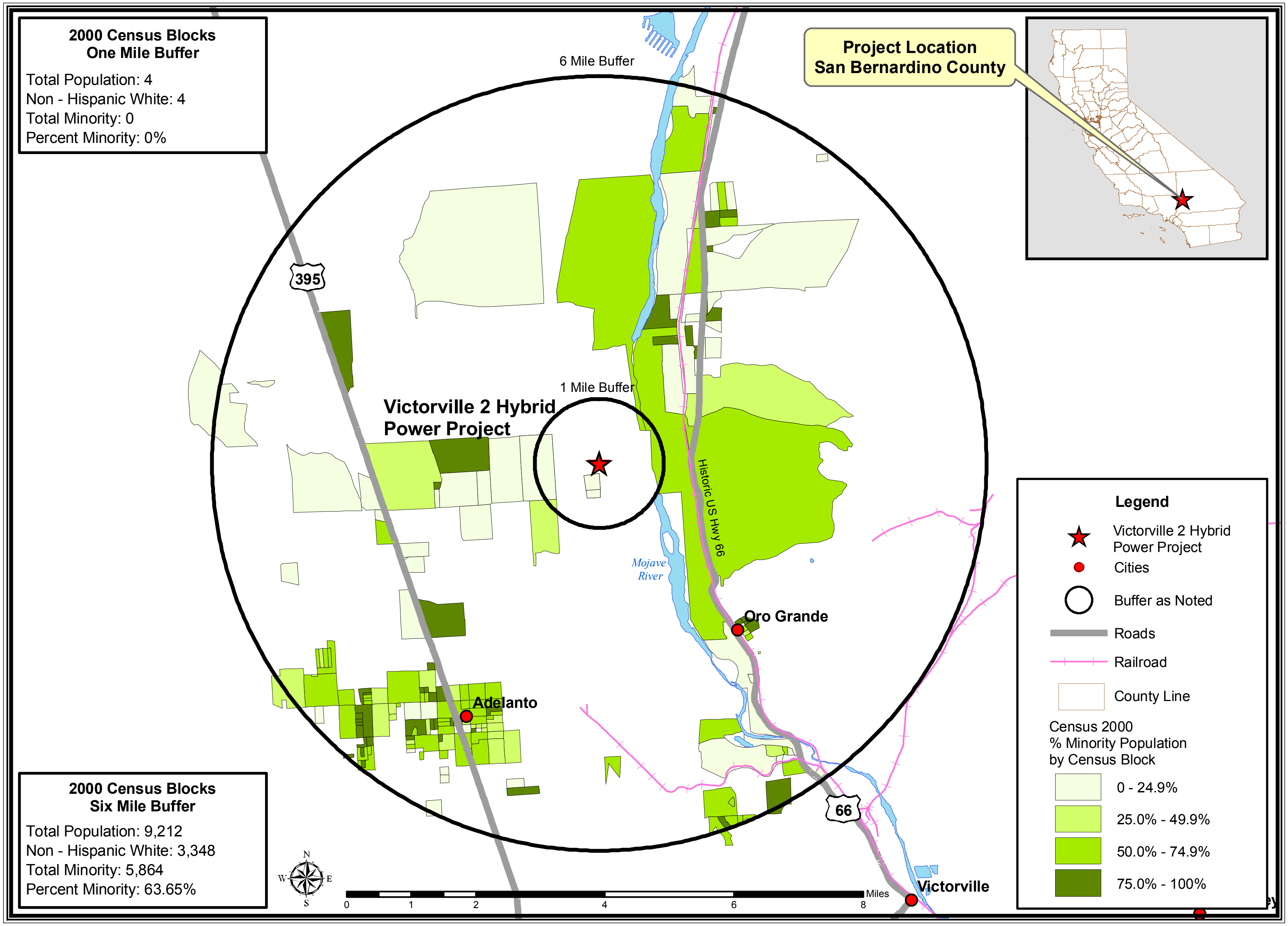
USEPA (U. S. Environmental Protection Agency). 1998. Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis. April 1998.

U.S. Office of Management and Budget (OMB). 1978. Current population reports, Series P-60, on income and poverty.

Victorville 2007a - City of Victorville (tn: 39421). Application for certification of the Victorville 2 Hybrid Power Project. Vols. 1 and 2. 2/27/07.

SOCIOECONOMICS - FIGURE 1

Victorville 2 Hybrid Power Project- Census 2000 Minority Population by Census Block - One and Six Mile Buffer



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: California Energy Commission Statewide Power Plant Maps 2007 - Census 2000 PL 94-171 Data - Matrix PL2

SOIL AND WATER RESOURCES

Ellen Townsend-Hough, Linda D. Bond, P.G. and John Kessler, P.E.

SUMMARY OF CONCLUSIONS

From the preliminary analysis completed to date for the Victorville 2 Hybrid Power Project (Victorville 2), staff has not identified any immitigable significant impacts to Soil and Water Resources provided the proposed conditions of certification are implemented and outstanding stormwater management issues are resolved. Staff has identified three issues to be resolved regarding plans for stormwater management during project operations:

1. Revisions are needed to pre- and post- development runoff calculations using the correct precipitation associated with the design criteria for the entire project site;
2. The post-development runoff estimates need to account for the reduction in soil permeability in the Solar Field; and
3. A preliminary design for a Sediment/Stormwater Retention Facility needs to be developed for the Solar Field.

These are key elements in avoiding significant adverse impacts. The applicant has indicated that it will address these issues before the Final Staff Assessment (FSA).

Also, given staff's observation that the overdraft in the Mojave Groundwater Basin is not cured, staff wants to understand and confirm its preliminary conclusion that the project's use of excess reclaimed water will neither adversely impact the contributions reclaimed water currently serves for restoring flows to the Mojave River nor compromise attainment of the objectives delineated in the Memorandum of Understanding between Victor Valley Water Reclamation Authority and California Department of Fish and Game. We will address this item with the parties, interested agencies and members of the public in the Preliminary Staff Assessment (PSA) workshop.

INTRODUCTION

This section analyzes potential impacts to soil and water resources from the construction or operation of the Victorville 2. The analysis specifically focuses on the potential for the project to cause impacts in the following areas:

- Whether construction or operation will lead to accelerated wind or water erosion and sedimentation.
- Whether the project will exacerbate flood conditions in the vicinity of the project.
- Whether the project's water use would cause a substantial, or potentially substantial, adverse change in the quantity or quality of groundwater or surface water.
- Whether the project will comply with all applicable laws, ordinances, regulations and standards.

Where the potential for impacts is identified, staff has proposed mitigation measures to reduce the significance of the impact and, as appropriate, has recommended conditions of certification.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Soil & Water Table 1
Laws, Ordinances, Regulations, and Standards

Federal LORS	
Clean Water Act (33 U.S.C. Section 1251 et seq.)	The Clean Water Act (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which includes regulation of stormwater and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the Clean Water Act under the Porter-Cologne Water Quality Control Act of 1967.
Resource Conservation and Recovery Act	The Resource Conservation Recovery Act (RCRA) of 1976 (40 CFR Part 260 et seq.) seeks to prevent surface and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes.
Farmland Protection Policy Act	The Farmland Protection Policy Act requires the assessment of the project impacts on farmlands
State LORS	
California Water Code Section 13260	Requires filing with the appropriate Regional Board 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 13551	Requires the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such water is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare.
California Water Code Section 13552.6	Specifically identifies the use of potable domestic water for cooling towers, if suitable recycled water is available, as a waste or unreasonable use of water. The availability of recycled water is determined based on criteria listed in Section 13550 by the State Water Resources Control Board. (SWRCB). .
Local LORS	
Mojave Basin Adjudication	The Mojave Basin Adjudication establishes a system of water management actions designed to cure the regional groundwater and surface water overdraft, to ensure equitable distribution of the water supply, and to mitigate water development impacts to the environment. The Adjudication imposes requirements both on individual groundwater producers and on subareas of the Mojave Basin. Regional water use and implementation of the Adjudication is now managed by the court-appointed Watermaster, the Mojave Water Agency (MWA), according to the terms of the Adjudication.
Victor Valley Water Reclamation Authority (VVWRA), Wastewater Ordinance Article 08	Specifies discharge limits for wastewater as managed by the Victor Valley Water Reclamation Authority.

San Bernardino County Code Title 3, Division 5, Chapter 1 and Hydrology Manual	Specifies requirements for preparation and application of a Water Quality Management Plan for managing stormwater during project operations to protect water quality; The Hydrology Manual provides design criteria for design of stormwater systems.
San Bernardino County Code Title 3, Division 3, Chapter 6 Domestic Water Sources and Systems	Provides for monitoring and enforcement of all applicable laws and orders for public water supply systems with less than two hundred service connections within San Bernardino County.
City of Victorville Grading Permit, Ordinance 1500	The City of Victorville requires a grading permit for earthmoving activities exceeding 50 cubic yards.
City of Victorville Standard Specifications for Public Improvements	The City of Victorville provides standard specifications for stormwater drainage systems.
State Policies and Guidance	
California Constitution, Article X, Section 2	This section requires that the water resources of the State be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use or unreasonable method of use of water is prohibited.
The Porter-Cologne Water Quality Control Act of 1967, Water Code Sec 13000 et seq.	Requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those regulations require that the RWQCBs issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.
State Water Resources Control Board (SWRCB) Res. 77-1	State Water Resources Control Board Resolution 77-1 encourages and promotes recycled water use for non-potable purposes.
SWRCB Resolutions 75-58 and 88-63	The principal policy of the SWRCB that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. Resolution 75-58 defines brackish waters as “all waters with a salinity range of 1,000 to 30,000 mg/l” and fresh inland waters as those “which are suitable for use as a source of domestic, municipal, or agricultural water supply and which provide habitat for fish and wildlife”. In a May 23, 2002 letter from the Chairman of the SWRCB to Energy Commission Commissioners, the principal of the policy was confirmed ‘that the lowest quality cooling water reasonably available from both a technical and economic standpoint should be utilized as the source water for any evaporative cooling process utilized at these facilities’. Resolution 88-63 defines suitability of sources of drinking water. The total dissolved solids must exceed 3,000 mg/L for it not to be considered suitable, or potentially suitable, for municipal or domestic water supply.

California Code of Regulations, Title 17	Title 17, Division 1, Chapter 5, addresses the requirements for backflow prevention and cross connections of potable and non-potable water lines.
California Code of Regulations, Title 22	Title 22, Division 4, Chapter 15, requires the California Department of Health Services (DHS) to review and approve the wastewater treatment systems to ensure they meet tertiary treatment standards allowing use of reclaimed water for industrial processes such as steam production and cooling water. DHS also specifies Secondary Drinking Water Standards in terms of Consumer Acceptance Contaminant Levels, including TDS ranging from a recommended level of 500 mg/l, an upper level of 1,000 mg/l and a short term level of 1,500 mg/l.
California Code of Regulations, Title 23	Title 23, Division 3, Chapter 15, requires the Regional Board issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.
Recycling Act of 1991 (Water Code 13575 et. seq)	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 CA.
California Water Code (CWC) Section 13146	Requires that state offices, departments and boards in carrying out activities, which affect water quality, shall comply with state policy for water quality control unless otherwise directed or authorized by statute, in which case they shall indicate to the State Water Resources Control Board in writing their authority for not complying with such policy.
CWC Section 13523	Requires that a Regional Board, shall prescribe water reuse requirements for water, which is to be used or proposed to be used as recycled water after consultation with and upon receipt of recommendations from the State Department of Health Services, and if it determines such action to be necessary to protect the public health, safety, or welfare.
CWC Section 13550	Requires the use of recycled water for industrial purposes subject to recycled water being available and upon a number of criteria including: provisions that the quality and quantity of the recycled water are suitable for the use, the cost is reasonable, the use is not detrimental to public health, and the use will not impact downstream users or biological resources.
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.
The California Safe Drinking Water and Toxic Enforcement Act	This Act (California Health & Safety Code Section 25249.5 et seq.) prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The Regional Water Quality Control Board administers the requirements of the Act.
Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq)	In the 2003 IEPR, consistent with State Water Resources Control Board Policy 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating they will approve the use of fresh water for cooling purposes by power plants only where alternative water supply sources and alternative cooling technologies are shown to be “environmentally undesirable” or “economically unsound.”

SETTING

The proposed Victorville 2 Hybrid Power Plant (Victorville 2) is a 563 MW natural gas-fired, combined cycle generating facility integrated with 250 acres of solar-thermal collectors and associated heat transfer equipment. The Victorville 2 is located within the Mojave River watershed in the southwestern part of the Mojave Desert, in San Bernardino County, California. The Victorville 2 project site is located north of the Southern California Logistics Airport (SCLA), the former George Air Force Base (AFB), in the City of Victorville. The site lies approximately 3.5 miles east of U.S. Highway 395 and approximately 0.5 mile west of the Mojave River. All lands adjacent to the power plant site are currently vacant. There is currently one residence within the power plant site, which the city of Victorville is seeking to acquire. The next nearest residence is approximately one mile west of the power plant boundary on Colusa Road. The power plant site is currently zoned industrial and is within the jurisdiction of city of Victorville, San Bernardino County and the SCLA planning area. Construction of the proposed Victorville 2 facility would require three areas that total 388 acres, located immediately north of the SCLA. Including the land required for the solar collectors, the footprint of the power plant would require grading of approximately 338 acres in order to provide a usable area of 275 acres for the Power Block and Solar Field. Construction laydown would require grading and gravel surfacing for temporary use of two separate areas consisting of 20 and 30 acres each. (Victorville 2007a, page 2-3).

The Victorville 2 is estimated to require a maximum annual supply of 3,150 acre-feet per year of reclaimed water for process use and landscape irrigation. Process water will be used primarily for cooling with a minor amount, 46 acre-feet/year, for parabolic mirror washing (Victorville 2007a, Table 2-4 and page 2-24). Recycled water would be provided by Victor Valley Wastewater Reclamation Authority (VVWRA). Potable water and backup process water would be supplied to the proposed project from the City of Victorville's municipal supply of groundwater via a 1.5-mile long pipeline along Perimeter Road. Potable water would serve drinking, sanitary and other washing needs, requiring up to 3.6 acre-feet/year. The process water backup supply will also consist of potable groundwater from the city of Victorville's municipal system (Victorville 2007c, Data Response 65).

SOILS

The Victorville 2 project site, offsite pipeline routes, and the transmission line corridor are located on areas mapped by the State as grazing land and do not encroach on Prime Farmland, Farmland of State Importance, or Unique Farmland (Victorville 2007a Page 6.2-4) The soils at the proposed site consist of deep, moderately well to excessively drained soils on low river terraces and alluvial deposits. Surface soils typically consist of sandy loam, a substratum of sandy loam, and thin strata of loamy sand, sand and clay loam. Rather than listing the other numerous soil types separately, only the primary soil types are listed below in **Soil & Water Table 2**. Additional soil characteristic data can be found in Table 6.2-3 of the Application for Certification (AFC).

Soil & Water Table 2
Primary Soil Types Potentially Affected & Characteristics

Primary Soil Name	Slope Class	Water Erosion Potential	Wind Erosion Potential	Permeability (in/hr)	Shrink-Swell Potential
Bryman	0 to 15 %	moderate	high	2.0 – 6.0	Low-moderate
Cajon	0 to 15%	low	extreme	6.0-20	low
Haplargids/Calciorthids Complex	15 to 50%	Not Available	moderate to high	0.2-2.0/ 2.0-20	Not Available
Villa		moderate	high	6.0-20	
Helendale	0 to 5 %	moderate	high	2.0-20	low
Hesperia	2 to 5%	moderate	high	5-18	Low
Kimberlina	2 to 5%	moderate	high	2.0-6.0	Low
Lavic		moderate	high	2.0-20	Low
Mohave	0 to 2%	moderate	high	0.2-20	Low - moderate

Victorville 2007a, Section 6.2.3.2

In general, soils of the project are highly permeable and have low to moderate water erosion potential. However, the coarse texture of the soils causes them to be overall highly vulnerable to wind erosion. The applicant proposes to apply reclaimed water during construction as the primary Best Management Practice (BMP) to limit erosion from wind.

SOIL AND GROUNDWATER CONTAMINATION

ENSR Corporation conducted a Phase I Environmental Site Assessment (ESA) for the proposed Victorville 2 site. Based on a review of 1984 aerial photographs, the site has always been vacant, undeveloped land except for the one residence. Evidence of past or present hazardous substance use, storage or disposal was not observed on the property during the site reconnaissance.

The site is within the George Groundwater sub-basin which includes an upper perched aquifer and a deeper regional aquifer system (Victorville 2007c page 6.17-10). Portions of the perched aquifer system in the vicinity of the SCLA have been contaminated with trichloroethylene (TCE) from leaking underground tanks and/or as a result of historical military activities. The Federal Environmental Protection Agency added George AFB to the Superfund National Priority List. The TCE groundwater plume is present in the lower aquifer, approximately 210 to 250 below ground surface along the routes for the Victorville 2 sanitary wastewater pipeline and transmission lines. The presence of TCE in the groundwater is a Recognized Environmental Condition (REC) (Victorville 2007a Appendix M). An REC is the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicate an existing release, past release, or a material threat of a release of any hazardous substance or petroleum products into structures on the property or in the ground, groundwater, or surface water of the property.

PROCESS AND SANITARY WASTEWATER

The applicant proposes two wastewater collection systems for the Victorville 2, separating process from sanitary wastewater. The process wastewater system, collecting primarily cooling tower blowdown, would collect all process wastewater streams generated from operation of the plant and deliver it to the zero liquid discharge (ZLD) system. All process wastewater streams are recycled through the water purification system and returned to the demineralizer as a makeup supply. The remaining sludge is concentrated in a dryer, which reduces the sludge to solids for disposal in a landfill. The process wastewater system would also collect any drainage from plant drains and hazardous materials storage areas and route this flow through an oil/water separator before its reuse in the cooling tower. No wastewater would be discharged to surface waters (Victorville 2007a, Section 2.4.5.2).

The sanitary wastewater system would collect wastewater from sinks, toilets, and other sanitary facilities for discharge to the VVWRA treatment plant via a new 1.25-mile sanitary wastewater line (Victorville 20007a Section 2.4.5.4).

STORMWATER

The annual rainfall in the Mojave Desert, where the proposed Victorville 2 site would be located, is less than eight inches per year (Victorville 2007a Page 6.17-14). Although the project would require grading of about 388 acres including 50 acres for laydown, the finished project would occupy 275 acres. The combined-cycle generating equipment (Power Block) would be located on 25 acres and the Solar Field on the remaining 250 acres.

During construction, the Power Block would be graded to generally drain from west to east by means of sheet flow into the Sediment/Stormwater Retention Facility on the east side of the Power Block area (Victorville 2007c Data Response 83). Following settlement of suspended sediments and attenuation of peak flows, stormwater would discharge into an exiting ditch immediately east of the site. The Solar Field would be graded from south to north at generally a 0.5% slope, keeping storm water flow velocities low and minimizing the amount of soils detached and potential for transport of sediment by runoff.

During operation, non-contact areas of the Power Block (where there is not potential for contamination from hazardous materials) would be graded to drain to the north and south by means of sheet flow away from equipment foundations and into swales, inlets and/or storm sewer pipes along the perimeter of the Power Block. At the north and south sides of the Power Block, the runoff would then be conveyed eastward by ditches and culverts into the Sediment/Stormwater Retention Facility. Following settlement of suspended sediments and attenuation of peak flows, stormwater would discharge into an existing ditch immediately east of the site. Contact areas (in the vicinity of oil-filled transformers and hazardous material storage) would drain into a separate collection system and be conveyed through an oil-water separator before it is conveyed to the cooling tower for reuse. Secondary containment structures would be built around the oil-filled equipment and hazardous materials. The Solar Field would remain graded to a 0.5% slope, thus keeping the storm water flow velocities low and minimizing the amount of sediment displaced by runoff. The applicant would design the Sediment/Stormwater

Retention Facility and all drainage features in accordance with the city of Victorville's Standard Specifications for Public Improvements and San Bernardino County's Hydrology Manual and Water Quality Management Plan Program. (Victorville 2007a – Section 6.17, Victorville 2007b - Section 6.17 and Victorville 2007c - Data Response 83)

PROJECT, SITE AND VICINITY SETTING

Regional Water Resources

The proposed project will be located in the Mojave Basin. The Mojave Water Agency (MWA) defines the Mojave Basin as the surface-water drainage basin of the Mojave River, which encompasses about 3,800 square miles (MWA 2006). The Mojave River groundwater basin, within the larger drainage basin, underlies about 1,400 square miles, as defined by the USGS (Stamos 2001). The Mojave Basin is located about 80 miles from Los Angeles and is part of the Mojave Desert Region.

The natural water resources of the Mojave Basin are extremely limited. The Mojave River is the primary natural source of both surface water and groundwater recharge for the region. However, the river is usually dry and flows are unpredictable and unreliable. Therefore, groundwater has served as the primary water supply reservoir for the region. Groundwater use began for agriculture in the 1800s and has accelerated in recent years with rapid urban growth as people relocated from the Los Angeles area. With the development of groundwater, regional water use has exceeded natural recharge, resulting in reductions in stream flow and groundwater recharge, declines in groundwater levels and groundwater overdraft.

In 1990, the city of Barstow and the Southern California Water Company initiated a lawsuit that alleged that upstream groundwater production had overdrafted the Mojave River groundwater basin. This lawsuit led to the Adjudication of the Mojave Basin. A settlement was reached in 1996, to which over 200 parties agreed and specified a "physical solution" intended (1) to ensure that downstream users are not adversely affected by upstream use, (2) to raise money to purchase imported water supplies, (3) to encourage water conservation, and (4) to maintain and conserve the riparian resources of the Mojave River. Outstanding issues raised by regional water users who did not participate in the 1993 settlement were resolved by trial court, Court of Appeal, and California Supreme Court decisions. Regional water use and implementation of the Adjudication is now managed by the court-appointed Watermaster, the Mojave Water Agency, according to the terms of the Adjudication.

For management purposes, MWA subdivided the Mojave River Basin into five subareas and one transition zone – Oeste, Este, Alto, Transition zone of the Alto subarea (Transition zone), Centro and Baja (**Soil & Water Figure 1**). The Oeste and Este subareas flank the Alto subarea and are hydraulically connected by the groundwater system. The Alto subarea is upstream of the Transition zone and the Centro and Baja subareas. These four areas are hydraulically connected primarily by the Mojave River and secondarily by underflow in the groundwater system. The proposed project is located in the Alto subarea.

The water supply resources of the Mojave Basin can be divided into four categories: stream flows of the Mojave River, groundwater, imported surface water, and reclaimed water. However, as with most water resources within any region, these resources are intrinsically interdependent.

Mojave River

Historically, the major source of water to the region has been the Mojave River. Most of the river's flows occur during intense storms, leaving the river's 100 miles of streambed dry most of the year. When water is present in the river, it flows from the headwaters at the base of the San Bernardino Mountains northward through Victorville and then eastward through Barstow. MWA reports that gaged inflows averaged 71,300 acre-feet/year (afy) for the period from 1931 -2001 (MWA 2005). Ungaged inflow averages about 7,200 afy. Any river flow that does not percolate into the groundwater basin exits the Mojave Basin at Afton Canyon. MWA reports that outflows from Afton Canyon averaged about 8,100 afy from 1931-2001.

Under natural conditions, perennial flow in the Mojave River system was maintained by base flow, defined as groundwater discharge to the river. Base flow specifically excludes flow that results from direct runoff after intense storm events. Prior to the 1900's, many reaches of the river had perennial flow. By the mid 1900's, only three reaches still had naturally occurring perennial flow. Perennial flow now occurs only in a short reach below the Lower Narrows, which is currently supported primarily by reclaimed water discharges from the VVWRA.

The 1996 Trial Court decision (referred to as "Judgment after Trial" or "the Adjudication) requires groundwater producers of the Alto subarea to maintain 21,000 afy of measurable flow in Mojave River from the Alto Subarea to the Transition zone (Barstow v. Adelanto 1996). Producers meet any shortfall in this obligation with the payment of fees to the MWA for the purchase and discharge of imported surface water. The purpose of this minimum flow requirement is to maintain a reach of riparian habitat in the Mojave River and to support the transmission of storm flows to the downstream subareas. Storm flows are important to downstream communities, such as Barstow, because these flows are the primary source of the groundwater recharge in the lower subareas.

Thus, the current composition of non-storm flows in the Mojave River from the Alto Subarea to the Transition zone currently is groundwater base flow plus reclaimed water discharges from the VVWRA. Part of the reclaimed water discharged to the Mojave River is supplied to the river by VVWRA under a Memorandum of Understanding with the California Department of Fish and Game (CDFG) dated June 27, 2003 (CDFG-VVWRA 2003). The balance of reclaimed water, which represents excess, unsold supply, is discharged to the river. To date, the flow from the Alto Subarea, composed of base flow and VVWRA discharges, has met the requirements of the Adjudication without requiring a contribution of imported surface water from the Alto Subarea (Victorville 2 Data Response 62).

Groundwater

The Mojave River groundwater basin is bounded by the San Bernardino and San Gabriel Mountains to the south, extending to Afton Canyon to the northeast, and is bounded by the Lucerne Valley to the east, and the Antelope Valley to the west. The boundary coincides with the contact between unconsolidated alluvial deposits and nonwater-bearing bedrock. The alluvial deposits include two primary units, the floodplain aquifer and the regional aquifer, which underlies and surrounds the floodplain aquifer. The more productive groundwater unit is the floodplain aquifer, which consists of recent Mojave River alluvium and younger deposits of the ancestral Mojave River. The regional aquifer includes older deposits of the ancestral Mojave River, undifferentiated alluvial deposits and ancestral lakebed deposits.

Faults and other geologic structures have a significant effect on groundwater and river flows in the region. Faults trend predominately from northwest to southeast. Faults lift bedrock in blocks, creating subsurface stairstep-like barriers to groundwater flow and forcing groundwater to the surface in sections of the river, such as the Upper Narrows, Lower Narrows and Afton Canyon. Historically, these bedrock, faulted sections of the river created corridors of perennial flow. However, most of these corridors are dry, owing to the pumping of groundwater in the Mojave River Basin.

The principal sources of groundwater recharge are stream leakage from the Mojave River, mountain-front recharge from ephemeral streams, and artificial recharge. Recharge from precipitation is considered minimal because direct recharge from rainfall within the basin is significantly less than the potential vegetation and soil moisture requirements. The principal sources of groundwater discharge are pumping, evapotranspiration, and base flow at Afton Canyon.

In reference to **Soil & Water Figure 1,** groundwater recharge from the Mojave River occurs primarily in the Alto and Centro subareas because only the largest storm flows reach the Baja subarea. The quantity of natural recharge from the river is highly variable and is directly correlated to annual storm rainfall in the San Gabriel Mountains. The river does not flow through the Este and Oeste subareas and therefore does not provide direct recharge to these areas. Historically, recharge to the basin has ranged from less than 30,000-acre-feet to more than 450,000 acre-feet annually. The USGS estimates that groundwater recharge from the river averaged about 46,000 acre-feet from 1931 to 1994, including several thousand acre-feet of artificial recharge from the Mojave River fish hatchery each year since the 1950’s. From 1931-1994, recharge to the Centro subarea (including the Transition zone) averaged about 39,000 acre-feet. Records for the Baja subarea are limited to the period from 1931-32 and 1953-1994. During this period, the Baja subarea received about 11,000 acre-feet of river recharge annually.

Mountain-front recharge occurs primarily at the boundaries of the upper basin in the Oeste, Este and Alto subareas. The USGS reports that this recharge has never been directly measured but estimates that average recharge ranges from 10,000 to 13,000 acre-feet annually.

Artificial recharge to the Mojave Basin includes imported water, wastewater, irrigation-return flow and fish hatcheries. Importation of surface water and the production of wastewater have significantly increased in the last 10 years. During water year 2005-

2006, MWA imported 39,172 acre-feet of State Water Project (SWP) water to the Alto, Centro and Baja Subareas (MWA 2007). During the same period, 5,171 acre-feet of wastewater was also imported to the Mojave Basin area. Urban water use and agriculture within the basin also return water to the basin. Groundwater recharge from septic tanks and percolation from landscape and agricultural irrigation return a portion of the water pumped for municipal and agricultural use to the aquifer. In areas serviced with sewers, treated municipal wastewater is returned to the Mojave River through direct discharge or percolation ponds adjacent to the river. The Adjudication assumes that 50% of water provided to residences and to agriculture is returned to the basin. The USGS estimates that modern farming methods have decreased agricultural return flow rates, ranging from 46% in the Alto subarea to 29% in the Baja subarea, which would result in a reduction in groundwater recharge (Stamos 2001). Fish hatcheries, which began operation in 1949, usually discharge between 6,000 to 15,000 afy to the Mojave River, which percolates to the groundwater system within the Alto Subarea.

Groundwater pumping and evapotranspiration account for most of the discharge from the groundwater basin, with a very small amount exiting the basin as underflow from Afton Canyon. Pumping has become the principal source of groundwater discharge in the Mojave Basin. Evapotranspiration caused by natural processes has become a minor source of groundwater consumption.

Groundwater use from shallow wells along the Mojave River began before 1880. By the 1930's, pumping approached 40,000 afy and gradually increased to about 60,000 afy by the mid-1940's, at which point pumping rapidly increased to over 160,000 by the mid-1950's with the introduction of deep-well turbine pumps. Pumping continued to increase to a peak of 240,000 afy in the late 1980's, followed by a significant decline to a low of 150,000 afy in 1998 with the implementation of the Adjudication. MWA reports that verified groundwater production in water year 2005-2006 was 159,000 acre-feet.

Evapotranspiration consumes groundwater from areas in which the groundwater table is near the land surface. For purposes of this report, evapotranspiration is defined as the consumptive use of water by riparian vegetation, bare soil evaporation and evaporation from ponds and the river. The USGS estimates that current rates of evapotranspiration are about 20,000 afy (Stamos 2001).

The USGS monitors and analyzes long-term changes in groundwater levels in the Mojave Basin based on the review of 25 wells (Stamos 2006). The USGS reports that water levels have declined between 50 and 75 feet in the Alto Subarea since the 1940's, about 75 feet in the Centro subarea since the 1960s and more than 100 feet in the Baja area since the 1950's. **Soil & Water Figure 2** shows a representative hydrograph of a cluster of wells in the Alto subarea and illustrates the decline in groundwater levels. This report indicates that groundwater level declines have continued since the implementation of the Adjudication and that overdraft has not yet been reversed.

Imported Surface Water

The principal source of imported water supply to the Mojave Basin is SWP water imported by the MWA. MWA imports SWP water for groundwater and river recharge in accordance with the terms of the Adjudication. MWA's Table a SWP entitlement is

75,000 afy. However, MWA's actual allocation varies by water year. Based on the 2005 State Water Project Delivery Reliability Report published by the California Department of Water Resources, MWA's long-term average annual delivery is projected to be 58,000 afy (CDWR 2005). MWA reports that it imported 39,172 acre-feet of SWP water to the Alto, Centro and Baja subareas during water year 2005-2006.

Reclaimed Water

Several facilities generate treated wastewater within the Mojave Basin area. However, the VVWRA facility located at Shay Road, which would supply the proposed project, is the primary concern of this assessment. VVWRA provides wastewater treatment in the Alto Subarea, in which the proposed project would be located. Prior to the construction of the wastewater treatment plant, effluent was discharged to septic systems, which contributed to groundwater recharge. Effluent from areas now served by the VVWRA is piped to the wastewater treatment plant, which is located adjacent to the Mojave River at the border between the Alto Subarea and the Transition zone. Most of the reclaimed water generated by the VVWRA is discharged directly to the Mojave River or indirectly to the river through percolation ponds adjacent to the river. VVWRA's total annual volume of treated wastewater has steadily increased over the past five years from 9,860 afy in 2002 to 15,680 afy in 2006.

VVWRA has two contracts for the delivery of reclaimed water produced by the plant. In 2003, through a Memorandum of Understanding between CDFG and VVWRA (CDFG-VVWRA MOU), VVWRA committed to discharge reclaimed water to the Mojave River on an annual basis. The amount of water to be discharged is equal to 9,000 acre-feet plus 20% of VVWRA's annual production in excess of 10,500 afy, up to 15,000 afy. VVWRA's second contract commits the balance of its annual reclaimed water production to the city of Victorville. Victorville had entered into a contract for water with VVWRA prior to the CDFG-VVWRA MOU and expanded its contract in 2005 to include an option to purchase any of VVWRA's reclaimed water production in excess of the amount required pursuant to the CDFG-VVWRA MOU. To date, the city has only received delivery of reclaimed water to irrigate its golf course. The balance of reclaimed water in excess of the CDFG supply and the golf course deliveries has been discharged to the Mojave River, either directly or through percolation ponds at VVWRA's Shay Road Wastewater Treatment Plant, which has steadily increased from an excess of 860 afy in 2002 to 5,344 afy in 2006.

As discussed previously, the VVWRA's discharges to the Mojave River, including the amount required pursuant to the CDFG-VVWRA MOU and the balance of VVWRA's production that has not been purchased, have maintained required flows in the Mojave River from the Alto Subarea. Because of the VVWRA discharges to the river, the Alto groundwater producers have not needed to supplement river flows to meet the 21,000-afy flow requirement under the Adjudication (**Soil & Water Table 3**).

Soil & Water Table 3
Source of Mojave River Flows from Alto Subarea (2005-2006)

SOURCES	LEGAL REQUIREMENTS (acre-feet)	DISCHARGE (acre-feet)
Base Flow[1]	Not Applicable	7,000
Reclaimed Water[2] (VVWRA)	9,000 + 20% of VVWRA production in excess of 10,500	14,700 (9,900 required+4,800 excess)
SWP Water[3]	Balance required to meet annual flows of 21,000 (Adjudication)	None required owing to excess reclaimed water discharge[4]
TOTAL	21,000 minimum	21,700

[1] Base flow is the natural discharge of groundwater to the Mojave River. Base flow depends on overdraft recovery of the groundwater system.
[2] Water discharge to Mojave River by VVWRA (VVWRA-CDFG MOU)
[3] Alto Subarea groundwater producers finance the purchase of SWP water for MWA recharge projects in accordance with Adjudication.
[4] If the VVWRA discharge to the Mojave River had been limited to the required 9,900 AF, Alto Subarea groundwater users would have been required to pay fees to MWA for the purchase and discharge of 4,100 AF of SWP water to the Mojave River (21,000 AF – 9,900 AF – 7,000 AF = 4,100 AF).

VVWRA projects a significant increase in the production of reclaimed water over the next 20 years based on the current level of parcel development activity at the local city planning offices (RBF 2007). Population growth and increasing housing costs in the Los Angeles area are expected to drive population growth and housing construction in the Alto Subarea over the next 20 years. VVWRA reports that it produced 13,520 acre-feet of effluent in 2005 (VVWRA 2005). VVWRA project that reclaimed water production will increase to 17,250 acre-feet in 2007, which would represent the baseline for the proposed power project, and 21,840 acre-feet the year the proposed project would begin operation in 2010. By 2030, VVWRA estimates that reclaimed water production will be over 40,000 afy (RBF 2007).

Project Water Supply

The Victorville 2 project would have two sources of water. Reclaimed water would be the primary water supply for project process needs during operations, and groundwater that serves local municipal needs would be used to meet the project's potable water demands. Groundwater would also be used as the project's operational backup water supply.

Reclaimed Water Demands

During construction, reclaimed water would be used to meet the all of the project's non-potable water demands, including for dust suppression and compaction. During the first stage of construction grading for the power block area, the applicant estimates that the daily maximum water demand would be 65,000 gpd. During the next stage for grading of the solar field, average daily water use would increase to a maximum of 650,000 gpd. During non-grading construction periods, the average daily water demand would be about 58,000 gpd.

During operations, reclaimed water would be used for cooling, other process needs, mirror washing, fire protection and landscaping. During project operation, the applicant estimates a maximum annual water demand of 3,150 acre-feet per year, including 46 afy for mirror washing. The average maximum daily rate would be 2,603 gallons per minute (gpm) and the peak daily rate would be 2,965 gpm. A one-and-one-half mile (1.5 mile) pipeline will be constructed from the VVWRA treatment plant to the Victorville 2 project to supply reclaimed water to the project. Water will be trucked from the treatment plant to the Victorville 2 construction site for dust suppression until the pipeline is constructed.

Potable Water Demands

Groundwater that serves local municipal needs would be used to meet the potable demands for the project's operation workforce. The estimated annual potable water demand is 3.6 acre-feet/year (**Soil & Water Table 4**). During construction, potable water use would be limited to drinking water as provided in bottles; waterless portable facilities would be used for sanitary needs.

The applicant has also proposed to use municipal groundwater, purchased from the city of Victorville, to meet backup process water demands in case of outages in the reclaimed water system. The applicant does not expect any significant interruptions in reclaimed water supply. The applicant's worst-case assumption is that the backup water demand would be no more than 45 acre-feet annually (Victorville 2007c, Data Request 7). The applicant would be prepared to shut down the project if disruption of reclaimed water deliveries exceeded 30 days (Response to Data Request 79).

Victorville Water, a division of the city of Victorville, which operates the area's domestic groundwater supply system, would provide the potable groundwater supply for Victorville 2. Under the terms of the Adjudication, Victorville Water must purchase other producers' pumping allowance and pay fees to the MWA for the purchase of imported water for groundwater recharge to offset new pumping. In water year 2005-2006, Victorville Water pumped 11,281 acre-feet in addition to its Base Free-Production Allowance. To offset this additional production, it purchased 955 acre-feet pumping allowance from other groundwater producers and paid fees to MWA to purchase 10,206 acre-feet of imported water. Staff has evaluated the project's effects on long-term water supplies and demands in order to assess the reliability of the water supplies as proposed for the project.

Soil & Water Table 4
Victorville 2's Annual Water Demands

Water Use	Maximum Annual Use (acre-feet/year)	Water Supply Source	Water Supplier
Process Water	3,150	Reclaimed Water	Victor Valley Water Reclamation Authority (VVWRA) [2]
Process Water Backup Supply	45[3]	Groundwater	Victorville Water[4]
Potable Water	3.6	Groundwater	Victorville Water[4]

1 Operational process water uses include cooling, other process needs, fire protection and landscaping. Potable groundwater will serve as the backup water supply for the project's process demands.
2 City of Victorville has an agreement to purchase all VVWRA reclaimed water production in excess of required discharges to the Mojave River (2005 Agreement VVWRA and City of Victorville).
3 The applicant's worst-case assumption is that the backup water demand would be no more than 45 acre-feet annually (Victorville 2007c, Data Request 7).
4 City of Victorville purchased the Victor Valley Water District, the primary potable water supplier to the city of Victorville, on August 15, 2007. The new name for this service provider is Victorville Water.

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 would be caused by construction, operation and maintenance of the project. Staff's analysis of potential impacts consists of a brief 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 measures. Mitigation is designed to reduce the effects of potentially significant project impacts to less than significant.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Impacts leading to soil erosion or depletion of local/regional water supplies are among those staff believes could be potentially significant associated with the proposed project. Overall, staff evaluates if the project can be built and operated without violating erosion, sedimentation, flood, surface or groundwater quality, water supply, or wastewater discharge standards. There are extensive regulatory programs in effect designed to prevent or minimize these types of impacts. Our experience with these programs has demonstrated that they are effective. Therefore, absent unusual circumstances, we conclude that the threshold of significance for these potential impacts is based upon the ability of an applicant to identify and implement Best Management Practices (BMPs) and to prevent erosion or contamination to a level where these impacts will be less than significant. Soils can be adequately protected by development and implementation of a proper Drainage, Erosion and Sediment Control Plan (DESCP) to meet the Energy Commission's requirements and a Storm Water Pollution Prevention Plan (SWPPP) to meet the State Water Resources Control Board's requirements as applicable for both construction and operational phases of the project. The LORS and Policies presented in **Soil & Water Table 1** were used to determine the threshold of significance of project impacts for this proceeding.

Staff also evaluated the potential of the project's proposed water use to cause or contribute to:

- Substantial depletion or degradation of local or regional surface water supplies, particularly fresh water, or
- Substantial depletion or degradation of groundwater supplies or substantial interference with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.

Staff based the threshold criteria for significant water-use project impacts in part on environmental requirements developed for the implementation of the Adjudication of the Mojave Basin and the Memorandum of Understanding entered into between the California Department of Fish and Game and the Victor Valley Wastewater Reclamation Authority (CDFG-VVWRA MOU). The Adjudication identified environmental requirements related to Mojave River flows to ensure that downstream users are not adversely affected by upstream water use. These requirements are also directed at maintaining and conserving riparian resources of the Mojave River. The CDFG-VVWRA MOU is designed to ensure river flows in a section of riparian habitat along the Mojave River in the vicinity of the project by establishing minimum wastewater discharges from VVWRA to the Mojave River. The Adjudication also established pumping limits and water importation requirements that directly address groundwater use in the basin. As a whole, these river and groundwater requirements of the Adjudication are intended to provide a physical solution to the regional overdraft, which constitutes a substantial depletion of the regional surface water and groundwater supply.

These requirements consist of quantified minimum flows in the Mojave River, maximum base groundwater pumping rates and offset requirements for new pumping that can be applied to the evaluation of Victorville 2 project impacts. The Adjudication specifies minimum Mojave River flows, which must be sustained with or without the project, are those flows specified for the Alto Subarea in which the project would be constructed. Figure 1 shows that the project will be constructed in the Transition Zone of the Alto subarea. Non-storm flows in the Mojave River must average 21,000 acre-feet annually, as measured at the Lower Narrows. In addition, the CDFG-VVWRA MOU establishes that a minimum of 9,000 acre-feet/year plus 20% of VVWRA's production in excess of 10,500 acre-feet/year, and not less than 24.7 acre-feet/day of available reclaimed water will be discharged into the Mojave River as combined from the permitted points of discharge consisting of direct surface discharge and from VVWRA's percolation ponds. The Adjudication specifies base groundwater pumping rates for groundwater producers in the basin, including Victorville Water (formerly Victor Valley Water District), which would provide the project's potable and backup water supply. Victorville Water has a maximum base groundwater-pumping rate (called Base Free-Production Allowance) of 10,991 acre-feet per year. Victorville Water provides additional water to customers by purchasing other producers' pumping allowance and by paying fees to the MWA for the purchase of imported water for groundwater recharge to offset new pumping. In water year 2005-2006, Victorville Water pumped 11,281 acre-feet in addition to its Base Free-Production Allowance. The Adjudication requires Victorville Water to offset this additional production. In water year 2005-2006, Victorville Water purchased 955 acre-feet of pumping allowance from other groundwater producers and paid fees to MWA to purchase 10,206 acre-feet of imported SWP water.

Staff believes it is appropriate to rely on the requirements of the Adjudication and the CDFG-VVWRA MOU to evaluate the potential for adverse project impacts to water resources. However, in light of recent evidence indicating that groundwater levels are continuing to drop, even when the terms of the Adjudication and CDFG-VVWRA MOU have been fully implemented, staff also evaluated the physical effect of the project's water use on groundwater recharge.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The direct and indirect impact and mitigation discussion presented below is divided into a discussion of impacts related to construction and a discussion of impacts related to operation. For each potential impact evaluation, staff briefly describes the potential effect and applies the threshold criteria for significance to its analysis of 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 and the required mitigation measures.

Construction Impacts and Mitigation

Construction of the Victorville 2 will include soil excavation, grading, installation of utility connections and the use of water, primarily for dust suppression. Potential impacts to soils related to increased erosion or release of hazardous materials are possible during construction. Potential stormwater 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 discharge of eroded sediments from the site, discharge of hazardous materials released during construction, or migration of any existing hazardous materials present in the subsurface soil and groundwater. However, staff does not believe there would be any potential adverse impacts associated with soil and groundwater contamination that could be exacerbated by construction of the proposed Victorville 2 project. Project water demand could affect quantity of groundwater or surface water resources. Potential construction related impacts to soil, stormwater, and water quality or quantity, including the applicant's proposed mitigation measures and staff's proposed mitigation measures are discussed below.

Soil Erosion Potential

Construction activities can lead to adverse impacts to soil resources including increased soil erosion, soil compaction, loss of soil productivity, and disturbance of soils crucial for supporting vegetation or wetlands. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Soil erosion results in the loss of topsoil and increased sediment loading to nearby receiving waters such as the Mojave River.

The magnitude, extent and duration of those impacts would depend on several factors, including the proximity of the Victorville 2 site to surface water, the soils affected, and the method, duration, and time of year of construction activities. Prolonged periods of precipitation, or high intensity and short duration runoff events coupled with earth disturbance activities can result in on-site erosion. In addition, high winds during grading and excavation activities can result in wind borne erosion leading to increased particulate emissions that adversely impact air quality. The implementation of appropriate erosion control measures will help conserve soil resources, maintain water quality, prevent accelerated soil loss, and protect air quality (Victorville 2007a Section 6.2.3.2). **AIR QUALITY CONDITIONS OF CERTIFICATION AQ-SC3, and AQ-SC4** provides mitigation that will prevent significant impacts from fugitive dust and soil erosion by requiring dust control to disturbed lands during construction.

Construction of the proposed Victorville 2 facility would require three areas that total 388 acres. In the absence of proper BMPs and due to the soil type, the project earthwork could cause significant fugitive dust and erosion. In reference to **Soil & Water Table 2**, the predominant surface soil condition on the proposed Victorville 2 site is sandy loam or very fine sandy loam with a water erosion potential of slight to moderate. However, the surface textures of these soil types have a high potential for wind erosion (Natural Resources Conservation Service Web Soil Survey URL: websoilsurvey.nrcs.usda.gov).

Water and Wind Erosion

The Victorville 2 project site will be subject to wind and water erosion during construction and operation. Project construction will be completed over a 27-month period (Victorville 2007a, Page 1-3). The total earth movement will be significant amounting to approximately 1.5 million cubic yards. The earthwork will consist of primarily cut and fill grading with excavation for foundations and underground systems (Victorville 2007a, page 2-35). Several factors contribute to the significant potential for water and wind erosion effects, including the high volume of earth displacement, a long duration for construction, and soil properties that have a slight to moderate susceptibility for water erosion and high susceptibility for wind erosion. The erosion and sedimentation control measures include, but are not limited to: wetting the roads in active construction and laydown areas; controlling speed on unpaved surfaces; placing gravel in entrance ways; use of straw bales, silt fences, and earthen berms to control runoff; restoration of native plant communities by natural revegetation, seeding and transplanting, and application of soil bonding and weighting agents (Victorville 2007a, page 6.2-15, Victorville 2007c, DR 83). Watering for fugitive particulate matter emission control during soil handling, bulldozing and grading is expected to maintain soil moisture content of 15% (ENSR 2007d, Data Response Air Quality 2).

The general sequence for implementing BMPs would be to install a silt fence around the perimeter of the entire project area and along the perimeter of sub-section plots according to the phases of grading. Construction would begin in the Power Block area, followed by the Solar Field. As grading is performed in the Power Block area, the Sediment/Stormwater Retention Facility and its outlet structure will also be constructed.

During construction, the capacity of the Sediment/Stormwater Retention Facility will be maintained by performing sediment removal as needed. Temporary and permanent ditches that carry runoff to the Sediment/Stormwater Retention Facility will be protected against erosion during construction using flow check dams constructed of hay bales. As the permanent storm sewer piping is installed, the inlets will be protected from receiving sediments using silt fencing to protect the entrance. Ground surface areas disturbed in the Power Block will be stabilized with straw or other suitable material until the final surface is established. (Victorville 2007b, Section 6.17 and Victorville 2007c, DR 83)

During grading work, soil would be stabilized by maintaining sufficient water content to make it resistant to weathering and erosion by wind and water. Upon completion of grading work, soil in the Solar Field would be stabilized by maintaining a soil-bonding agent to bond soil particles together while maintaining a crust on the surface of the soil resilient to weathering and erosion from wind and water. The soil-bonding agent allows the treated soil to retain most of its permeability (on the order of 70 – 90% depending on application rate) with only a slight increase in runoff compared to untreated soil. Silt fences would also be placed at adequate spacing perpendicular to the drainage path that generally follows in a northward direction to trap sediment before it can migrate to the north end of the site. The Solar Field will have an average grade of 0.5% and will include some flat areas to encourage ponding and infiltration of runoff from precipitation (Victorville 2007b, Section 6.17 and Victorville 2007c, DR 83). Prior to application of the soil-bonding agent, a Sediment/Stormwater Retention Facility will be needed on the northern boundary to attenuate the higher runoff rates that will occur when soil permeability is reduced from the application of a soil-bonding agent. This issue is addressed in the **Stormwater** Section of this PSA under **Operation Impacts and Mitigation** and a requirement for developing a Sediment/Stormwater Retention Facility for Solar Field drainage is included in Condition of Certification **SOIL & WATER-2**.

The applicant has prepared a draft DESCP providing conceptual plans for erosion and drainage control measures during the construction phase of Victorville 2. Overall, staff believes the applicant has identified a reasonable plan and sequence for implementing BMPs that will avoid significant adverse impacts, notwithstanding the somewhat unique site conditions for of the proposed project. Condition of Certification **SOIL & WATER-2** would require the applicant to prepare a Final DESCP for both construction and operations to assure these BMPs are implemented and to address stormwater retention from the Solar Field. Similar to the Energy Commission's requirements to prepare a DESCP, the State Water Resources Control Board (SWRCB) specifies that the applicant is to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) for construction activity as would be required under Condition of Certification **SOIL & WATER-1**.

Staff agrees that through the proper application of BMPs, the impact to soil resources from water and wind erosion will be reduced to a level that is less than significant.

Groundwater

The proposed Victorville 2 would not use groundwater during construction, and the applicant does not expect to encounter groundwater during plant excavation activities because the reported depth to perched groundwater is 115 feet below ground surface (bgs) and 210 to 250 feet bgs to the water table in the regional aquifer (Victorville

2007a page 6.17-10). Any groundwater encountered would be sampled prior to off-site disposal. Staff agrees the likelihood of encountering groundwater during construction is remote, and based on the applicant's proposed dewatering operations, no impacts to groundwater resources will occur during construction of the Victorville 2.

Soil and Groundwater Contamination

The site is within the George Groundwater sub-basin which includes an upper perched aquifer and a deeper regional aquifer system (Victorville 2007c). Portions of the perched aquifer system in the vicinity of the SCLA near the project site have been impacted with trichloroethylene (TCE) from leaking underground tanks and/or because of historical military activities. The Federal Environmental Protection Agency added George AFB (now the SCLA) to the Superfund National Priority List. The TCE groundwater plume is present in the lower aquifer, approximately 210 to 250 bgs along the routes for the Victorville 2 Project sanitary wastewater pipeline and transmission lines. The presence of TCE in the groundwater is a Recognized Environmental Condition (Victorville 2007a Appendix M). A REC is the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicated an existing release, past release, or a material threat of a release into structures on the property or in the ground, groundwater, or surface water of the property.

The applicant states that it is unlikely that groundwater will be encountered or affected by the construction of the Victorville 2 because the depth to perched groundwater is 115 feet bgs and depth to the water table in the regional aquifer is 210 to 250 feet bgs, (Victorville 2007a page 6.17-10). Staff agrees that there does not appear to be any potential adverse impacts associated with soil and groundwater contamination that could be exacerbated by construction of the proposed Victorville 2 project.

Wastewater

Soil & Water Table 5 shows the reclaimed water that will be needed for one-time hydrostatic testing of pipelines and pressure vessels during construction. This water will be reused to the extent possible and then discharged as wastewater through a temporary connection to the project's sanitary wastewater disposal pipeline and sent to the VVWRA treatment plant (Victorville 2007a Page 6.17-14). In addition, a small amount of reclaimed water would be needed for equipment washing. Improper handling or containment of construction wastewater could cause a broader dispersion of contaminants to soil, groundwater or surface water. During construction, wastewater would be managed to maintain compliance with the required Industrial Wastewater Discharge Permit with VVWRA consistent with Condition of Certification **SOIL & WATER 9**. The discharge of any non-hazardous wastewater during construction must comply with regulations for discharge. The equipment wash water will be transported to a VVWRA treatment plant by vacuum truck hauler. Staff concludes that no significant impact to wastewater will occur if the construction wastewater is discharged in accordance with VVWRA's Industrial Wastewater Discharge Permit consistent with Condition of Certification **SOIL & WATER-9**.

Soil & Water Table 5
Construction Use of Reclaimed Water for Hydrostatic Testing
Contributing to Wastewater Discharges

Source	Gallons
Heat Recovery Steam Generator (HRSG)	90,000
Plant piping & equipment	40,000
Solar field piping	225,000

Source: Victorville 2007a, Page 6.17-14

Stormwater

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 stormwater runoff and drain off-site. Water quality could also be potentially diminished if the stormwater drainage pattern concentrates runoff in areas that are not properly protected with BMPs causing erosion of soils and sediment discharge off-site and possibly into surface waters.

The Victorville 2 site is located in an undeveloped area except for one residence on the power plant property. Brush and Joshua trees will be cleared prior to grading (Victorville 2007 data response 83). The stormwater runoff percolates either into the soil or flows overland off-site. Several factors contribute to the significant potential for water erosion effects, including the high volume of earth displacement, a long duration for construction, and soil properties that have a slight to moderate potential for water erosion.

The applicant recognizes that construction of the Victorville 2 will add impervious areas to the site causing an increase in stormwater runoff, and has proposed drainage and erosion control measures creating a separate drainage system for the Power Block and Solar Field. The general sequence for implementing BMPs would be to install a silt fence around the perimeter of the entire project area and along the perimeter of sub-section plots according to the phases of grading. Construction would begin in the Power Block area, followed by the Solar Field. As grading is performed in the Power Block area providing for drainage in an eastward direction, the Sediment/Stormwater Retention Facility and its outlet structure will also be constructed for collecting all stormwater runoff from the Power Block area. The Sediment/Stormwater Retention Facility will serve to allow suspended soil particles in the runoff to settle out, promote infiltration of stormwater, and provide attenuation of stormwater peak discharge rates for significant storm events that would lead to releases from the Sediment/Stormwater Retention Facility. During construction, the capacity of the Sediment/Stormwater Retention Facility will be maintained by performing sediment removal as needed. Temporary and permanent ditches that carry runoff to the Sediment/Stormwater Retention Facility will be protected against erosion during construction using flow check dams constructed of hay bales. As the permanent storm sewer piping is installed, the inlets will be protected from receiving sediments using silt fencing to protect the entrance. Ground surface areas disturbed in the Power Block will be stabilized with straw or other suitable material until the final surface is established. (Victorville 2007b, Section 6.17 and Victorville 2007c, DR 83)

During grading work, soil would be stabilized by maintaining sufficient water content to make it resistant to weathering and erosion by wind. Upon completion of grading work, soil in the Solar Field would be stabilized by maintaining a soil-bonding agent to bond soil particles together while maintaining a crust on the surface of the soil resilient to weathering and erosion from wind and water. The soil-bonding agent allows the treated soil to retain most of its permeability (on the order of 70 – 90% depending on application rate) with only a slight increase in runoff compared to untreated soil. Silt fences will also be placed perpendicular to the drainage path that generally follows a northward direction in order to trap sediment before it can migrate to the north end of the site. The Solar Field will ultimately have an average grade of 0.5% and will include some flat areas to encourage ponding and infiltration of runoff from precipitation (Victorville 2007b, Section 6.17 and Victorville 2007c, DR 83). Staff believes that due to the reduction in permeability of the Solar Field following application of the soil-bonding agent, a Sediment/Stormwater Retention Facility will be necessary to prevent the rate of stormwater runoff during construction from exceeding the pre-developed rate. Staff is including this requirement in Condition of Certification **SOIL & WATER-2**.

The applicant has prepared a draft DESCP providing conceptual plans for erosion and drainage control measures during the construction phase of Victorville 2. The DESCP has included measures for properly storing and containing hazardous materials used, and hazardous waste generated, during the course of construction. Upon addressing the need for a Solar Field Sediment/Stormwater Retention Facility, staff believes the applicant will have identified a reasonable conceptual plan and sequence for implementing BMPs in order to avoid significant adverse impacts in consideration of the proposed project and its unique site conditions. Condition of Certification **SOIL & WATER-2** would require the applicant to prepare a Final DESCP for both construction and operations to assure these BMPs are implemented, including the stormwater retention measures for the Solar Field. Similar to the Energy Commission's requirements to prepare a DESCP, the State Water Resources Control Board (SWRCB), in implementing federal law, specifies will require that the applicant prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) for construction activity; this is reflected in Condition of Certification **SOIL & WATER 1**.

Staff believes that through the proper application of BMPs, including a Sediment/Stormwater Retention Facility along the Solar Field northern boundary for attenuating stormwater runoff equal to or below pre-developed rates, the impact to soil and water resources from stormwater drainage during construction will be reduced to a level that is less than significant.

Project Water Supply

Reclaimed water would be used to meet the construction water demand, except for bottled water that would be used to supply the workforce with drinking water. The applicant estimates that daily water demand during construction will range from 58,000 gallons per day (gpd) (40 gpm) to 650,000 gpd (450 gpm). Water demand will be highest during grading of the solar field area, which will range from 560,000 gpd to 650,000 gpd (Victorville 2007a page 6.17-14). The rates of reclaimed water use during construction would be significantly less than the average maximum daily rate of 2,603 gpm (3,748,000 gpd) used during operations. Therefore, staff's impact assessment for reclaimed water use during operations adequately addresses reclaimed water use during construction.

Potable water demands during construction will be minimal. The applicant proposes to use bottled water to supply drinking water for the construction workforce. Portable facilities would be used for sanitary needs and operate without water. Therefore, staff concludes that there will not be significant adverse environmental impacts associated with potable water use during project construction.

Operation Impacts and Mitigation

Operation of the Victorville 2 could lead to potential impacts to soil, stormwater runoff, water quality, water supply, and wastewater treatment. Soils may be potentially impacted through erosion or the release of hazardous materials used in the operation of the Victorville 2. Stormwater runoff from the Victorville 2 site could result in potential impacts if increased runoff flow rates and volumes discharged from the Victorville 2 site increase downstream flooding. Water quality could be impacted by discharge of eroded sediments from the Victorville 2 site, or discharge of hazardous materials released during operation. Water supply for plant processes, cooling, fire protection and landscape irrigation could lead to potential quantity or quality impacts to regional groundwater or surface water resources. Potential impacts to soil, stormwater, water quality, water supply, and wastewater related to the operation of the Victorville 2 including the applicant's proposed mitigation measures and staff's proposed mitigation measures are discussed below.

Soil

The applicant has proposed permanent erosion control measures to mitigate all potential soil related impacts from the operation of the Victorville 2. During operations, the Power Block area will be covered predominantly with gravel (about 70%) and landscaping serving to prevent wind and water erosion, maintaining a high degree of the pre-project water infiltration capacity into the soil. The balance of the Power Block area (30%) will be covered by foundations and paving. The Sediment/Stormwater Retention Facility will offset the loss of permeable surface area by attenuating storm water discharges and promoting water infiltration into the soil. Soil in the 250-acre Solar Field would be stabilized using two approaches. For the majority of the Solar Field not exposed to routine vehicle traffic, the soil would be stabilized by maintaining a soil-bonding agent to bond soil particles together while maintaining a flexible crust on the surface of the soil resilient to weathering and erosion from wind and water. For the portion of the solar field exposed to routine vehicular traffic such as roads between rows of parabolic mirrors used for mirror washing, staff is recommending that soil be stabilized using a soil-weighting agent that absorbs into the soil particles to increase their weight and to prevent fugitive dust. Based on manufacturer's recommended maintenance frequencies, it is likely that soil stabilization using the soil bonding and weighting agents will need follow-up treatment annually and biannually, respectively. Conditions of Certification **SOIL & WATER-2, 3 and 4** will require the implementation and maintenance of drainage and erosion control measures according to plans as specified in the DESCP, Industrial SWPPP and Water Quality Management Plan

(WQMP) respectively. With these BMPs implemented and maintained, staff does not believe there would be significant impacts to soil resources during operation of Victorville 2.

Wastewater

The applicant proposes two separate wastewater-collection systems for Victorville 2. The first is the process wastewater system, which collects all wastewater generated from operation of the plant and delivers it to the zero liquid discharge (ZLD) system. The ZLD System will recover about 90% of the wastewater for reuse by Victorville 2, and will concentrate the solids into a salt cake for disposal to a landfill (Victorville 2007a, Page 2-25 and Figure 2-12a). Plant drainage consisting of leakage and drainage from facility containment areas would be collected in a system of floor drains, sumps, and pipes within the Victorville 2 and discharged to an oil/water separator (Victorville 2007a Page 6.17-17). The oil-free water will be reused in the cooling tower.

The second wastewater-collection system proposed by the applicant is the sanitary system. The sanitary system would collect wastewater from sinks, toilets, and other sanitary facilities for discharge to the VVWRA's Adelanto Inceptor sewer pipeline (Victorville 2007a Page 2-26). No significant water or soil related impacts are expected due to wastewater if the project owner meets Condition of Certification **SOIL & WATER 6** that requires the project owner treat all process wastewater with a ZLD system in accordance with a ZLD management plan.

Stormwater

Staff's evaluation of potential stormwater effects of the proposed project involved verifying that stormwater discharge rates from the project would not exceed pre-development rates, using the methods specified by local LORS, and reviewing conceptual plans for controlling drainage to assure that appropriate BMPS are identified to avoid degradation of water quality from erosion or contact with contaminants. During operations, separate drainage systems would be developed for stormwater drainage from the Power Block and Solar Field. Without mitigation, post-development runoff from the Victorville 2 site would exceed pre-development runoff due to the increase of impervious areas in proportion to the overall site. Therefore, the Applicant would design the drainage features for the site in accordance with the City of Victorville's Standard Specifications for Public Improvements and San Bernardino County's Hydrology Manual and Water Quality Management Plan Program (Victorville 2007a – Section 6.17, Victorville 2007b - Section 6.17 and Victorville 2007c - Data Response 83). The most stringent of these stormwater discharge rate criterion considering the project's particular site conditions is a requirement under the San Bernardino County Hydrology Manual that the stormwater system be designed to prevent discharge of post-development flows in excess of pre-development flows for the 100-year, 24-hour storm.

In the draft DESCP, the applicant has provided drainage calculations for the stormwater drainage system including the Sediment/Stormwater Retention Facility for the Power Block. The applicant has estimated the runoff and discharges for pre- and post-development as summarized in **Soil & Water Table 6**.

Soil & Water Table 6
Summary of Pre-Development and Post-Development Stormwater Runoff and Discharge Estimates for a 100-year, 24-hour Storm

Item	Power Block		Solar Field	
	Pre-Developed	**Post-Developed**	**Pre-Developed**	**Post-Developed**
Area	25.9 acres	25.9 acres	250.1	250.1
Curve Number*	75	97	75	**75****
Precip. For 100-Year Storm***	**3.0 inches**	**3.0 inches**	**3.0 inches**	**3.0 inches**
Discharge from 100-Year Storm	**13.7 cfs******	**51.7 cfs******	**53.8 cfs******	**(to be provided)******
Attenuated Discharge from Retention Facility	Not Applicable	**1.5 cfs******	Not Applicable	**(to be provided)******

Reference: Victorville 2007c, Data Response 83
Note: * Curve Number is a coefficient used in the TR-55 method of the Natural Resources Conservation Service, and characterizes the runoff factor as a function of the permeability of the ground surface based on soil type and land use.
** The curve number for the solar field after application of the soil-bonding agent is expected to increase above pre-developed conditions.
*** The precipitation for the 100-year storm appears to be in error based on the table of data provided in the DESCP, since the value for the 50-year storm is higher than the 100-year storm.
**** All stormwater discharge values are expected to change as a result of making the above corrections.

Staff has reviewed the applicant's stormwater discharge estimates and believes that while the applied methodology is sound, that there may be some inaccuracies in assumptions that could lead to under-estimating stormwater discharges from the Power Block and Solar Field. Staff is listing these concerns as follows:

1. The assumed Curve Number (75) for the post-developed condition of the Solar Field should be higher than the pre-developed condition due to plans for application and maintenance of a soil-bonding agent that has the effect to reduce soil porosity and increase runoff.

2. The assumed precipitation for the 100-year, 24-hour event of 3.00 inches appears too low based on comparison with the 50-year, 24-hour event of 4.70 inches. Intuitively, a less frequently occurring event should have a higher value of precipitation.

3. The DESCP contains inconsistencies in the assumed precipitation and the estimates of stormwater runoff rates when compared to the summary provided in Table 2.1 to the Drainage Calculations in Appendix B.

4. Higher post-development rates of stormwater runoff in the Solar Field compared to pre-development rates create the need for stormwater retention mechanisms to attenuate the rate of discharge from the site.

Staff recognizes the draft DESCP is preliminary because it is prepared in advance of final engineering and design. However, because recognition of the potential rate of runoff following construction for the entire site, and developing a conceptual plan for stormwater retention in the Solar Field are key elements in avoiding significant adverse impacts, staff is identifying these as outstanding issues so that they can be resolved before the Final Staff Assessment. The applicant had previously indicated that if the outcome of detailed stormwater drainage design work shows a need for more retention of runoff from the Solar Field, a trapezoidal ditch may also be constructed along the entire northern boundary to retain runoff and enhance infiltration (Victorville 2007b, Section 6.17 and Victorville 2007c, DR 83). The applicant has agreed to re-evaluate the Solar Field conditions in order to develop a plan for demonstrating that post-developed conditions for runoff of stormwater will not exceed the pre-developed rate for the 100-year, 24-hour storm (CEC 2007i).

Other than the applicant needing to update their calculations, staff is satisfied at this time with the applicant's conceptual plans for managing stormwater, and general methodology for estimating stormwater rates from the Power Block. In reference to **Soil & Water Table 6**, the applicant's initial calculations show that they are using the correct design criteria consisting of the 100-year, 24-hour storm. Their calculations also show recognition that the higher runoff that will occur in the post-developed condition will need to be attenuated by the Sediment/Stormwater Retention Facility and result in a discharge less than the pre-developed runoff rate. The values shown in bold print are those that staff expects will change, as a result of the applicant's updated calculations. The applicant will also need to demonstrate or confirm that the capacity of the Sediment/Stormwater Retention Facility for the Power Block is still adequately sized to attenuate discharge from the site to be less than or equal to the pre-developed condition.

Staff has also reviewed the applicant's conceptual Best Management Plans (BMPs) for controlling stormwater drainage to assure that appropriate erosion control and drainage measures are identified to avoid degradation of water quality from water coming into contact with either soil or contaminants. The 25-acre Power Block will be lightly sloped and surfaced with equipment and foundations, paving, gravel and landscaping. Non-contact areas of the Power Block (where there is not potential for contamination from hazardous materials) would be graded to drain to the north and south by means of sheet flow away from equipment foundations and into swales, inlets and/or storm sewer pipes along the perimeter of the Power Block. At the north and south sides of the Power Block, the runoff would then be conveyed eastward by ditches and culverts into the Sediment/Stormwater Retention Facility. Following settlement of suspended sediments and attenuation of peak flows, stormwater would either infiltrate into the ground or discharge into an existing ditch immediately east of the site. During operation, the capacity of the Sediment/Stormwater Retention Facility will be maintained by performing sediment removal as needed. Contact areas (in the vicinity of oil-filled transformers and hazardous materials storage) would drain into a separate collection system and be conveyed through an oil-water separator before it is conveyed to the cooling tower for reuse. Secondary containment structures would be built around the oil-filled equipment and hazardous materials to prevent dispersion in case of a spill. Solid wastes and small amounts of hazardous waste that are generated would be properly accounted for, tracked, handled, and disposed of off-site using licensed transporters and disposal facilities. Conditions of Certification **SOIL & WATER-2, 3 and 4** require the project owner to prepare plans for implementing, monitoring and maintaining BMPs appropriate for the operating phase in the form of a DESCP, SWPPP for Industrial activity, and a Water Quality Management Plan respectively. The goal of the WQMP Program is to identify during project planning and design any potential sources of contaminants that could be present during project operations, and to assure adequate BMPs are incorporated into the project's final design, and then implemented for preventing pollution of soil and water resources. Compliance with Conditions of

Certifications **SOIL & WATER-2, 3 and 4** will ensure there are no significant impacts or conveyance of pollutants to the VVWRA's sanitary sewer system or to soil and water resources.

The 250-acre Solar Field will have an average grade of 0.5% sloping to the north and will include some flat areas to encourage ponding and infiltration of runoff from precipitation. Several factors contribute to the moderate potential in the Solar Field for water erosion effects during operation including the lack of vegetation, the possible breakdown of soil bonding from project-related vehicular traffic, and the soil properties themselves.

Upon completion of grading work, soil in the Solar Field would be stabilized using two approaches. For the majority of the Solar Field not exposed to routine vehicle traffic, the soil would be stabilized by maintaining a soil-bonding agent to bond soil particles together while maintaining a crust on the surface of the soil resilient to weathering and erosion from wind and water. The soil-bonding agent allows the treated soil to retain most of its permeability (on the order of 70 – 90% depending on application rate) with only a slight increase in runoff compared to untreated soil. As noted above, staff has identified that based on preliminary stormwater calculations provided in the applicant's draft DESCP, the calculated rate of stormwater runoff from the Solar Field does not account for the reduction in permeability as would occur following application of the soil-bonding agent. In other words, the applicant has estimated the pre-development and post-development stormwater runoff rates to be the same. Therefore, in order to compensate for the reduction in infiltration of stormwater, staff believes that a stormwater retention facility will be necessary to attenuate the stormwater discharge rate from the Solar Field following application of the soil-bonding agent. The applicant does note in their Draft DESCP that their stormwater calculations are preliminary, and that a trapezoidal ditch may be necessary. Staff believes that a structural BMP for stormwater retention will be necessary in some form or another in order to prevent the rate of stormwater runoff during operation from exceeding the pre-developed rate.

For the portion of the solar field exposed to routine vehicular traffic such as roads between rows of parabolic mirrors used for mirror washing, staff believes that soil should be stabilized using a soil-weighting agent that absorbs into the soil particles to increase their weight and to prevent fugitive dust. Because the soil-weighting agent does not fill the void spaces between soil particles, it does not affect soil permeability. Based on manufacturer's recommended maintenance frequencies, it is likely that soil stabilization using the soil-weighting agent will need follow-up treatment approximately every six months.

The applicant has prepared a draft DESCP providing conceptual plans for erosion and drainage control measures during the construction and operation phases of Victorville 2. Other than, the applicant's plans to update their runoff rate calculations and to conceptually design a retention facility for the Solar Field prior to the FSA, staff believes the applicant has identified a reasonable plan and sequence for implementing BMPs in order to avoid significant adverse impacts in consideration of the proposed project and its unique site conditions. Condition of Certification **SOIL & WATER-2** would require the applicant to prepare a Final DESCP for both construction and operations to assure these BMPs are implemented, monitored and maintained. Similar to the Energy

Commission's requirements to prepare a DESCP, the State Water Resources Control Board (SWRCB) specifies that the applicant is to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) for industrial activity as would be required under Condition of Certification **SOIL & WATER-3**. San Bernardino County Public Works – Environmental Management requires the applicant to prepare and implement a Water Quality Management Plan (WQMP) as would be required under Condition of Certification **SOIL & WATER-4.**

Staff believes that through the proper application of BMPs, including updating estimates of stormwater runoff rates from the Solar Field and developing plans for stormwater retention along the Solar Field northern boundary to maintain stormwater runoff equal to or below pre-developed rates, that the impacts to soil and water resources from stormwater drainage during operation would be less than significant. Staff expects to receive additional data from the applicant prior to preparing the FSA. In the mean time, this specific requirement is included in Condition of Certification **SOIL & WATER-2**.

Flooding, and Tsunami

The Victorville 2 site is not located within the 100-year floodplain of the Mojave River as defined by FEMA. FEMA has designated the eastern portion of the project site, which is lowest in elevation, as 'undetermined', meaning that FEMA has not determined the frequency of flood that would occur. However, with the elevation being higher than, and outside of the 100-year floodplain, the eastern portion of the site would not be exposed to flooding as frequently as the 100-year recurrence interval. The western portion of the project site is within the 500-year floodplain, and thus the entire project site is not likely to be affected by Mojave River flooding as it is outside of the 100-year floodplain. Although Victorville 2's post-construction stormwater runoff will exceed the pre-construction volume, the applicant proposes to capture all site stormwater runoff in retention basins that will encourage infiltration and will attenuate any discharges so that they do not exceed the pre-developed runoff rates. The project would not be exposed to tsunami given its inland location, distant from any water body with large areal features.

Project Water Supply

The applicant has proposed to use two sources of water for project operations. Reclaimed water would be the primary water supply for all of the project's water demands, except potable water demands, which would be met with groundwater. The project also proposes to use potable groundwater for the process backup water supply. The project's potential effects on these two water supplies are evaluated as follows.

Reclaimed Water

Staff analyzed the project's proposed use of reclaimed water to determine if this water use would cause a substantial depletion or degradation of local or regional surface water or groundwater supplies. Staff identified depletion of flows in the Mojave River as the one potential direct impact that could be caused by the project's use of reclaimed water. Project use of reclaimed water could also indirectly cause the depletion of groundwater recharge. Staff did not identify any potential for the degradation of surface water or groundwater caused by project use of reclaimed water.

As stated above, staff evaluated the project's direct impacts in part on environmental requirements developed for the implementation of the Adjudication of the Mojave Basin, and the CDFG-VVWRA MOU. The Adjudication identified minimum flows between sub-basins and in the Mojave River to ensure that downstream users are not adversely affected by upstream water use, and to protect riparian resources along the Mojave River. The Adjudication also established pumping limits and water importation requirements in order to reverse the overdraft in the basin. The CDFG-VVWRA MOU is specifically directed at protecting riparian resources along a section of the Mojave River that is near the proposed project, and establishes requirements governing the amount of reclaimed wastewater discharged by VVWRA to the Mojave River.

The effect of the project's reclaimed water use would be to remove water from the basin's hydrologic system. The applicant estimates that the project would use an annual maximum of 3,150 acre-feet of reclaimed water for project operations, including cooling, process operations, mirror washing, fire protection and landscaping. Reclaimed water used by the project, except for landscape irrigation, would be completely consumed through evaporation.

Reclaimed water would be purchased by the city of Victorville from VVWRA under the Second Amended and Restated Agreement for Reclaimed Water Service, which enables the city to use all reclaimed water produced in excess of the environmental water commitments that are specified under the CDFG-VVWRA MOU (Victorville 2007a, Appendix N, Exhibit 1). Currently, the city of Victorville is using up to 300 acre-feet/year of this water for the irrigation of Westwinds Golf Course, which is only a small portion of the supply of excess reclaimed water. All of the excess reclaimed water produced by VVWRA that the city does not use is currently discharged by VVWRA to the Mojave River.

Staff has evaluated the impact of project reclaimed water use with the assumption that the city of Victorville would have no other immediate alternative use of the water planned for Victorville 2 and that VVWRA would continue to discharge unused excess water to the Mojave River. Based on these assumptions, Victorville 2 project use of reclaimed water would cause short-term reductions in the amount of reclaimed water discharged to the Mojave River. **Soil & Water Table 7** lists the historical and projected distribution of reclaimed water with and without the Victorville 2 project.

During the first two years of project operation, 2010 and 2011, there would be a reduction in the amount of reclaimed water discharged to the Mojave River, compared to the 2009 projected discharge, prior to project construction. However, given the projected growth of reclaimed water production, project use of reclaimed water would cause no decline in VVWRA's discharges of unused excess water to the Mojave River compared to the baseline discharges in 2007 (RFB 2007). Compared to the 2007 baseline, the amount of reclaimed water discharged from the VVWRA facility to the Mojave River would be unaffected by the project and the terms of the CDFG-VVWRA MOU would continue to be met.

Staff also considered whether the project's use of reclaimed water would be growth inducing. Staff concluded that VVWRA's projected increases in reclaimed water production will occur with or without the construction of the Victorville 2 project owing to new housing development already slated for construction. The consumption of reclaimed water by the project would have no effect on population growth or housing construction.

Soil & Water Table 7
VVWRA's Distribution of Reclaimed Water (acre-feet/year)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total Effluent	9,860	10,415	11,985	13,520	15,680	17,250	18,705	20,275	21,840	23,230	24,865
CDFG MOU Requirement	9,000	9,000	9,297	9,604	10,036	10,350	10,641	10,955	11,268	11,546	11,873
Excess Water	860	1,415	2,688	3,916	5,644	6,900	8,064	9,320	10,572	11,684	12,992
City of Victorville Water Use											
Golf Course	0	0	0	300	300	300	300	300	300	300	300
Victorville 2	0	0	0	0	0	0	0	0	**-2,000**	**-3,150**	**-3,150**
Excess Reclaimed Water Discharged to Mojave River											
Without Victorville 2	860	1,415	2,688	3,616	5,344	6,600	7,764	9,020	10,272	11,384	12,692
With Victorville 2	860	1,415	2,688	3,616	5,344	6,600	7,764	9,020	**8,272**	**8,234**	**9,542**

Staff also applied the threshold criteria (found in the terms of the Adjudication) of 21,000 acre-feet/year flow in the Mojave River for the Alto Subarea to the stream flows that would occur if the proposed project used 3,150 acre-feet of reclaimed water annually. Reduction in flows below 21,000 acre-feet/year would cause a direct significant impact to riparian habitat. In addition, reductions in stream flows below 21,000 acre-feet/year would indirectly cause a significant reduction in downstream groundwater recharge. The minimum flows from the Alto subarea are needed to support the transmission of storm flows, which are a primary source of the groundwater recharge in downstream communities, such as Barstow. Staff finds that the ability of the Alto Subarea to meet the 21,000 acre-feet/year flow requirement would not be impaired by Victorville 2.

Non-storm stream flows of the Mojave River in the Alto Subarea are derived from three sources, (1) base flow from groundwater discharge; (2) reclaimed water discharged by VVWRA and (3) imported water discharged by MWA. Base flow is the natural discharge of groundwater to the Mojave River. Base flow depends on overdraft recovery of the groundwater system. Reclaimed water discharge has two components. VVWRA discharges water according to the terms of the CDFG-VVWRA MOU and discharges unused excess reclaimed water. Finally, as noted above, the terms of the Adjudication require that MWA discharge sufficient quantity of imported water to maintain the annual 21,000 acre-foot flow.

Soil & Water Table 8 projects the Mojave River flows from the Alto Subarea that would occur during the first three years of project operation. During the first two years of operation, project use of reclaimed water would cause approximately an 800 acre-foot decrease in flows in the Mojave River from the Alto Subarea, as compared to pre-project flows in 2009. However, even with those reductions, there would be more water releases from VVWRA to the Mojave River than in 2007 when the Application for Certification was filed, which constitutes the baseline for the project.

Soil & Water Table 8
Projected Mojave River Flow for the Alto Subarea with Victorville 2 Project (Acre-feet/year)

	2009	2010	2011	2012
		Project water use begins 2010		
Base Flow (1) (approximate)	7,000	7,000	7,000	7,000
CDFG MOU Requirement	10,955	11,268	11,546	11,873
Excess Reclaimed Water Discharge With Victorville 2	9,020	**8,272**	**8,234**	**9,542**
Imported Water Discharge	0	0	0	0
Total Mojave River Flows	27,015	26,450	26,780	28,415

(1) Base flow for the Alto Subarea in Water-Year 2005-2006 was approximately 7,000. Staff applied a conservative assumption that base flow would remain constant for this projection.

In addition, this projection indicates that, even with an 800 acre-foot reduction in reclaimed water discharges to the Mojave River caused by the project, non-storm flows in the river would be greater than the minimum of 21,000 acre-feet/year required by the Adjudication. Staff's projections, shown in **Soil & Water Table 8** uses a conservative assumption that base flow to the river will remain at 2005-2006 rates.

Finally, if minimum flows were not maintained, MWA would be required to provide sufficient quantity of imported water to maintain the annual 21,000 acre-foot flow, under the terms of the Adjudication. MWA has sufficient rights to imported water to meet Mojave River minimum discharge requirements for the basin through the agency's SWP entitlement. MWA currently imports about one third of its 75,000 afy SWP entitlement and about half of MWA 58,000 afy long-term maximum average deliveries. MWA imported 27,855 acre-feet of SWP water, which was used primarily for groundwater recharge, during the 2005-2006 water year.

Therefore, staff concludes that proposed project use of reclaimed water would not cause significant impacts to either surface water or groundwater resources. Project use of reclaimed water would not be growth inducing because it would have no effect on regional population growth or housing development. The project's water use would not interfere with compliance with the terms of either the Adjudication or the CDFG-VVWRA MOU. In addition, discharges to the Mojave River from the VVWRA facility would not be reduced below baseline levels. To ensure that reclaimed water use will not exceed the amount evaluated and permitted by the Energy Commission, staff recommends the adoption of **SOIL & WATER-7**, which establishes the project's annual water-use limit and specifies requirements for the metering and reporting of reclaimed water use. Potential impacts to groundwater resources are further discussed in the **Cumulative Impacts and Mitigation** section of this staff assessment.

Potable Water

Staff analyzed the project's proposed use of potable groundwater to determine if this water use would cause a substantial depletion or degradation of local or regional surface water or groundwater supplies. The applicant proposes to use potable groundwater to meet the domestic water demands of the operational workforce and to serve as a backup supply for process needs during outages of the reclaimed water system.

The applicant estimates that the project would use an annual maximum of 3.6 acre-feet of potable groundwater for domestic uses. The applicant commits to using no more than 45 acre-feet as an emergency backup for project process needs. This estimate is based on the applicant's understanding that the wastewater treatment industry predicts reliability of reclaimed water supply to be 98.5%. Groundwater for the project would be purchased from Victorville Water. The city, through Victorville Water, has the option to pre-purchase 45 acre-feet of SWP water through MWA's 'Claim Program' to be used for recharge and storage in the Alto Subarea groundwater basin, which would mitigate this potential project water use, but has not committed to making this purchase (Victorville 2007c, DR 78).

MWA's rights to SWP water are sufficient to import the additional water needed to offset project groundwater use. MWA's allocation of SWP supply for a given year is based on natural climatic conditions, which cause variation in the quantity of SWP water available to all contractors. MWA imported a total of 27,855 acre-feet (af) of its 75,000 af SWP entitlement, primarily for groundwater recharge, during the 2005-2006 water year. The DWR Division of Environmental Services coordinates environmental mitigation, documentation, monitoring and reporting responsibilities for the SWP, including deliveries to MWA and other SWP contractors. As a result, staff does not independently evaluate the environmental effect of the MWA purchases of SWP water.

Staff concludes that the proposed project's use of groundwater for potable and emergency backup of process needs would cause no impact to the regional groundwater supply. However, to ensure that potable water use will not exceed the amount evaluated and permitted by the CEC, staff recommends the adoption of Condition of Certification **SOIL & WATER-8**, which establishes the project's annual water-use limit and specifies requirements for the metering and reporting of potable use. It also includes a requirement that the city maintain a reserve of 45 acre-feet of pre-purchased SWP water through the Claim program.

CUMULATIVE IMPACTS AND MITIGATION

Project Water Supply

Staff evaluated the potential cumulative impacts that would be caused by proposed project water use of reclaimed water and potable groundwater.

Reclaimed Water

Staff considered the cumulative effect of the city's use of reclaimed water for the Victorville 2 project in addition to other reasonably foreseeable projects. Staff identified only one other project that would use reclaimed water currently proposed to the city. The High Desert Power Project initiated negotiations with the city of Victorville in 2005 to purchase a maximum of 1,750 acre-feet of reclaimed water annually (CEC 2005). However, staff notes that this additional water demand is not certain because HDPP's negotiations have been on hold for over a year and included an imported-water offset component. In addition, any use of reclaimed water by HDPP would require the review and approval of a project amendment by the Energy Commission, which at this time has not been filed by the owner of HDPP.

Staff's cumulative impacts analysis assumes that the HDPP amendment would be permitted and would begin reclaimed water use by 2009 (**Soil & Water Table 9**). With the additional use of reclaimed water by HDPP, there would initially be a slight 2-year reduction in the amount of excess reclaimed water discharged to the Mojave River during 2010 and 2011, as compared to existing conditions in 2007. However, beginning on 2012, reclaimed water discharges to the Mojave River would again exceed baseline excess discharges of 6,600 acre-feet estimated for 2007 owing to the increase of reclaimed water production (RBF 2007).

Soil & Water Table 9
VVWRA Distribution of Reclaimed Water
(Acre-feet/year)

	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Total Effluent	9,860	10,415	11,985	13,520	15,680	17,250	18,705	20,275	21,840	23,230	24,865
CDFG MOU Requirement	9,000	9,000	9,297	9,604	10,036	10,350	10,641	10,955	11,268	11,546	11,873
Excess Water	860	1,415	2,688	3,916	5,644	6,900	8,064	9,320	10,572	11,684	12,992
City of Victorville Water Use											
Golf Course	0	0	0	300	300	300	300	300	300	300	300
Victorville 2	0	0	0	0	0	0	0	0	**-2,000**	**-3,150**	**-3,150**
HDPP	0	0	0	0	0	0	0	**-1,750**	**-1,750**	**-1,750**	**-1,750**
Excess Reclaimed Water Discharged to Mojave River											
Without Victorville 2 and HDPP	860	1,415	2,688	3,616	5,344	6,600	7,764	9,020	10,272	11,384	12,692
With Victorville 2 and HDPP	860	1,415	2,688	3,616	5,344	6,600	7,764	**7,270**	**6,522**	**6,484**	**7,792**

Soil & Water Table 10
Projected Mojave River Flow for the Alto Subarea with the Victorville 2 Project (Acre-feet/year)

	2008	**2009**	**2010**	**2011**	**2012**
		HDPP water use begins 2009 Victorville 2 water use begins 2010			
Base Flow (1) (approximate)	7,000	7,000	7,000	7,000	7,000
CDFG MOU Requirement	10,955	10,955	11,268	11,546	11,873
<u>Excess Reclaimed Water Discharge With</u> Victorville 2	7,764	**7,270**	**6,522**	**6,484**	**7,792**
Imported Water Discharge	**0**	**0**	**0**	**0**	**0**
Total Mojave River Flows	**27,019**	**25,225**	**24,790**	**25,030**	**26,665**

(1) Base flow for the Alto Subarea in Water-Year 2005-2006 was approximately 7,000. Staff applied a conservative assumption that base flow would remain constant for this projection.

As with the direct impacts of Victorville 2 alone, staff's analysis indicates that non-storm flows in the river would be greater than the minimum of 21,000 acre-feet/year for the Alto Subarea required pursuant to the Adjudication during this initial period of maximum project impact on river flows (**Soil & Water Table 10)**. In addition, if the city were to use the entire excess reclaimed water production, MWA would be required to provide sufficient quantity of imported water to maintain the annual volume of 21,000 afy to be discharged to the Mojave River, under the terms of the Adjudication. Similarly, the terms of the CDFG-VVWRA MOU would continue to be met and the discharge of reclaimed water to the Mojave River would be at or above a level consistent with those requirements.

Staff also considered the potential contribution of project use of reclaimed water to the existing regional overdraft. Although the Adjudication explicitly excludes municipal wastewater from its water-use regulation plan (*City of Barstow, et al. v. City of Adelanto, et al.* (Super. Ct. Riverside County, 208568), Rules and Regulations of the Mojave Basin Area Watermaster, § 26.), the use of reclaimed water within the Mojave Basin does have a physical effect on the regional water balance.

In spite of the fact that the region has made significant progress in meeting the water-management goals of the Adjudication, groundwater data indicates that the overdraft has not yet been reversed in the Mojave Basin. MWA reports that the Alto Subarea, in which the project would be located, has reduced baseline groundwater pumping, funded replacement water for new groundwater pumping and exceeded minimum flow requirements for the Mojave River. However, the USGS reports that groundwater levels in the Alto Subarea have continued to decline, except near the recharge ponds along the Mojave River, indicating that the regional overdraft conditions in the subarea have not yet been reversed (Stamos 2006). **Soil & Water Figure 2** provides a hydrograph for a representative well in the Alto subarea. Furthermore, the downstream subareas, Centro and Baja, which depend on flows in the Mojave River for groundwater recharge, have not met baseline groundwater pumping reduction goals and groundwater levels have continued to decline in most areas of Centro and Baja.

Given the apparent persistence of overdraft conditions, staff not only assessed the effect of the project on the “physical solution” to overdraft established in the Adjudication, but also evaluated the actual potential contribution of project water use to Alto Subarea overdraft. Although regulation of reclaimed water is not included in the terms of the Adjudication, the production and use of reclaimed water has a hydrologic effect on the basin’s groundwater and surface water conditions. To conduct this assessment, staff examined the expansion of wastewater service, the regulatory status of the fresh water supply for new municipal/urban development, the status of the wastewater service area, and the use of reclaimed water.

Septic systems provide recharge to the groundwater basin. To the extent that VVWRA expands service to existing water users who currently use septic systems, new sewer service will cause a decrease in groundwater recharge in the Alto Subarea. In other words, reclaimed water generated from effluent from homes that previously used septic systems would result in a 1-to-1 reduction in groundwater recharge in the Alto Subarea, The USGS reported that less than half of the Victorville area and most of Apple Valley and Hesperia used septic systems in 1990 (Stamos 2001). Although the population of Victorville, Apple Valley and Hesperia are comparable, VVWRA reported that Victorville contributed almost twice as much effluent as Apple Valley and Hesperia combined in 2004 (VVWRA 2004). Therefore, staff assumes that the potential for septic system replacement in Apple Valley and Hesperia could be significant.

Nevertheless, based on the long-term projected growth in urban development reported for the region, which anticipates an increase in population from about 270,000 in 2005 to 407,000 in 2020, sewer expansion to new housing development will represent the majority of growth in the region (MWA 2005). These new developments will require an increase in groundwater production. New groundwater use within the Mojave Basin requires either the purchase of water rights (called production allowance) from existing water users (in most cases agriculture) or the importation of new water supply by MWA to offset new groundwater pumping.

In previous years, the transfer of production allowance from agricultural users to urban users has supported urban growth in the Alto Subarea. With the adoption of urban water conservation practices and expansion of sewer service to new developments, the transfer of water from agricultural use to urban water use probably resulted in a reduction in groundwater recharge. However, MWA projected no decrease in agricultural water use in the Alto Subarea after 2005 (MWA 2004). Therefore, new groundwater use will require the importation of new water for groundwater recharge by MWA.

New groundwater use will potentially cause continued depletion of groundwater within the Alto Subarea. When a local purveyor pumps additional groundwater in excess of its base allocation (free production allowance), the purveyor is required to fund the importation of surface water to replace the increase in groundwater use in a 1:1 ratio under the terms of the Adjudication. However, imported water currently does not provide in-place offset of groundwater pumping. Groundwater is pumped from the regional aquifer at a distance from the river. Wastewater from indoor water use within the VVWRA service area is piped to the wastewater treatment plant, where it is treated, and most of the effluent is discharged to the river. In addition, given current and projected landscaping practices, outside water use is limited and only a small amount of this water percolates back into the regional aquifer. Therefore, little water from new developments would return to the aquifer in the Alto Subarea. Furthermore, the recharge projects for imported water have a limited ability to restore water levels in the regional aquifer in the Alto Subarea because these projects are located adjacent to the river and recharge the floodplain aquifer, not the regional aquifer. Some of the recharged water is transmitted from the floodplain aquifer to the regional aquifer to replace the increases in groundwater pumping, but a portion of the water percolates to the river. Therefore, although imported water will offset increased pumping basin-wide, within the Alto Subarea, the impact of projected expansion of fresh water use and wastewater service may not be fully offset by recharge of imported water.

With respect to water supply conditions within the entire Mojave Basin, new groundwater use, coupled with water importation, would have a positive impact on the regional water supply. Recharge to the floodplain aquifer in the Alto Subarea would tend to increase base flow in the Mojave River, potentially increasing downstream groundwater recharge in the Centro and Baja subareas. As long as replacement water is recharged to the groundwater system, either locally or downstream, the Mojave Basin would receive a net recharge, attributable to replacement water provided at a 1:1 ratio of groundwater used and the contribution from reclaimed water. However, if reclaimed water is not used for surface or groundwater recharge, the net benefit of water importation will be small and its potential to cure the overdraft will be limited.

Excess reclaimed water is the only unregulated water supply in the basin. With respect to the Adjudication, future increases in reclaimed water clearly represent an additional water supply for the region with potential to contribute to the recovery of the overdraft. The effect of reclaimed water on the existing overdraft will depend on how and where the water is used. For example, the existing CDFG-VVWRA discharges to the Mojave River support basin recovery from overdraft by (1) maintaining riparian habitat in the Transition Zone, (2) contributing to groundwater recharge below the Alto Subarea and (3) supporting the transmission of storm flows, which are the primary source of the groundwater recharge in the Centro and Baja Subareas. If future increases in the production of reclaimed water by VVWRA were used to increase stream flows in the Mojave River above the adjudicated flow requirements, it would augment groundwater recharge and hasten overdraft recovery in the Centro and Baja Subareas. Future increases in the production of reclaimed water by VVWRA could also be used to contribute to the reversal of local Alto Subarea declines in groundwater levels, shown in **Soil & Water Figure 2**. If excess reclaimed water were used for irrigation or groundwater recharge projects within the Alto Subarea at a distance from the river, it would hasten the recovery of the local groundwater overdraft, as well as increase local groundwater discharges to the base flow of Mojave River.

Although the project's use of reclaimed water would reduce the amount of the future supply of reclaimed water, staff recognizes, nonetheless, that this use water constitutes an opportunity cost for the region but not a CEQA impact. Because reclaimed water product is expected to increase so rapidly, the use of reclaimed water by the Victorville 2 project will have no impact on the baseline water supply. VVWRA estimates that it will produce 6,600 acre-feet of excess reclaimed water in 2007, which represents the baseline year for the Victorville 2 project. By the time Victorville 2 begins operation in 2010, VVWRA expects to be producing 10,272 afy of excess reclaimed water. Project use would reduce the excess to 8,272 afy, which is greater than the 2007 baseline rate (**Soil & Water Table 7)**. Therefore, the proposed project water use will not diminish the amount of reclaimed water available for recharge below baseline conditions.

With the additional use of reclaimed water for HDPP, the availability of excess reclaimed water could be reduced to about 6,500 afy in 2010 and 2011, which is 100 acre-feet below the baseline rate of 6,600. However, based on VVWRA's projections, rates would recover and exceed baseline conditions by 2012 (**Soil & Water Table 9)**. The actual rate of reclaimed water production and the timing and term of HDPP's request for an amendment would determine whether cumulative adverse impacts would be likely to occur with this additional use. However, because HDPP's use of reclaimed water will require an amendment of its Conditions of Certification and approval by the Energy Commission, exceedance of baseline conditions can be avoided.

Staff concludes that the proposed Victorville 2 project's use of reclaimed water would not contribute to the existing overdraft, and, if approved, the addition of HDPP's use of reclaimed water could be limited so as not to contribute to overdraft. While use of the reclaimed water by the Victorville 2 and HDPP projects prevents its use for other purposes that could contribute to an improvement in water conditions in the region, it does not constitute a significant impact. Nonetheless, given staff's observation that the overdraft in the Mojave Groundwater Basin is not cured, staff wants to understand and confirm its preliminary conclusion that the project's use of excess reclaimed water will neither adversely impact the contributions reclaimed water currently serves for restoring flows to the Mojave River nor compromise attainment of the objectives delineated in the Memorandum of Understanding between Victor Valley Water Reclamation Authority and

California Department of Fish and Game. We will address this item with the parties, interested agencies and members of the public in the Preliminary Staff Assessment (PSA) workshop.

Potable Water

The Mojave Basin, including the Alto Subarea, has historically experienced significant groundwater overdraft. Since the implementation of the Adjudication of the Mojave Basin, MWA reports that the Alto Subarea has made significant progress in meeting the groundwater production and offset requirements required by the Adjudication. MWA states in its 2005-2006 annual report that the Alto Subarea has met its groundwater production allowance goals and expects to reach its goals for water importation within two years.

Given the following factors:

- The groundwater management controls in place;
- The limited use of groundwater for potable supply of 3.6 acre-feet/year; and
- The mechanism for banking 45 acre-feet of water for emergency backup supply for process needs;

Staff concludes the proposed project's use of groundwater would not contribute to the overdraft or impede the recovery of the basin as a whole. Although importation and recharge of SWP water currently has a limited ability to offset increases in groundwater pumping within the Alto Subarea, staff believes it is appropriate to rely on MWA's efforts to develop regional-aquifer recharge to reduce potential adverse impacts caused by project pumping to less than significant.

WATER RELIABILITY ASSESSMENT

Staff performed a water reliability assessment of the Victorville 2 proposed water supplies. The purpose of the water reliability assessment is to determine if there are sufficient water supplies available to serve the project from existing entitlements and resources. To address the question of entitlements, this assessment identifies existing water service contract-holders. To address the question of resource availability, this assessment includes a 20-year analysis of the projected water supplies available to meet the project's projected water demand during normal, single dry, and multiple dry water years.

Staff assessed the project's primary water demand, 3,150 afy of reclaimed water. However, based on the criteria identified in SB 610 (Stats. 2001, ch. 643, § 6), staff excluded the project's minimal groundwater demand of 3.6 afy for potable use and 45 afy for emergency backup process water supply.

The reclaimed water supply that would serve the project is produced by the VVWRA. VVWRA has water supply agreements with only two entities, the CDFG and the city of Victorville. These agreements have been executed between 1999 and 2005:

- April 16, 1999: the city of Victorville entered into an agreement with VVWRA for delivery of 1,680 afy for Westwinds Golf Course and other irrigation uses in the Southern California Logistics Airport.
- June 27, 2003: CDFG entered into an agreement with VVWRA (CDFG-VVWRA MOU) for the discharge of reclaimed water. The MOU specifies a base rate, incremental increases tied to the overall reclaimed water production rate, and a maximum limit, described as follows:
  - VVWRA shall discharge at least 9,000 afy of reclaimed water to the Mojave River.
  - If the total production of reclaimed water exceeds 10,500 afy, VVWRA shall discharge 20% of the portion of production that exceeds 10,500.
  - VVWRA's discharge to the Mojave River need not be more than is necessary to produce, in combination with the base flow measured at the Lower Narrows gage, a total of 15,000 acre-feet annually.
- August 23, 2005: the city of Victorville expanded its contract with VVWRA for the delivery of all reclaimed water produced by VVWRA in excess of the supply required to meet the CDFG-VVWRA agreement.

Reclaimed water for Victorville 2 would be purchased by the city of Victorville, through the city's contract for excess reclaimed water with Victor Valley Wastewater Reclamation Authority (VVWRA). The applicant has submitted a "will-serve" letter from the city of Victorville (AFC, Appendix N) that commits the city to provide 3,100 acre-feet of reclaimed water annually to the Victorville 2 project. Because the project could use up to 3,150 acre-feet per year, staff believes it is reasonable to assume that the city will allocate up to 3,150 acre-feet/year of reclaimed water for Victorville 2, considering the city is entitled to all excess reclaimed water available after meeting the requirements of the CDFG-VVWRA MOU.

Projecting over a twenty-year period, VVWRA anticipates that influent to the reclamation plant will increase beginning in 2010 from 19 million gallons per day (21,000 afy) to 41 million gallons per day (46,000 afy) in 2030 (RBF Consulting 2007). With an annual production rate of 21,000 acre-feet, VVWRA discharges pursuant to the CDFG-VVWRA MOU would be 11,100 acre-feet, leaving 9,900 acre-feet of reclaimed water available to the city during the first year that the Victorville 2 project begins operation. Given the projected increase in reclaimed water production, the city would have rights to an ample water supply to serve the project in any normal water year.

Significant reductions in reclaimed water supply are not anticipated during dry years. VVWRA reports that influent to the treatment plant is supplied entirely by indoor water use. The plant does not receive stormwater flows. Although Victor Valley Water District's water shortage contingency plan has demand-reduction goals of up to 50% when water shortages are 36-50%, the city of Victorville reports that reductions will be primarily accomplished through the curtailment of outside water use, such as landscape irrigation. Therefore, influent to the VVWRA plant would not be expected to change significantly during single or multiple dry water years. In addition, MWA's 2000 to 2020 analysis of projected regional water use during average years, single dry years and multiple dry years indicates that urban water use for the Alto Subarea would remain static (MWA 2005).

Finally, if projections for growth of influent to the VVWRA plan were overestimated, current production rates would be sufficient to supply the Victorville 2 project if there are no other increases in Victorville 2 deliveries. Staff bases this conclusion on VVWRA production records for 2005. In 2005, VVWRA reports that it produced 13,520 acre-feet of reclaimed water. Staff calculates that VVWRA discharged approximately 9,600 acre-feet of water to the Mojave River in accordance with its contract with CDFG leaving about 3,600 acre-feet of reclaimed water in excess of its obligations to CDFG in 2005. That year, the city of Victorville requested deliveries of 300 acre-feet for the Westwinds Golf Course; the balance of 3,300 acre-feet was discharged to the Mojave River. Therefore, the city has rights to a sufficient reclaimed water supply to serve the Victorville 2 project if reclaimed water production remained static at 2005, water deliveries to the golf course did not increase and reclaimed water was not provided to HDPP.

COMPLIANCE WITH LORS

WATER SUPPLY

Use of groundwater for potable uses and reclaimed water for all other project water requirements, including cooling and process water, complies with the terms of the Mojave River Adjudication. The project would purchase and use reclaimed water from Victor Valley Water Reclamation Authority, which is exempt from regulation under the terms of the Adjudication. The project would purchase groundwater from Victorville Water, which is a permitted groundwater producer under the terms of the Adjudication. Victorville Water is permitted to produce groundwater within specified allowances (called Free Production Allowance) or additional allowances that are offset by fees to purchase imported water for recharge (called Replacement Water). The Mojave Water Agency, the court-appointed Watermaster for the region, reports that Victorville water is in full compliance with the terms of the Adjudication (MWA 2007).

The applicant proposes to comply with Titles 17 and 22 of the California Code of Regulations (CCR), which address the use of reclaimed water. Under these regulations, the project owner is required to prepare an Engineer's Report describing the production, distribution and use of reclaimed water and to obtain review and approval from DHS. The Engineer's Report will verify that VVWRA's reclaimed water meets the standards for unrestricted use and that the plumbing constructed for the Victorville 2 project is inspected for prevention of backflow and cross connection with the potable water supply. Staff supports these regulations and recommends the adoption of Condition of Certification **SOIL & WATER-5** to monitor and ensure compliance with DHS requirements.

The project would comply with:

- The Clean Water Act and the authority granted to the State to enforce coverage under the NPDES by the Lahontan Regional Water Quality Control Board and the San Bernardino County Public Works Department – Environmental Management to administer the requirements and preparation of the SWPPPs and WQMP;
- The Resource Conservation Recovery Act of 1976 by the proper handling and discharge of wastewater;
- The California Constitution, Article X, Section 2 by using recycled water for all non-potable plant construction and operation uses;
- The Porter-Cologne Water Quality Control Act by the use of recycled water and the implementation of the DESCP, WQMP, and SWPPP;
- The California Safe Drinking Water and Toxic Enforcement Act by establishing secondary containment in chemical storage areas, and including dual plumbing for use of recycled water;
- The Water Recycling Act by using recycled water for all non-potable plant construction and operation uses;
- Title 17 of the California Code of Regulations, by ensuring the Department of Health Services confirms the requirements for backflow prevention and cross connections of potable and non-potable water lines (see **SOIL & WATER-5**);
- Title 22 of the California Code of Regulations, by ensuring the Department of Health Services reviews the wastewater treatment systems to ensure they meet tertiary treatment standards for protection of public health (see **SOIL & WATER-5**);
- Title 23 of the California Code of Regulations requiring the Regional Board to issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable;
- The SWRCB Resolution 75-58 by using recycled water as the most degraded source of water reasonably available to the project for all non-potable plant operational uses;
- The SWRCB Resolution 77-1 by using recycled water for all non-potable plant construction and operation uses;
- The Integrated Energy Policy Report by using recycled water for all non-potable plant operational uses;
- The Mojave Basin Adjudication by purchasing and using groundwater from Victorville Water, which is the permitted groundwater producer under the terms of the Adjudication; and
- The Mojave Basin Adjudication by purchasing and using reclaimed water, which is exempt from regulation under the terms of the Adjudication.

CONCLUSIONS

From the preliminary analysis completed to date for the Victorville 2 Hybrid Power Project (Victorville 2), staff has not identified any immitigable significant impacts to Soil and Water Resources provided the proposed conditions of certification are implemented and outstanding stormwater management issues are resolved. Staff has identified three issues to be resolved regarding plans for stormwater management during project operations:

1. Revisions are needed to pre- and post- development runoff calculations using the correct precipitation associated with the design criteria for the entire project site;

2. The post-development runoff estimates need to account for the reduction in soil permeability in the Solar Field; and

3. A preliminary design for a Sediment/Stormwater Retention Facility needs to be developed for the Solar Field.

These are key elements in avoiding significant adverse impacts. The applicant has indicated that it will address these issues before the Final Staff Assessment (FSA).

Also, given staff's observation that the overdraft in the Mojave Groundwater Basin is not cured, staff wants to understand and confirm its preliminary conclusion that the project's use of excess reclaimed water will neither adversely impact the contributions reclaimed water currently serves for restoring flows to the Mojave River nor compromise attainment of the objectives delineated in the Memorandum of Understanding between Victor Valley Water Reclamation Authority and California Department of Fish and Game. We will address this item with the parties, interested agencies and members of the public in the Preliminary Staff Assessment (PSA) workshop.

PROPOSED CONDITIONS OF CERTIFICATION

SOIL & WATER-1: The project owner shall comply with the requirements of the general National Pollutant Discharge Elimination System (NPDES) permit for discharge of stormwater associated with construction activity. The project owner shall develop and implement a construction stormwater pollution prevention plan (construction SWPPP) for the construction of the Victorville 2 site, laydown area, and all linear facilities.

<u>Verification:</u> The project owner shall submit to the CPM a copy of the construction SWPPP prior to site mobilization and retain a copy on site. The project owner shall submit copies to the compliance project manager (CPM) of all correspondence between the project owner and the Lahontan Regional Water Quality Control Board regarding the NPDES permit for the discharge of stormwater associated with construction activity within 10 days of its receipt or submittal. Copies of correspondence shall include the notice of intent sent to the State Water Resources Control Board, and the board's confirmation letter indicating receipt and acceptance of the notice of intent.

SOIL & WATER-2: Prior to site mobilization, the project owner shall obtain CPM approval for a site-specific drainage, erosion, and sediment control plan (DESCP). The DESCP must ensure proper protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, include provisions for sediment and stormwater retention from both the Power Block and Solar Field to meet San Bernardino County requirements, and identify all monitoring and maintenance activities. The DESCP shall contain elements A through I below outlining site management activities and erosion- and sediment-control BMPs to be implemented during site mobilization, excavation, construction, and post construction (operating) activities.

1. **Vicinity Map** – A map(s) at a minimum scale 1"=100' shall be provided indicating the location of all project elements (construction site, laydown area, pipelines) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

2. **Site Delineation** – All areas subject to soil disturbance for the Victorville 2 (project site, laydown area, all linear facilities, landscaping areas, and any other project elements) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.

3. **Watercourses and Critical Areas** – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. It shall indicate the proximity of those features to the Victorville 2 construction, laydown, and landscape areas and all transmission and pipeline construction corridors.

4. **Drainage Map** – The DESCP shall provide a topographic site map(s) at a minimum scale 1"=100' showing existing, interim, and proposed drainage swales and drainage systems and drainage-area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off site for a minimum distance of 100 feet.

5. **Drainage of Project Site Narrative** – The DESCP shall include a narrative of the drainage measures necessary to protect the site and potentially affected soil and water resources within the drainage downstream of the site The narrative shall include the summary pages from the hydraulic analysis prepared by a professional engineer and erosion control specialist. The narrative shall state the watershed size(s) in acres that was used in the calculation of drainage features. The hydraulic analysis shall be used to support the selection of BMPs and structural controls to divert off-site and on-site drainage around or through the Victorville 2 site and laydown and linear areas.

6. **Clearing and Grading Plans** – The DESCP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections, or other means. The

locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography shall be illustrated tying in proposed contours with existing topography.

7. **Clearing and Grading Narrative** – The DESCP shall include a table with the quantities of material excavated or filled for the site and all project elements (project site, laydown area, transmission and pipeline corridors, roadways, and bridges) whether such excavation or fill is temporary or permanent, and the amount of such material to be imported or exported.

8. **Best Management Practices Plan** – The DESCP shall identify on the topographic site map(s) the location of the site specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). BMPs shall include measures designed to prevent wind and water erosion.

9. **Best Management Practices Narrative** – The DESCP shall show the location (as identified in H above), timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during all project element (site, pipelines) excavations and construction, final grading/stabilization, and operation.. Separate BMP implementation schedules shall be provided for each project element for each phase of construction. The maintenance schedule shall include post-construction maintenance of structural-control BMPs, or a statement provided about when such information will be available.

Verification: No later than 90 days prior to start of site mobilization, the project owner shall submit a copy of the DESCP to San Bernardino County and the Lahontan Regional Water Quality Control Board (Lahontan RWQCB) for review and comment. No later than 60 days prior to start of site mobilization, the project owner shall submit the DESCP with the county's and Lahontan RWQCB's comments to the CPM for review and approval. The CPM shall consider comments by the county and Lahontan RWQCB before approval of the DESCP. The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL 1**, and relevant portions of the DESCP shall clearly show approval by the chief building official. The DESCP shall be a separate plan from the SWPPP developed in conjunction with any NPDES permit for Construction Activity. The project owner shall provide in the monthly compliance report a narrative on the effectiveness of the drainage, erosion, and sediment-control measures and the results of monitoring and maintenance activities. Once operational, the project owner shall update and maintain the DESCP for the life of the project and shall provide in the annual compliance report information on the results of monitoring and maintenance activities.

SOIL & WATER-3: The project owner shall comply with the requirements of the general NPDES permit for discharges of stormwater associated with industrial activity. The project owner shall develop and implement an industrial stormwater pollution prevention plan for the operation of Victorville 2.

Verification: The project owner shall submit to the CPM a copy of the industrial SWPPP for operation of the Victorville 2 prior to commercial operation, and shall retain a copy on site. The project owner shall submit copies to the CPM of all correspondence between the project owner and the Lahontan RWQCB regarding the general NPDES permit for discharge of stormwater associated with industrial activity within 10 days of its receipt or submittal. Copies of correspondence shall include the Notice of Intent sent by the project owner to the State Water Resources Control Board.

SOIL & WATER-4 The project owner shall comply with the requirements of the Water Quality Management Plan Program for managing stormwater during project operations as normally administered by the San Bernardino County Public Works – Environmental Management Department. The project owner shall develop a Water Quality Management Plan that incorporates these requirements during project design and implement the plan for the operation phase of Victorville 2.

Verification: At least 60 days prior to site mobilization, the project owner shall submit copies of the Water Quality Management Plan for operation of the Victorville 2 to the San Bernardino County Public Works – Environmental Management Department for review and comment and to the CPM for review and approval. The project owner shall submit copies to the CPM of all correspondence between the project owner and the San Bernardino County Public Works – Environmental Management Department regarding the Water Quality Management Plan within 10 days of its receipt or submittal.

SOIL & WATER-5 The Victorville 2 shall use recycled water for all non-potable plant construction and operation uses consisting of process needs including cooling, mirror washing and landscape irrigation. The Victorville 2 shall comply with all requirements of Title 22 and Title 17 California Code of Regulations. Prior to delivery of recycled water to the Victorville 2 for any purpose, the owner shall submit a Title 22 Engineer's Report and copies of any comments based from the review by the Department of Health Services (DHS) and the Lahontan Regional Water Quality Control Board (RWQCB) for review and approval by the CPM.

Verification: Prior to beginning any site mobilization activities, the project owner shall submit to the CPM the water supply and distribution system design and Engineer's Report for the Production, Distribution and Use of Recycled Water and copies of any comments from DHS and the Lahontan RWQCB for review and approval by the CPM. The water supply and distribution system design shall be included in the final design drawings submitted to the CBO as required in Condition of Certification **CIVIL 1**.

The Engineer's Report for the Production, Distribution and Use of Recycled Water shall be prepared in accordance with Title 22 and Title 17 of the CA Code of Regulations, the Health and Safety Code, and the Water Code. The project owner shall comply with any reporting and inspection requirements set forth by the DHS and Lahontan RWQCB to fulfill statutory requirements. The project owner shall submit copies to the CPM of all correspondence between themselves and DHS or the Lahontan RWQCB within 10 days of receipt or submittal.

SOIL & WATER-6 The project owner shall treat all process wastewater streams with a zero liquid discharge (ZLD) system that results in a residual solid waste. The solid waste shall be disposed of in the appropriate class of landfill suitable for the constituent concentrations in the waste. Surface or subsurface disposal of process wastewater from the Victorville 2 is prohibited. The project 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 power plant;

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 Victorville 2 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 project 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 project owner shall prepare a ZLD management plan for review and approval by the CPM. The ZLD management plan shall be updated by the project 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 project owner shall submit a status report on operation of the ZLD system, including dates and length of disruptions, maintenance activities performed, volumes of interim wastewater streams stored on site, monthly volumes of residual salt cake or brine generated, and results of at least one annual sampling of the waste solids or brine comparing the constituent concentrations to the permit limits of the landfill. 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 project owner if the CPM has determined it is necessary based on the project owner's annual compliance report(s).

SOIL & WATER-7 The project owner shall use tertiary treated recycled water supplied from the City of Victorville's Recycled Water System as its primary source for process water including cooling, fire protection and landscape irrigation. Annual usage (excluding fire suppression) shall not exceed 3,150 acre-feet. Prior to the use of recycled water for commercial operation, the project owner shall install and maintain metering devices as part of the water supply and distribution system or verify that the water supplier will provide adequate metering or billing to the project owner to document project water use as required to monitor and record in gallons per day the total volume(s) of water supplied to the Victorville 2 from this water source. The metering devices shall be operational for the life of the project.

Verification: The project owner shall prepare an annual summary, which will include the monthly range and monthly average of daily water usage in gallons per day, and total water used on a monthly and annual basis in acre-feet. For years subsequent to the initial year of operation, the annual summary will also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal.

At least sixty (60) days prior to commercial operation of the Victorville 2, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational for the recycled water supply and distribution system.

SOIL & WATER-8 The project owner shall use potable water supplied from Victorville Water (city of Victorville) for potable purposes and emergency backup for process needs in case of interruptions in the reclaimed water supply. The annual uses of groundwater shall not exceed four acre-feet/year for potable purposes and 45 acre-feet/year for backup process needs. The project owner shall monitor and record in gallons per day the total volume(s) of groundwater supplied to the Victorville 2 for domestic use. Prior to the use of potable water for commercial operation, the project owner shall either install and maintain metering devices as part of the water supply and distribution system or verify that the water supplier will provide adequate metering or billing to the project owner to document project water use as required. The metering devices shall be operational for the life of the project. The city (or Victorville Water) shall pre-purchase 45 acre-feet of SWP water through MWA's 'Claim Program' to be used for recharge and storage in the Alto Subarea groundwater basin and dedicated for use as emergency backup water supply for project process needs. To the extent groundwater is used for process needs during the life of the project, additional water shall be pre-purchased to restore 45 acre-feet of banked water in the Alto subarea groundwater basin

Verification: The project owner shall prepare an annual summary of amount of water used for potable purposes. The summary shall include the monthly range and monthly average of daily water usage in gallons per day, and total water used on a monthly and annual basis in acre-feet. For years subsequent to the initial year of operation, the annual summary will also include the yearly range and yearly average water use. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal. The annual summary shall also provide a chronological accounting of the SWP water pre-purchased for recharge and storage in the Alto Subarea groundwater basin and used as emergency backup water supply for project process needs. If the pre-purchase of SWP water for Victorville 2 is part of a larger program that the city is conducting to meet its overall potable water demands, the city shall provide the accounting for the overall program with the water dedicated and banked for Victorville 2 clearly delineated to show additions and withdrawals to the 45 acre-feet dedicated for project emergency backup supply.

At least sixty (60) days prior to commercial operation of Victorville 2, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational. Potable water use reporting may be based on metering or billings from the supplier.

At least sixty (60) days prior to commercial operation of Victorville 2, the project owner shall submit to the CPM evidence that it has pre-purchased a minimum of 45 acre-feet of SWP water to be used for recharge and storage in the Alto Subarea groundwater basin and dedicated for use as emergency backup water supply for project process needs.

SOIL & WATER-9 Prior to site mobilization the project owner shall obtain a Permit for Industrial Wastewater Discharge and comply with the wastewater discharge limitations, pretreatment requirements, peak flow restrictions, dewatering discharges, payment of fees, and monitoring and reporting requirements of Victor Valley Water Reclamation Authority as applicable for construction.

Verification: At least 30 days prior to Victorville 2 site mobilization, the project owner shall provide the CPM with a copy of its Permit for Industrial Wastewater Discharge from Victor Valley Water Reclamation Authority as applicable for construction. The CPM shall be notified in writing within 10 days of any reported non-compliance with Victor Valley Water Reclamation Authority's discharge requirements, including corrective measures for non-compliance and the results of implementing those measures.

REFERENCES

Barstow v. Adelanto 1996 – Mojave Basin Area Adjudication, City of Barstow, et. al. v. City of Adelanto, et. al., Riverside County Superior Court Case No. 208568, Judgment after Trial, January 10, 1996.

Barstow v. Adelanto 2005 – Rules and Regulations of the Mojave Basin Area Watermaster, City of Barstow, et. al. v. City of Adelanto, et. al., Riverside County Superior Court Case No. 208568, Judgment after Trial, Adopted June 30, 1994, Revised December 11, 1996, Revised March 23, 2005.

CDFG-VVWRA 2003 – Memorandum of Understanding by and between the California Department of Fish and Game and the Victor Valley Wastewater Reclamation Authority regarding the Discharge to the Mojave River Transition Zone, June 27, 2003.

CDFG 2007A – California Department of Fish and Game (tn: 39759). Request for Agency Participation. 3/23/07. Received 3/26/07.

CEC 2005 Report of Conversation/Meeting Notes, 2005, Proposed project use of recycled water for HDPP operations, Victorville, 5/25/2005.

CEC 2007a – California Energy Commission (tn: 39788). Data Adequacy Recommendation. 3/28/07. Received 3/28/07.

CEC 2007b – California Energy Commission (tn: 30051). Revised Data Adequacy Recommendation. 4/9/07. Received 4/9/07.

CEC 2007d – California Energy Commission/J. Kessler (tn: 40178). MOU between CA Department of Fish & Game and Victor Valley Water Reclamation Authority. Received 4/26/07.

CEC 2007f – California Energy Commission/J. Kessler (tn: 411119). Data Request Set 1 (#s1-100). 6/22/07. Received 6/22/07.

CEC 2007i – California Energy Commission. Personal communication from John Kessler – CEC with Tom Barnett/Tony Penna – Inland Energy on 10/22/07.

ENSR 2007d – ENSR/S. Head (tn: 42131). Response to CURE's Data Request Set 2. 8/28/07. Received 8/29/07.

MWA 2007, Mojave Water Agency, Watermaster Annual Report for Water Year 2005-06, April 1, 2007.

MWA 2005, Mojave Water Agency, 2004 Regional Water Management Plan, Adopted February 24, 2005.

MWA 1996, Mojave Water Agency, First annual engineer's report on water supply for water year 1994-95; Victorville, California, 55 p.

LRWQCB 2007a – Lahontan Regional Water Quality Control Board/M. Plaziak (tn: 39760). Request for Agency Participation. 3/21/07. Received 3/21/07.

LRWQCB 2007b – Lahontan Regional Water Quality Control Board/M. Dellavalle (tn: 40581). Data Request Set 1. 5/23/07. Received 5/24/07.

RBF Consulting, 2007, Flow Projection Study for the Victor Valley Wastewater Reclamation Authority, February 14, 2007.

Stamos, 2001, Stamos, C. L., Martin, P., Nishikawa, T. and Cox, F.C., Simulation of ground-water flow in the Mojave River basin, California: U.S. Geological Survey Water Resources Investigation 2001-4002, 129 p.

Stamos 2006, Stamos, C.L., McPherson, K.R., Sneed, Michelle, and Brandt, J.T., 2007, Water-level and land-subsidence studies in the Mojave River and Morongo ground-water basins: U.S. Geological Survey Scientific Investigations Report 2007-5097, unpaginated. [Available on the World Wide Web at http://pubs.water.usgs.gov/sir20075097 .

VVWRA 2004, Victor Valley Wastewater Reclamation Authority, Victor Valley Wastewater Subregional Facilities Draft Program EIR/EIS, August 12, 2004.

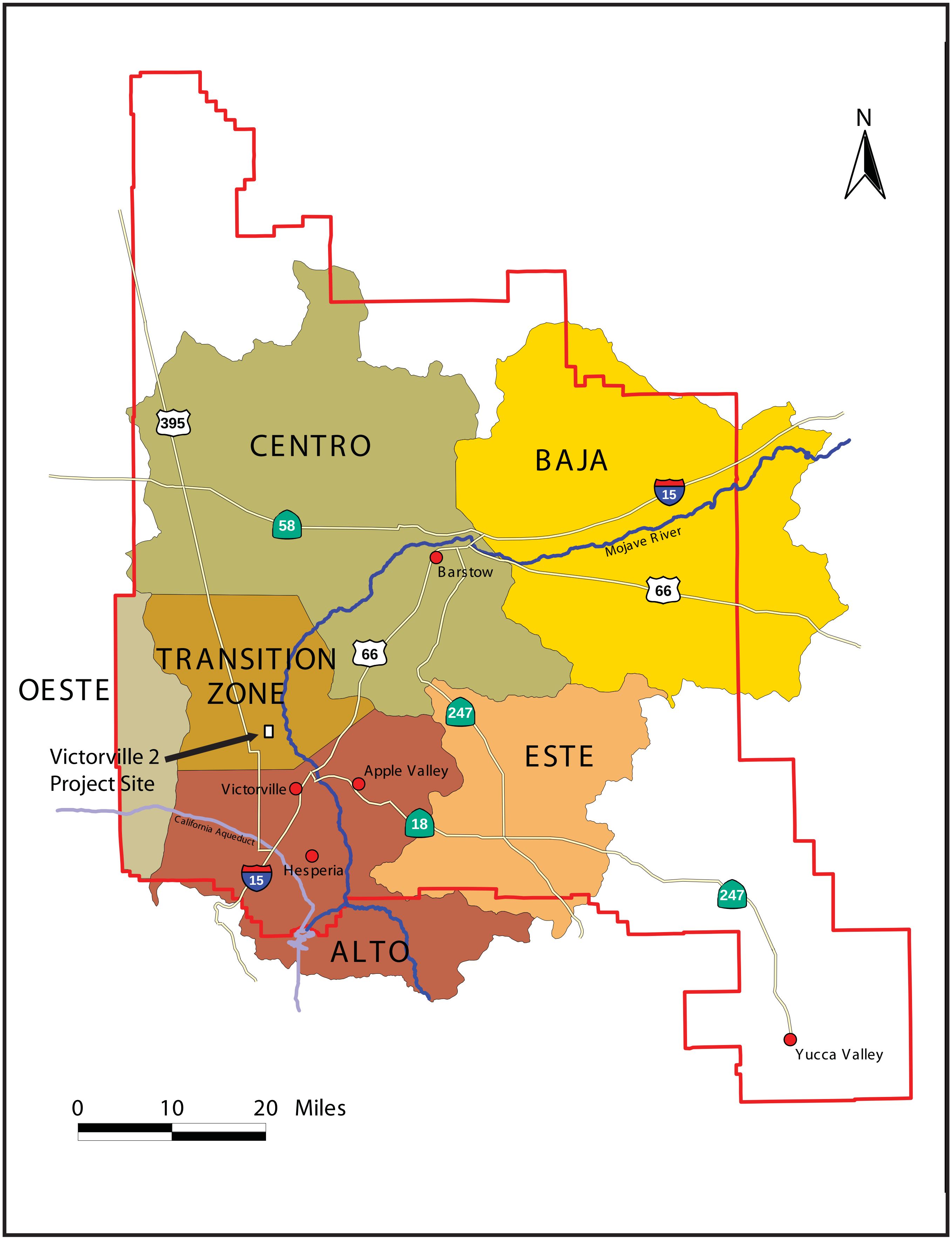
VVWRA 2005, Victor Valley Wastewater Reclamation Authority, Victor Valley Wastewater Discharge Monitoring Report 2005.

Victorville 2007a – City of Victorville (tn: 39421). Application for Certification of Victorville 2 Hybrid Power Project. Vol. 1&2. 2/27/07. Received 2/28/07.

Victorville 2007b – City of Victorville (tn: 39934). Application for Certification Data Adequacy Supplement. Vol. 3 4/6/07. Received 4/9/07.

Victorville 2007c – City of Victorville (tn: 41644). Applicant's Responses to CEC's Data Request Set 1, #s 1-110. 7/23/07. Received 7/23/07.

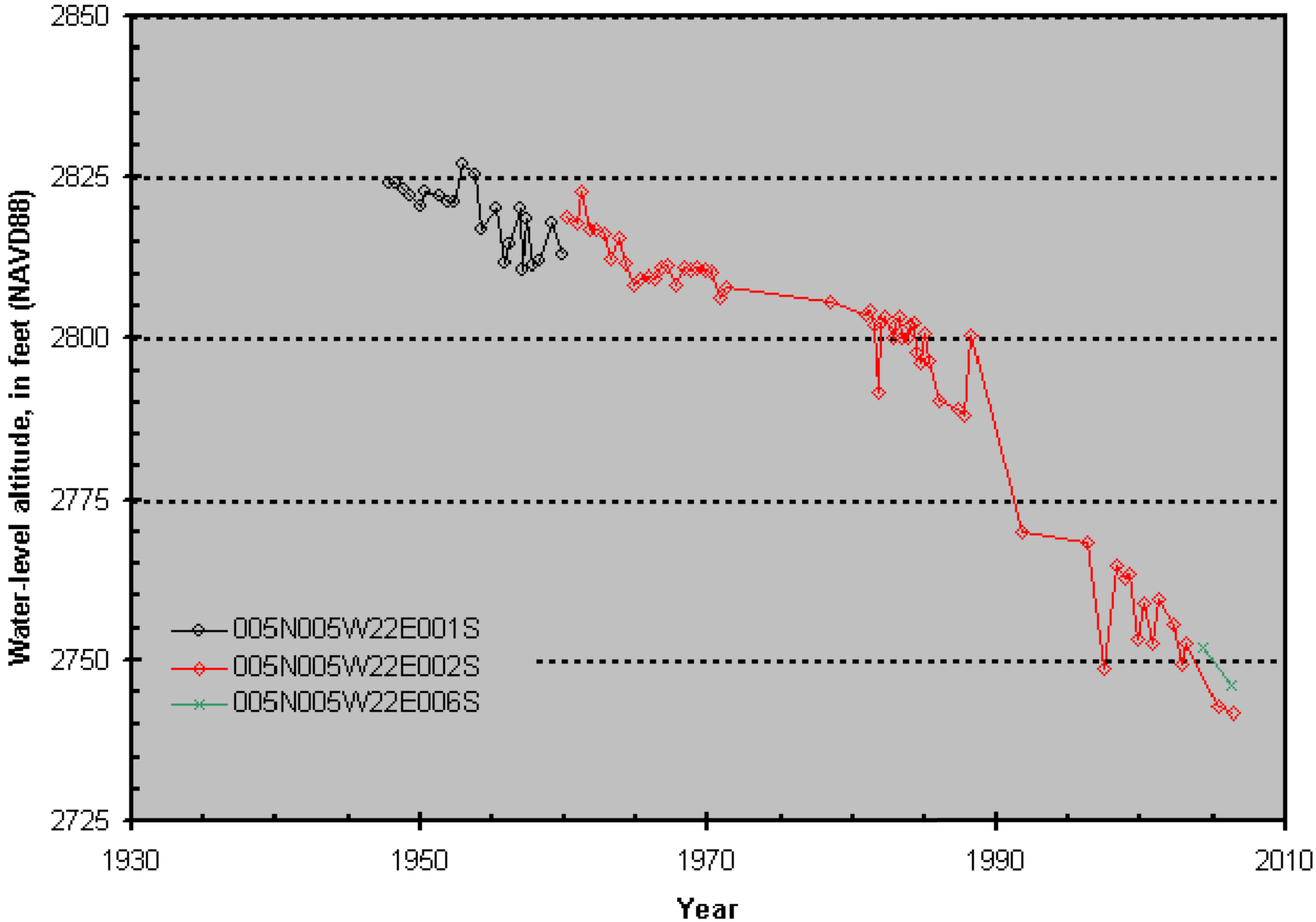
SOIL AND WATER RESOURCES - FIGURE 1
Victorville 2 Hybrid Power Project - Mojave Water Agency, 2004 Regional Water Management



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: Mojave Water Agency Regional Water Management Plan 2004 Figure 2-2

SOIL & WATER RESOURCES - FIGURE 2

Victorville 2 Hybrid Power Project - Historic Groundwater Levels in the Alto Subarea



Hydrograph of 005N005W22E001S. Approximate Land Surface 3,120 feet (NAVD88).

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE:Stamos, C.L., McPherson, K.R., Sneed, Michelle, and Brandt, J.T., 2007, Water-level and land-subsidence studies in the Mojave River and Morongo ground-water basins: U.S. Geological Survey Scientific Investigations Report 2007-5097, unpaginated. [Available on the World Wide Web at http://pubs.water.usgs.gov/sir20075097

TRAFFIC AND TRANSPORTATION

James Adams

SUMMARY OF CONCLUSIONS

The Victorville 2 Hybrid Power Project (Victorville 2 Project or project) would be consistent with the Circulation Element in the city of Victorville General Plan and all other applicable laws, ordinances, regulations, and standards (LORS) related to traffic and transportation. The project would not have a significant adverse impact on the local and regional road/highway network. During the construction and operation phases, local roadway and highway demand resulting from the daily movement of workers and materials would not increase beyond significance thresholds established by the city of Victorville. During the operational phase, the project could adversely affect aviation operations at the Southern California Logistics Airport due to glare from the solar thermal arrays. Staff continues to investigate this issue and will provide a complete analysis in the Final Staff Assessment (FSA).

INTRODUCTION

In the Traffic and Transportation analysis, staff addresses the extent to which the project may impact the transportation system in the local area. This analysis includes the identification of: (1) the roads and routings that are proposed to be used for construction and operation; (2) potential traffic-related problems associated with the use of those routes by construction workers and truck deliveries; (3) the anticipated encroachment upon public rights-of-way during the construction of the proposed project and associated facilities; (4) the frequency of trips and probable routes associated with the delivery of hazardous materials; and (5) the possible effect of project operations on local airport flight traffic.

In addition to assessing potential project related impacts, staff has reviewed the applicable LORS to determine compliance. The LORS that govern the project are listed below in **Traffic and Transportation Table 1**, followed by a discussion of the potential impacts related to traffic operations and safety hazards resulting from the construction and operation of the Victorville 2 project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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	Includes requirements pertaining to licensing, size, weight and load of vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials.
California Streets and Highway Code, Division 1 & 2, Chapter 3 & Chapter 5.5	Includes requirements for the care and protection of State and County highways, and provisions for the issuance of written permits.
Local:	
City of Victorville General Plan – Transportation and Circulation Element.	Primarily concerned with identifying goals, policies, and implementation measures that will relieve existing road congestions while expanding the circulation network to serve outlying areas where future growth is anticipated. It 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.
Southern California Logistics Airport (SCLA) Specific Plan	Serves as a tool for implementing the reuse plan established by the Victor Valley Economic Authority and the main intent is to enable the City to more adequately assess the detailed planning and environmental review procedures for development within the SCLA Specific Plan area. The discussion about circulation notes that the combination of business, industrial, rail and airport uses will necessitate improvements on existing roads.
Comprehensive Land Use Plan – Phase Two – SCLA	Intended to protect and promote the safety and welfare of airport users, residents, and visitors to the cities of Victorville and Adelanto, while promoting the continued operation of the airport.
County of San Bernardino General Plan – Circulation Element	Lays the groundwork for and promotes the development of a coordinated, multi-modal countywide transportation system and infrastructure capacity to meet the needs of all people living, working, or visiting the county and all economic segments of the community.

SETTING

The Victorville 2 project site is located about 3.5 miles east of State Route 395 (SR-395) and 1.5 miles northeast of the end of the north/south runway (RY 17/35) of the Southern California Logistic Airport. The site is just south of the northern boundary of the city of Victorville and would be located adjacent to the intersection of Colusa and Helendale Roads. **Traffic And Transportation Figure 1, Regional Transportation System** (transportation figures are located at the end of this analysis) shows the region surrounding the project site.

Plant construction and operation traffic would use the existing roadways, which could include SR-395, Interstate 15 (I-15), SR-18 (Palmdale Road), and Adelanto and Colusa roads. I-15 and SR-395 are the principal highways in the area and have Levels of Service (LOS) B for daily traffic levels (Victorville 2 2007a, Table 6.13-5, pg. 6.13-13, and 2007c). Access to the site would be via Colusa and Helendale roads, which are operating at LOS A with free flowing traffic (Victorville 2 2007c). The local roadways that could be affected by the Victorville 2 project are shown in **Traffic and Transportation Figure 2, Local Transportation Network.** There are no bicycle lanes or trails in the immediate vicinity. The critical roads, highways, and transit modes in the area of the project are identified below (Victorville 2 2007a, pp. 6.13-8 through 13-13).

LOCAL HIGHWAYS AND ROADS

I-15 is a northeast-southwest oriented six to eight-lane freeway that connects the Apple Valley area with the Southern California counties of San Bernardino, Riverside and San Diego, and the State of Nevada to the north. Caltrans records show average daily traffic volume on I-15 in the project area (junction with SR-18) is about 90,000 vehicles per day (Caltrans 2006). SR-395 is a two to four lane north-south highway that begins at the junction with I-15 within the community of Hesperia and proceeds north along the east side of the Sierra Nevada Mountains, and into the State of Oregon. Average daily traffic volume is about 19,000 vehicles.

Air Expressway is a west-east two to four lane arterial road that connects SR-395 to the city of Victorville and I-15 via D Street. Adelanto Road is a north/south two lane road that connects Air Expressway with Colusa Road just west of Helendale Road. D Street is a two lane north-south road that connects I-15 and Air Expressway. Colusa Road is a two-lane east-west dirt road that provides access to the Victorville 2 project site from SR-395. Helendale Road is a one lane north-south dirt road that intersects Colusa Road and would also provide access to the project site (see **TRAFFIC AND TRANSPORTATION Figure 2**). Both Colusa and Helendale roads have very little vehicle traffic on a daily basis.

LEVEL OF SERVICE

Level of Service (LOS) is a qualitative measure describing operational conditions within a traffic stream. The 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 Highway Capacity Manual[1]

1 National Research Council, Highway Capacity Manual, Third Edition, 1994.

defines six levels of service for roadways or intersections ranging from LOS A representing the best operating conditions and LOS F the worst.

Traffic and Transportation Table 2 provides existing daily and peak traffic volume and LOS in the project area. It demonstrates that roadways in the project vicinity generally operate at LOS A and B. As noted below, SR-395 has LOS D south of Air Expressway. The city of Victorville tries to maintain LOS C as a general goal (City of Victorville 2000) and the current LOS B for I-5 and LOS D for SR-395 are acceptable to Caltrans (Caltrans 2007b).

Traffic And Transportation Table 2
Roadway Segment, Existing Peak Hour Traffic Volume, Capacity and LOS

Roadway Segment	Peak Hour Volume	Capacity	LOS
I-15 - South of Natural Trails Highway	6,000	10,400	B
SR-395 – South of Air Expressway	1,600	2,000	D
Air Expressway (SR-395 to Adelanto Road	470	2,000	A
D Street (I-15 to Air Expressway)	*	*	B
Adelanto Road (north of Air Expressway)	230	6,800	A
Colusa Road	negligible	2,000	A
Helendale Road	negligible	2,000	A

Source: Victorville 2 2007a, Table 6.13-6, Pg. 6.13-17, Victorville 2 2007c; Victorville 2-2007b. Victorville 2 2007b, Table DR85-3, pg. 5.
*Staff is pursuing this information and it will be provided in the FSA.

AIRPORTS

The project is located 1.5 miles northeast of Runway (RY) 17/35 of the Southern California Logistics Airport (SCLA), formerly George Airforce Base. It has an additional runway (RY 3/21) and is the home base for eight U.S. Army Blackhawk helicopters. SCLA is a goods movement facility that is expected to handle an increasing amount of air cargo destined for Southern California (SCLA 2007). The Victorville 2 project site is within the landing and take-off pattern of the SCLA.

Additional aviation facilities include Apple Valley Airport (ten miles east) and Edwards Airforce Base (AFB) (thirty miles northwest). The project site is not in the landing or take-off pattern of either of these facilities and is not within the Edwards AFB Military Operational Airspace (fifteen miles northwest).

PUBLIC TRANSPORTATION

The Victor Valley Transit Authority provides bus service between the cities of Victorville and Helendale. The route uses D Street and National Trails Highway. There is no bus service along Air Expressway near the junction with Adelanto Road or on Adelanto Road itself.

RAILROADS

There are two major rail lines in the vicinity of Victorville 2 project site. Burlington Northern and Santa Fe Railroad have a north/south oriented line that parallels National Trails Highway and provides freight service to numerous markets in San Bernardino County and beyond. The rail line is about one mile east of the project site (see **Traffic and Transportation Figure 2**) and does not cross any roads that would be used for construction or operation of the Victorville 2 project. The Union Pacific Railroad has an east/west rail line about sixteen miles south of the project site.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Significance criteria are based on California Environmental Quality Act (CEQA) Guidelines, the CEQA Environmental Checklist (amended December 1, 1999) and on performance standards and thresholds established by interested agencies. A project may have a significant effect if the project would:

- cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections);
- exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways;
- 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;
- substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- result in inadequate emergency access; or
- result in inadequate parking capacity; or conflict with adopted policies, plans, or programs.
- generate a high velocity thermal plume or glare that could present a hazard to aircraft.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Construction Impacts and Mitigation

When evaluating a project's potential impact on the local transportation system, staff uses LOS determinations as the foundation on which to base its analysis. The following discussion identifies potential traffic impacts associated with the construction of the Victorville 2, and provides an explanation of staff's conclusions.

The AFC provides an analysis of projected traffic conditions with the addition of project construction traffic trips. Project construction is scheduled to be completed in 27 months. Construction is expected to commence in summer 2008, with commercial operation scheduled to begin in late summer 2010 (Victorville 2 2007a, pg. 2-37). All plant construction workers would park on one of two parking and laydown areas encompassing fifty acres of land. As depicted in **TRAFFIC AND TRANSPORTATION Figure 2**, one area is just west of Helendale Road and north of Colusa Road. The other area is just south of Colusa Road and east of Helendale Road (Victorville 2 2007a, pg. 5.9-6). Staff has determined that the parking areas are adequate for the number of construction workers involved in the project.

Construction Workforce Traffic

To determine the amount of vehicle trips to the project site during average and peak construction, the applicant assumed that workers would commute alone during the morning and afternoon peak intervals (7 to 9 AM and 4 to 6 PM). The average number of construction workers would be approximately 360, while the peak workforce would consist of 767 workers during a three month period. Given experience with previous projects, staff believes that the estimated construction traffic trips and assumptions about peak construction activity are reasonable. Based on regional demographics and availability of skilled laborers, the construction workers would probably come from the city of Victorville and other parts of San Bernardino County. However, staff believes that some workers could come from Riverside and Los Angeles counties.

To reach the project site, the applicant assumes construction workers coming from the south would use I-15, north on D Street to Air Expressway (also known as National Trails Highway north of I-15), west to Adelanto Road, north to Colusa Road, and east to Helendale Road and the entrance to the site. If workers use SR -395, they would travel east on Air Expressway to Adelanto Road and then the same route for workers arriving from I-15. Staff believes that these are reasonable assumptions since they appear to be the most direct routes.

Supplementary information provided by the applicant notes that SR-395 north and south of Air Expressway currently operates at LOS D, and is expected to deteriorate to LOS E/F during afternoon peak by year 2009 (Victorville 2 2007b). SR-395 changes from two to four lanes at various points north of I-15 and has about a half-dozen signalized intersections south of Air Expressway. In addition, the section of SR-18 near I-15 is congested (LOS D/E) during peak periods. In contrast, the LOS for I-15 south of the National Trails Highway is B (Victorville 2 2007, pg. 6.13-17). Therefore, staff is proposing that construction workers use I-15, D Street, Air Expressway, and Adelanto, Colusa, and Helendale roads to the Victorville 2 project site (see Condition of Certification **TRANS-1**).

Construction Truck Traffic

Construction of the generating plant would require the use and installation of heavy equipment and associated systems and structures. Heavy equipment would be used throughout the construction period, including trenching and earthmoving equipment, forklifts, cranes, cement mixers and drilling equipment. A passenger car equivalent (PCE) factor of three cars per truck was used to determine the traffic impacts of trucks and heavy equipment deliveries (National Research Council 1994). Project construction is expected to require fifteen trucks per day on average and fifty trucks during peak construction (PCE of 45 and 150, respectively) per day (Victorville 2 2007a, pg. 6.13-16). In-bound and out-bound truck traffic would arrive and depart the project site using the same route as construction workers.

Total Construction Traffic

Total average construction traffic impact (workforce and trucks) would be 405 vehicle trips (360 workers plus 45 PCE for trucks and deliveries), or 810 one-way vehicle trips. Total peak construction traffic impact would be 917 vehicle trips (767 workers plus 150 PCE for trucks and deliveries), or 1834 one-way vehicle trips. Both the average and peak construction increase in traffic would be a major change when compared to existing conditions, particularly on Adelanto, Colusa and Helendale roads, but the LOS A or B on local roads would not deteriorate. **Traffic and Transportation Table 3** presents the applicant's traffic study information which shows that the Victorville 2 project would not deteriorate the LOS on the applicable local roads. This is primarily related to the fact that the design capacity of the roads exceed existing traffic volume plus peak project traffic (design capacity for D Street has not been acquired to date). Staff believes the traffic study information is adequate.

Traffic And Transportation Table 3
Construction Traffic Impacts on Existing Levels of Service

Road Segment	Existing Peak LOS[1]	Project Trips[2]	Changes in LOS with Project[3]
I-15 South of D Street	B	767	B
D Street between I-15 and Air Expressway	B	767	B
Adelanto Road/Air Expressway to Bartlett Avenue	A	767	A
Colusa Road/Adelanto Road to Helendale Road	A	767	A
Helendale Road North of Colusa Road	A	767	A

1. Victorville 2 2007a, Table 6.13-5; VICTORVILLE 2 2007b, Table DR85-3. pg. 6.13-13
2. Assumes Month 12 peak construction traffic levels with 767 workers, VICTORVILLE 2 2007a, Table 6.13-6, pg. 6.13-7
3. Victorville 2 2007a, Table 6.13-6, pg. 6.13-17

The applicant has agreed to develop and implement a construction phase traffic management plan in consultation with the city of Victorville (Victorville 2 2007a, pg. 6.13-29). This would address issues such as the timing of deliveries of heavy equipment and materials, possible street or lane closures, detours of construction traffic with a flag-person, use of signage and traffic control devices, and ensuring access for emergency vehicles to the project site (Victorville 2 2007a, pg. 6.13-29. In order to ensure that the LOS for local roads predicted by the models would be maintained, staff has incorporated these measures into staff's proposed Condition of Certification **TRANS-1**. The applicant has stated their intention to pave the unpaved section of Adelanto Road north of Air Expressway as well as the section of Colusa Road from Adelanto to Helendale Road, and several hundred yards of Helendale Road north of Colusa Road until reaching the site entrance (Victorville 2 2007c). Staff is requiring that the road paving take place before construction begins (see **AIR QUALITY** section of this PSA including Condition of Certification **AQ-SC9**). In order to prevent dangerous road conditions, staff is proposing Condition of Certification **TRANS-2** which would require the project owner to repair any damage to local roads from construction traffic, particularly heavy trucks.

Linear Facilities

Natural gas would be provided by a new relatively short (450 feet offsite) 12-inch diameter gas line which would hook up to an existing 24-inch gas line located near the southwest corner of the project site. The pipeline would be installed just north of Colusa Road. Water for all the project needs would be supplied by a new three mile long extension of an existing 16 inch water line that currently terminates in front of the High Desert Power Plant on Perimeter Road. The project would require about ten miles of new 230-kV transmission line for interconnection to SCE's existing Lugo substation. The transmission lines would cross several local roads including Mojave Drive, Palmdale Road, Bear Valley Road, Main Street, and Maple Avenue (see **TRANSMISSION SYSTEM ENGINEERING** section of the PSA for more information regarding the transmission line route). The construction traffic management plan (**TRANS-1**) would also include mitigation measures to address offsite linear facilities impacts to local roads.

Construction Phase Transport of Hazardous Materials and Waste

Deliveries to the Victorville 2 project site would include small quantities of hazardous materials to be used during project construction. The applicant has stated that the delivery/disposal of hazardous materials (one to three times per month to and from the site [Victorville 2007h]), and materials handling on site would be conducted in accordance with all applicable federal and state statutes (see the **HAZARDOUS MATERIALS MANAGEMENT** section of this PSA for more information). Staff has determined that the best route for the transportation of hazardous materials is I-15, D Street, Phantom East Street. Perimeter Road (after its extension to the north), to the power plant site.

Operation Impacts and Mitigation

Employee and Truck Traffic

Operation of the power plant would require a labor force of 36 full-time employees that would generate 72 one way trips to and from the Victorville 2 project site. Other project-related trips (i.e. delivery trucks, visitors, and other business-related trips) are estimated to be 64 per month and would occur during regular business hours. Staff assumes that operational workers would follow the same routes as for construction. These trip additions to surrounding local streets and highways would not significantly affect the LOS of these roads.

Transport of Hazardous Materials and Waste

The transportation and handling of hazardous substances associated with the project can increase roadway hazard potential. Impacts associated with hazardous material transport to the facility can be mitigated to a level of insignificance by compliance with existing federal and state standards established to regulate the transportation of hazardous substances. These standards constitute a comprehensive regulatory program whose purpose is to ensure the safety of hazardous materials transportation. Staff has assessed the efficacy of these standards and finds that they are successful in minimizing the risks associated with hazardous materials transportation. The applicant intends to comply with all federal and state regulations related to the transportation of hazardous materials (Victorville 2 2007a, pp. 6.13-19 - 21).

The California Department of Motor Vehicles specifically licenses all drivers who transport hazardous materials. Drivers are also required to check for weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are also required to take instruction in first aid and procedures on handling hazardous waste spills. Drivers transporting hazardous waste are required to carry a manifest, which is available for review in the event of a spill, and is reviewed by the California Highway Patrol at inspection stations along major highways and interstates.

The California Vehicle Code and the Streets and Highways Code (Sections 31600 through 34510) ensure that the transportation and handling of hazardous materials are done in a manner that protects public safety. Enforcement of these statutes is under the jurisdiction of the California Highway Patrol.

Project operation would require use of hazardous substances including sulfuric acid and cleaning and water treatment chemicals. It is estimated that there would be a maximum of two truck trips every three months of these materials. Operation would also require 15 deliveries per month of other hazardous materials, 14 of which would be aqueous ammonia (Victorville 2 2007a, Pg. 6.13-18). Staff has not identified any road hazards along the proposed route of I-15, D Street, Air Expressway, and Adelanto, Colusa, and Helendale roads. A licensed hazardous waste transporter would haul any hazardous waste from the project site to one of three Class 1 hazardous waste landfills in western Kern County near the communities of Buttonwillow and Kettleman City, and in Imperial County near the community of Westmoreland. The handling and disposal of hazardous substances are also addressed in the **WASTE MANAGEMENT, WORKER SAFETY AND FIRE PROTECTION** and **HAZARDOUS MATERIALS** sections of this assessment.

Airport Operations

As noted earlier, the closest major airport is Southern California Logistics Airport (SCLA) which is 1.5 miles southwest of the Victorville 2 project site. The existing flight pattern does bring aircraft at low altitude (1,500 feet above ground level) near the northern boundary of the project site. Aircraft approaching from the northeast on landing approach to RY-17 would fly over the northwest corner of the project site over the solar field. Almost all of the aircraft using the SCLA are two or four engine cargo jets and staff has been advised that most of the small single engine aircraft will be transferred to the Apple Valley Airport (SCLA 2007a). The two combustion turbine generator stacks would be 145 feet high and the ten cell cooling tower would be 62 feet high (Aspen 2007, Table 1, pg. 2). The transmission line support towers would be 140 feet high. These structures would not penetrate navigable airspace (150 feet above ground level [AGL]) for the SCLA airport.

The project would generate thermal plumes from two turbine stacks and the ten-cell cooling tower (Aspen 2007a; see **APPENDIX TT-1**). Staff has predicted that turbine and cooling tower plumes at or exceeding the 4.3 meters per second (m/s) threshold could extend to about 1,000 feet and 900 feet AGL, respectively. Staff has adopted a 4.3 m/s threshold used by the Australian Civil Aviation Safety Authority that… " has established that an exhaust plume with a vertical velocity in excess of 4.3 m/s may cause damage to an aircraft airframe or upset an aircraft when flying at low levels" (Australian Civil Aviation Safety Authority 2004). The FAA has recommended that aircraft do not fly over plume generating industrial sites at less than 1,000 feet AGL (FAA 2006).

The turbulence caused by these plumes would not affect cargo jet aircraft on approach because heavier planes are not affected as easily as smaller planes, approach pattern altitude at 1.5 miles is 1,500 feet AGL, and the aircraft would not fly over the Victorville 2 project power block. Staff has been advised that the only aircraft that fly over the project area where the power block would be located and could be impacted by the Victorville 2 thermal plumes are Army helicopters departing the traffic pattern to the north at about 1,000 feet AGL. Staff has requested that the SCLA Manager work with the U.S. Army to change the helicopter departure or arrival route to avoid overflight of the Victorville 2 power block. This will be discussed at the PSA workshop and addressed more fully in the FSA (SCLA 2007d).

Approximately 180 aircraft use the SCLA on a daily basis and it is staff's understanding that given the fact that the prevailing wind comes from the west to southwest, most aircraft do a straight in approach to or departure from RY 17 (SCLAa). Staff is proposing Condition of Certification **TRANS-3** that would require the project owner to work with the Federal Aviation Administration (FAA) and the SCLA Airport Manager to implement a number of measures that would advise pilots to avoid direct overflight of the power block portion of the project. These could include: 1) requesting a FAA Notice to Airman (NOTAM) be issued advising pilots of the location of the Victorville 2 project; 2) amending navigational charts (i.e. Jeppguide Airport Directory, Western Region), the Los Angeles VFR Terminal Chart, and the SCLA Airport Facility Directory to include a symbol representing the Victorville 2 project; 3) provide SCLA control tower operators verbal and written notice before the Victorville 2 power block commences operation; and 4) install obstruction lighting and marking on each Victorville 2 exhaust stack and both ends of the cooling tower, and additional lighting at each corner of the power block.

Visible plumes from the turbine stacks are predicted to occur infrequently, about 17% of the time over a three year period based on Victorville 2002-2004 meteorological data. Using staff's worst case operating profile (full load no duct firing) during seasonal clear hours, the five percentile plume dimensions would be 831 feet high, 348 feet long, and 204 feet wide. Even if the plumes merge together at 1000 feet AGL, they would not be big enough to obscure or block a pilot's view of the runway. Staff has been advised that aircraft 1.5 to 2 miles northeast of SCLA on approach to RY 17 would be at 1,500 to 2,000 feet AGL and would not be impacted by project plumes (SCLA 2007b). Therefore, the Victorville 2 project visible plumes would not affect local aircraft operations.

The applicant mentions the issue of glare from the solar mirror collector array in the Application for Certification (AFC) and states that the visual distraction impact is not considered significant for SCLA operations. The issue was raised by the SCLA Airport Manager a couple of years ago. He has flown over the solar array near Barstow numerous times and while they are easily noticeable, there is no offending glare (SCLA

2007b). A consultant to Edwards Air Force Base has provided staff electronic copies of photographs taken of the Harper Lake SEGS at 4,000 feet AGL. A significant amount of glare was observed and while this did not cause any problems for the pilot, he did note that it could be a significant distraction while maneuvering closer to ground (Edwards Air Force Base 2007). On October 4, 2007, Caltrans Aeronautics and Energy Commission staff flew around the Kramer Junction and Harper Lake solar thermal facilities during a sunny mid-morning at about 1,500 feet AGL. No glare was observed, although from a distance of four miles the solar facility appeared to be a lake or pond and reflected some sunlight. Caltrans staff will be submitting a letter to staff about the recent fly-overs and the potential for glare.

Staff has reviewed an analysis regarding a parabolic trough mirror design that indicates that all sun rays hitting the mirror or collector would be reflected at the heat reflecting element when tracking the sun correctly (Victorville 2 2007i). The element may glow as the reflected sun rays enter the collector. According to the analysis, the glow could be observed by a pilot if the aircraft were positioned at the right angle above the array but it would not be a bright source of glare. Staff spoke with and received a memo from staff with the National Renewable Energy Laboratory (NREL) that indicated there would be a very low level of reflection from a parabolic mirror tracking the sun's movement. A worst case scenario would be 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 is concerned about this scenario, or when an array may be out of service and not positioned correctly and glare may occur that could be a distraction to pilots.

Staff will continue to gather information about this issue and expects it will be discussed at the PSA workshop and addressed more fully in the FSA. Staff is proposing Condition of Certification **TRANS-4** which would require that all the parabolic mirrors are monitored to ensure that they are tracking the sun correctly, and when not in use they should be positioned in such a manner as to reduce the potential for glare. In addition, **TRANS-4** proposes a glare complaint resolution process should any complaints be made by pilots.

Emergency Services Vehicle Access

The county of San Bernardino Fire Station 321 would provide 24-hour fire protection and emergency medical services to the Victorville 2 project and is located about six miles south of the project site (Victorville 2 2007d). Emergency service vehicles would reach the project site via Hardy Avenue, Adelanto, Colusa, and Helendale roads. Condition of Certification **TRANS-1** requires adequate access at the Victorville 2 project site for emergency vehicles. For a more detailed discussion of emergency services concerning adequate ingress/egress serving the facility, see the **WORKER SAFETY AND FIRE PROTECTION** section in this PSA.

Ground Level Fogging of Roads

During certain meteorological conditions when the temperature is cold (30ºF), water vapor plumes from the cooling towers can be pushed down to the ground by strong winds. However, staff's Seasonal Annual Cooling Tower Impact modeling did not predict ground hugging plumes (Aspen 2007b).

CUMULATIVE IMPACTS

In addition to the Victorville 2, staff has reviewed the Southern California Logistics Airport Specific Plan which notes that anticipated traffic levels will increase with the development of business, industrial, rail and airport uses. This will involve improvements on existing roads and upgrades to both SR-395, SR-18 (SCLA 2004). However, the timing of these improvements is unclear. Staff will continue to gather additional information, discuss the issue at the PSA workshop, and revisit the matter in the FSA. At this time, staff is unaware of any other development in the local area that could combine with the Victorville 2 project to produce cumulative traffic impacts.

Staff has considered the minority populations (as identified in **Socioeconomics Figure 1**) and low income populations in its impact analysis. There are no significant direct or cumulative traffic and transportation impacts, and therefore, no environmental justice issues.

COMPLIANCE WITH LORS

The applicant has stated its intention to comply with all applicable LORS related to traffic and transportation (Victorville 2 2007a, Section 6.13.1). Staff has concluded that the project as proposed would comply with relevant LORS. **Traffic and Transportation Table 4** summarizes the project's conformance with all applicable LORS.

Traffic & Transportation Table 4
Project Compliance with Adopted Traffic and Transportation LORS

Applicable LORS	Description
Federal:	
Code of Federal Regulations (CFR) Title 14, Chapter 1, Part 77	Includes standards for determining obstructions in navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alteration. Also, provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace.
	Unknown: The project is located within 20,000 feet of the Southern California Logistics Airport and its structures would not penetrate any navigable airspace. The applicant is required to file a "Notice of Proposed Construction or Alteration" (Form 7460-1) with the FAA. Staff has not been provided a copy of this form nor the response from the FAA.
Title 49, Subtitle B	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures), and provides safety measures for motor carriers and motor vehicles who operate on public highways.
	Consistent: Enforcement is conducted by state and local law enforcement agencies, and through state agency licensing and ministerial permitting (e.g., California Department of Motor Vehicles licensing, Caltrans permits), and/or local agency permitting (e.g., City of Victorville Department of Public Works).

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	Includes regulations pertaining to licensing, size, weight and load of vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials.	
	Consistent: Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing and permitting, and/or local agency permitting.	
California Streets and Highway Code, Division 1 & 2, Chapter 3 & Chapter 5.5	Includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits.	
	Consistent: Enforcement is provided by state and local law enforcement, and through ministerial state agency licensing and permitting, and/or local agency permitting.	
Local: City of Victorville General Plan – Circulation Element.	Primarily concerned with identifying goals, policies, and implementation measures that will relieve existing road congestions while expanding the circulation network to serve outlying areas where future growth is anticipated. It 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	
	Consistent: The project is consistent because it includes paving of dirt roads, provides off-street parking for new development, and ensures LOS C or better on the applicable local roads.	
Southern California Logistics Airport Specific Plan	Serves as a tool for implementing the reuse plan established by the Victor Valley Economic Authority and the main intent is to enable the City to more adequately assess the detailed planning and environmental review procedures for development within the Specific Plan area. The discussion about circulation notes that the combination of business, industrial, rail and airport uses will necessitate improvements on existing roads.	
	Consistent: The project would lead to the improvement of roads providing access to the site and promoting additional business and industrial use.	
Comprehensive Land Use Plan – Phase Two – SCLA	Intended to protect and promote the safety and welfare of airport users, residents, and visitors to the cities of Victorville and Adelanto, while promoting the continued operation of the airport.	
	Unknown: With staff's proposed mitigation, the Victorville 2 project would not adversely impact the airport users, residents, and visitors, and would not affect the operation of the airport. Given the uncertainty about changing the helicopter routes, staff cannot make a consistency determination at this time.	
County of San Bernardino -General Plan – Circulation Element	Lays the groundwork for and promotes the development of a coordinated, multi-modal countywide transportation system and infrastructure capacity to meet the needs of all people living, working, or visiting the county and all economic segments of the community.	
	Consistent: The project would improve the transportation and infrastructure capacity of the local area by paving existing dirt roads.	

CONCLUSIONS

1. The project as proposed would comply with all applicable LORS related to ground traffic, and would not degrade the LOS A for Air Expressway, Adelanto, Colusa, and Helendale roads, and the LOS B on D Street and I-15.

2. Staff is proposing Condition of Certification **TRANS-1** which would, with the participation of the city of Victorville Planning Department, require the development and implementation of a construction traffic control plan which would require workers to use a specific route to access the project site. This will ensure that the levels of service on local roads do not deteriorate to unacceptable levels.

3. Staff is also proposing Condition of Certification **TRANS-2** which would require that any road damaged by project construction would be repaired to original condition. This will ensure that any damage to a local roadway will not be a safety hazard to motorists.

4. Given the relatively close proximity to the Southern California Logistics Airport, the fact that aircraft approaching the airport from the northeast for landing fly over the northwest corner of the project site, and the possibility of glare or visual distraction from the solar thermal arrays affecting pilots view of Runway 17/35, the project could have an impact on aviation safety.

5. Staff is proposing **TRANS-4** which would require monitoring the solar arrays to ensure they are tracking the sun correctly to minimize glare, and when not in use, they would be positioned to reduce the potential for glare that could create air traffic safety hazards.

6. To date, staff has not received a copy of the No Hazard to Air Navigation Determination from the FAA regarding the Victorville 2 project. Until this is received, staff cannot conclude that the project complies with Federal aviation regulations.

7. **TRANS-3** proposes that the project owner, the SCL Airport Manager, and the FAA implement measures to advise pilots to avoid direct overflight of the power block of the project so as not to be affected by thermal plumes. This would include the change in helicopter arrival and departure routes. Until this is determined to be feasible, staff cannot conclude that the project complies with the SCLA Comprehensive Land Use Plan and presents no hazard to air navigation.

8. There would be no unmitigated significant direct or cumulative traffic and transportation impact and therefore no environmental justice issues.

PROPOSED CONDITION OF CERTIFICATION

TRANS-1 The project owner shall, in coordination with the city of Victorville, develop and implement a construction traffic control plan. Specifically, the overall traffic control plan shall include the following:

- Construction workers should access the project site via I-15, D Street, Air Expressway, and Adelanto, Colusa, and Helendale roads;

- Schedule delivery of heavy equipment and building material deliveries, as well as the movement of hazardous materials to the site, including the adjacent lay-down area, to occur during off-peak hours;
- Coordinate with the city of Victorville to mitigate any potential adverse traffic impacts from other proposed construction projects that may occur during the construction phase of the project; and
- Ensure there is adequate access for emergency vehicles at the project site.

The construction traffic control plan shall also address the following issues for linear facilities:

- Signing, lighting, and traffic control device placement;
- Temporary travel lane closures and potential need for flaggers;

Verification: At least 60 days prior to start of site mobilization, the project owner shall provide to the city of Victorville for review and comment and to the Compliance Project Manager (CPM) for review and approval, a copy of the construction traffic control plan. The plan must document consultation with the applicable agencies.

TRANS-2 Prior to site mobilization activities, the project owner shall prepare a mitigation plan for the roads that would be used for project construction (D Street, Air Expressway, Adelanto, Colusa, and Helendale roads) should they be damaged by project construction. The intent of this plan is to ensure that if roads are damaged by project construction they will be repaired and reconstructed to original or as near original condition as possible. The **AIR QUALITY** analysis requires that the unpaved portions of the Adelanto, Colusa, and Helendale roads be paved prior to construction. If the newly paved roads are damaged during construction they shall be repaired pursuant to city of Victorville standards. This plan shall include:

- Documentation of the pre-construction condition of above identified roads to the access road to the site. Prior to the start of site mobilization, the project owner shall provide to the CPM photographs or videotape identified roads.
- Documentation of any portions of the above noted roads that are not adequate to accommodate oversize or large construction vehicles, and identify necessary remediation measures;
- Provide for appropriate bonding or other assurances to ensure that any damage to identified local road due to construction activities will be remedied by the project owner; and
- Reconstruction of portions of identified roads that are damaged by project construction.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit a mitigation plan focused on restoring the local identified road to its pre-project condition to the city of Victorville for review and comment, and to the CPM for review and approval.

Within 90 days following the completion of construction, the project owner shall provide photo/videotape documentation to the city of Victorville, and the CPM that the damaged sections of the local identified roads have been restored to their pre-project condition.

TRANS-3 Prior to the start of operations, the project owner shall develop and implement, in conjunction with the SCL Airport Manager and the FAA, the following measures to alert pilots to the location of the Victorville 2 project. These would include: 1) requesting the FAA Notice to Airman (NOTAM) be issued advising pilots of the location of the Victorville 2 project; 2) amending navigational charts (i.e. Jeppguide Airport Directory, Western Region); the Los Angeles VFR Terminal Chart, and the SCLA Airport Facility Directory to include a symbol representing the VICTORVILLE 2 project; 3) provide SCLA control tower operators verbal and written notice before the VICTORVILLE 2 power block test, commissioning period, and commercial operation; and 4) install obstruction lighting and marking on each VICTORVILLE 2 exhaust stack, both ends of the cooling tower, and additional lighting at each corner of the power block.

Verification: At least 90 days prior to the start of operations, the project owner shall provide copies of the NOTAM, modified SCL Airport Facility Directory and the Los Angeles VFR Terminal Chart, a written advisement for use by controllers advising pilots to avoid direct overflight of the power block portion of the project, and the lighting plans for the exhaust stacks, cooling tower and the corners of the power block. These materials shall be provided to the SCL Airport Manager and the FAA for review and comment, and to the CPM for review and approval.

TRANS-4 The project owner shall develop and implement a plan 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 SCL Airport Manager and the FAA for review and comment, and 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.

REFERENCES

AIRNAV.COM 2007. Statistical Information about the Southern California Logistics Airport. Accessed August 29, 2007.

Aspen 2007a. Visible Plume Modeling Analysis by William Walters. March 2007.

Aspen 2007b. E-mail from William Walters to James Adams, California Energy Commission. September 28, 2007.

Aspen 2007c. E-mail from William Walters to James Adams. October 1, 2007.

Australian Civil Aviation Authority 2004. Advisory Circular 139-05(0), *Guidelines for Conducting Plume Rise Assessment.* June 2004

California Energy Commission 1987. Application for Certification for SEGS III through VII. January 1987.

California Energy Commission 1988. Application for Certification for SEGS VIII. February 1988.

California Energy Commission 1989. Application for Certification for SEGS IX & X. February 1989.

California Energy Commission 2007a. Commission Decision on the Russell City Energy Center Amendment. September 2007.

California Energy Commission 2007b. E-mail from Alvin Greenberg, California Energy Commission, to James Adams. September 12, 2007.

Caltrans 2007a. E-mail from Tony Calvillo, Office of Travel Forecasting, Region 8, and James Adams. September 20, 2007.

Caltrans 2007b. E-mail from Tony Calvillo to James Adams. September 24, 2007.

Caltrans 2007c. E-mail from Tony Calvillo to James Adams. September 26, 2007.

County of San Bernardino 2007. Circulation Element of the General Plan. Effective April 12, 2007.

Federal Aviation Administration 2006. Safety Risk Analysis of Aircraft Overflight of Industrial Exhaust Plumes. January 2006.

National Renewable Energy Laboratory. Memo from Mark Mehos, CSP Program Manager, to James Adams. October 9, 2007

Southern California Logistics Airport (SCLA) – Comprehensive Land Use Plan- Phase Two. December 2005.

Southern California Logistics Airport (SCLA) – Specific Plan. February 2004.

Southern California Logistics Airport (SCLA 2007a). Meeting with Peter Soderquist, SCLA Manager, Tony Pena, Inland Energy, and James Adams. September 10, 2007.

Southern California Logistics Airport (SCLA 2007b). E-mail from Peter Soderquist, to James Adams. September 11, 2007.

Southern California Logistics Airport (SCLA 2007c). E-mail from Peter Soderquist to Tom Barnett, Executive Vice President, Inland Energy. September 21, 2007.

Victorville 2005 – City of Victorville. Circulation Element of the General Plan. 2005

Victorville 2007a – City of Victorville. Application for Certification of the Victorville for the Victorville 2 Hybrid Power Project. Vol. 1&2. Received February 28, 2007.

Victorville 2007b – City of Victorville. Application for Certification Data Adequacy Supplement. Vol. 3. Received April 9, 2007.

Victorville 2007c – City of Victorville. Applicant's Responses to CEC's Data Request Set 1, #s 1-110. Received July 23, 2007.

Victorville 2007g – City of Victorville. Supplementary Traffic and Transportation Evaluation to Address Site Vehicular Access Route Revision. Dated September 27, 2007.

Victorville 2007h – City of Victorville. E-mail from Arrie Bachrach, Inland Energy, to James Adams. September 28, 2007.

Victorville 2007i – City of Victorville. Parabolic Trough Mirror Design Prevents Escape of Reflected Incident Rays. October 2007.

Victorville 2007j – City of Victorville. E-mail from Tom Barnett to John Kessler, California Energy Commission. October 1, 2007.

Victorville 2007k – City of Victorville. E-mail from Tom Barnett to James Adams. October 2, 2007.

Victorville 2007l – City of Victorville. E-mail from Tom Barnett to James Adams. October 5, 2007.

Victorville 2007m – City of Victorville. E-mail (Informal Data Request) from Arrie Bachrach to James Adams. October 5, 2007.

Victorville Valley Transit Authority 2007. Route 22 Map. Accessed September 11, 2007.

APPENDIX TT-1: PLUME VELOCITY ANALYSIS

William Walters

INTRODUCTION

The following provides the assessment of the Victorville 2 Hybrid Power Project (VV2) gas turbine/HRSG and cooling tower exhaust stack plume velocities. Staff completed calculations to determine the worst-case vertical plume velocities at different heights above the stacks based on the applicant's proposed facility design.

PROJECT DESCRIPTION

The proposed project includes two F-class gas turbines operating in combined cycle mode and a ten cell cooling tower that rejects heat from the steam condenser. Thermal load to the cooling tower comes from both the gas turbine/HRSG, which has duct burners to augment steam production, and from the project's thermal solar collectors.

PLUME VELOCITY CALCULATION METHOD

Staff has selected a calculation approach from a technical paper (Best 2003) to estimate the worst-case plume vertical velocities for the VV2 exhausts. The calculation approach, which is also known as the "Spillane approach", used by staff is limited to calm wind conditions, which are the worst-case wind conditions. The Spillane approach uses the following equations to determine vertical velocity for single stacks during dead calm wind (i.e. wind speed = 0) conditions:

1. $(V^*a)^3 = (V^*a)_o^3 + 0.12^*F_o^*[(z-z_v)^2-(6.25D-z_v)^2]$

2. $(V^*a)_o = V_{exit}{}^*D/2^*(T_a/T_s)^{0.5}$

3. $F_o = g^*V_{exit}{}^*D^{2*}(1-T_a/T_s)/4$

4. $Z_v = 6.25D^*[1-(T_a/T_s)^{0.5}]$

Where: V = vertical velocity (m/s), plume-average velocity
a = plume top-hat radius (m, increases at a linear rate of a = $0.16^*(z- z_v)$
F_o= initial stack buoyancy flux m^4/s^3
z = height above ground (m)
z_v= virtual source height (m)
V_{exit}= initial stack velocity (m/s)
D = stack diameter (m)
T_a= ambient temperature (K)
T_s= stack temperature (K)
g = acceleration of gravity (9.8 m/s^2)

Equation (1) is solved for V at any given height above ground that is above the momentum rise stage for single stacks (where z > 6.25D) and at the end of the plume merged stage for multiple plumes. This solution provides the plume-average velocity for the area of the plume at a given height above ground; the peak plume velocity would be higher than the plume-average velocity predicted by this equation. As can be seen the stack buoyancy flux is a prominent part of Equation (1). The calm condition calculation basis clearly represents the worst-case conditions, and the vertical velocity will decrease substantially as wind speed increases.

For multiple stack plumes, where the stacks are equivalent, the multiple stack plume velocity during calm winds was calculated by staff in a simplified fashion, presented in the Best Paper as follows:

$$V_m = V_{sp}*N^{0.25}$$

Where: V_m = multiple stack combined plume vertical velocity (m/s)
V_{sp} = single plume vertical velocity (m/s), calculated using Equation (1)
N = number of stacks

Staff notes that this simplified multiple stack plume velocity calculation method predicts somewhat lower velocity values than the full Spillane approach methodology as given in data results presented in the Best paper (Best 2003).

The applicant noted in the AFC (p. 6.13-27) that they completed a modeling analysis for plume turbulence; however, the applicant's analysis focused on the area of the gas turbine/HRSG thermal plume at an average wind speed of six miles per hour and the flight time through the plume, but does not evaluate the potential worst case calm wind thermal plume conditions for both the gas turbine/HRSG and cooling tower (Victorville 2007a).

VERTICAL PLUME VELOCITY ANALYSIS

The calm wind condition vertical plume velocities were calculated for the VV2 gas turbine/HRSGs and the cooling tower. The ambient and exhaust conditions for the gas turbine/HRSGs and the cooling tower, operating at full load, are provided below in **Plume Velocity Table 1**.

PLUME VELOCITY Table 1
Gas Turbine/HRSG and Cooling Tower Parameters

Case	Gas Turbine/HRSG		Cooling Tower	
	28°F	59°F	30°F, 35% RH	50°F, 10%RH
Stack Height ft (m)	164 (50)		62.3 (19.0)	
Stack Diameter ft (m)	18.5 (5.64)		28.0 (8.53) per cell	
Operating Case	Base Nonfired	Base Nonfired	Base Nonfired	Solar Fired
Stack Velocity ft/s (m/s)	66.6 (20.3)	63.4 (19.3)	40.4 (12.3)	40.0 (12.2)
Exhaust Temperature F (K)	196.7 (365)	194.8 (364)	61.2 (289)	71.9 (295)

Source: From or interpolated from Victorville 2007a, 2007c

The ten cell cooling tower is a two cell by five cell design. Under cold conditions fewer than 10 cells will operate (Victorville 2007a). The conditions modeled are worst case conditions where the plumes are not visible, as the visible condensed plumes can be avoided by pilots and the calculation procedure that is used by staff is not meant for condensed water vapor plumes that would create drag reducing the vertical plume velocity.

Using the Spillane calculation approach, the plume velocity at different heights above ground was determined by staff for calm conditions. Staff's calculated plume velocity values are provided in **Plume Velocity Table 2.** The gas turbine/HRSG plume velocities are calculated for the two gas turbine/HRSG exhausts, which are approximately 130 feet apart, while the cooling tower plume velocities are calculated for a ten-stack combined exhaust. The values provided below assume that the multiple stack plumes have merged; however, the plumes may not have fully merged at the lowest heights in this table.

PLUME VELOCITY Table 2
Gas Turbine/HRSG and Cooling Tower Predicted Plume Velocities

	Gas Turbine/HRSGs Plume Velocity (m/s)		Cooling Tower Plume Velocity (m/s)	
Height (ft)	**28°F**	**59°F**	**30°F, 35% RH**	**50°F, 10% RH**
300	10.56	10.03	8.20	8.42
400	7.37	6.89	6.55	6.53
500	6.20	5.74	5.69	5.57
600	5.55	5.12	5.16	4.98
700	5.12	4.71	4.79	4.58
800	4.80	4.41	4.50	4.28
900	4.55	4.18	4.28	4.06
1,000	4.35	3.99	4.10	3.87
1,100	4.18	3.83	3.95	3.72
1,200	4.03	3.70	3.82	3.59
1,300	3.90	3.58	3.70	3.47
1,400	3.79	3.47	3.60	3.37
1,500	3.69	3.38	3.51	3.29
1,600	3.60	3.30	3.43	3.21
1,700	3.52	3.22	3.35	3.14
1,800	3.44	3.16	3.28	3.07
1,900	3.38	3.09	3.22	3.01
2,000	3.31	3.03	3.16	2.95

Source: Staff calculations.

As explained in the Transportation and Traffic section a vertical velocity of 4.3 m/s has been determined as the critical velocity of concern to light aircraft. For the gas turbine/HRSG cases the heights at which the plume velocity drops below 4.3 m/s are calculated to be approximately 1,027 feet and 845 feet, respectively for the 28°F and 59°F operating cases. This indicates that the plume velocity of the gas turbine/HRSG exhausts decreases as a function of ambient temperature. Additionally, the plume velocities for the gas turbine/HRSGs would be lower for the duct fired and duct fired/solar operating cases due to the lower exhaust temperatures and velocities that occur under those operating cases. For the cooling tower the heights at which the plume velocity drops below 4.3 m/s are calculated to be approximately 890 feet and 795 feet, respectively for the 30°F and 50°F operating cases. The cooling tower vertical plume velocities would be much lower at higher ambient temperatures.

WIND SPEED AND TEMPERATURE STATISTICS

Plume Velocity Table 3 provides the hourly average wind speed and temperature statistics for the meteorological data provided by the applicant (Victorville 2007c). Calm or very low wind speeds can also occur for shorter periods of time within each of the monitored average hourly conditions.

PLUME VELOCITY Table 3
Wind Speed and Temperature Statistics for Victorville

Wind Speed		Temperature		Temperature and Wind Speed	
≤ 1 m/s	18.9%	≤ 40F	7.5%	≤ 1 m/s, ≤ 40F	2.7%
≤ 2 m/s	43.6%	≤ 50F	29.3%	≤ 1 m/s, ≤ 50F	8.3%
≤ 3 m/s	56.7%	≤ 60F	50.5%	≤ 1 m/s, ≤ 60F	11.8%

Source: Staff data reduction of applicant provided meteorological data (Victorville 2007c).

Calm conditions/low wind speeds averaging an hour or longer are not frequent in the site area but that they do occur, and do occur during lower temperature conditions more favorable to higher velocity conditions for the thermally buoyant gas turbine/HRSG and cooling tower plumes.

CONCLUSIONS

The calculated worst case calm wind condition vertical plume velocities from the VV2 gas turbine/HRSGs and cooling tower are predicted to exceed 4.3 m/s at heights as much as approximately 1,000 and 900 feet above ground level, respectively. The worst-case ambient conditions used in the velocity calculations will occur occasionally during the plant's life, and very low wind speed conditions (less than 1 m/s hourly average) occur approximately 19% of the time.

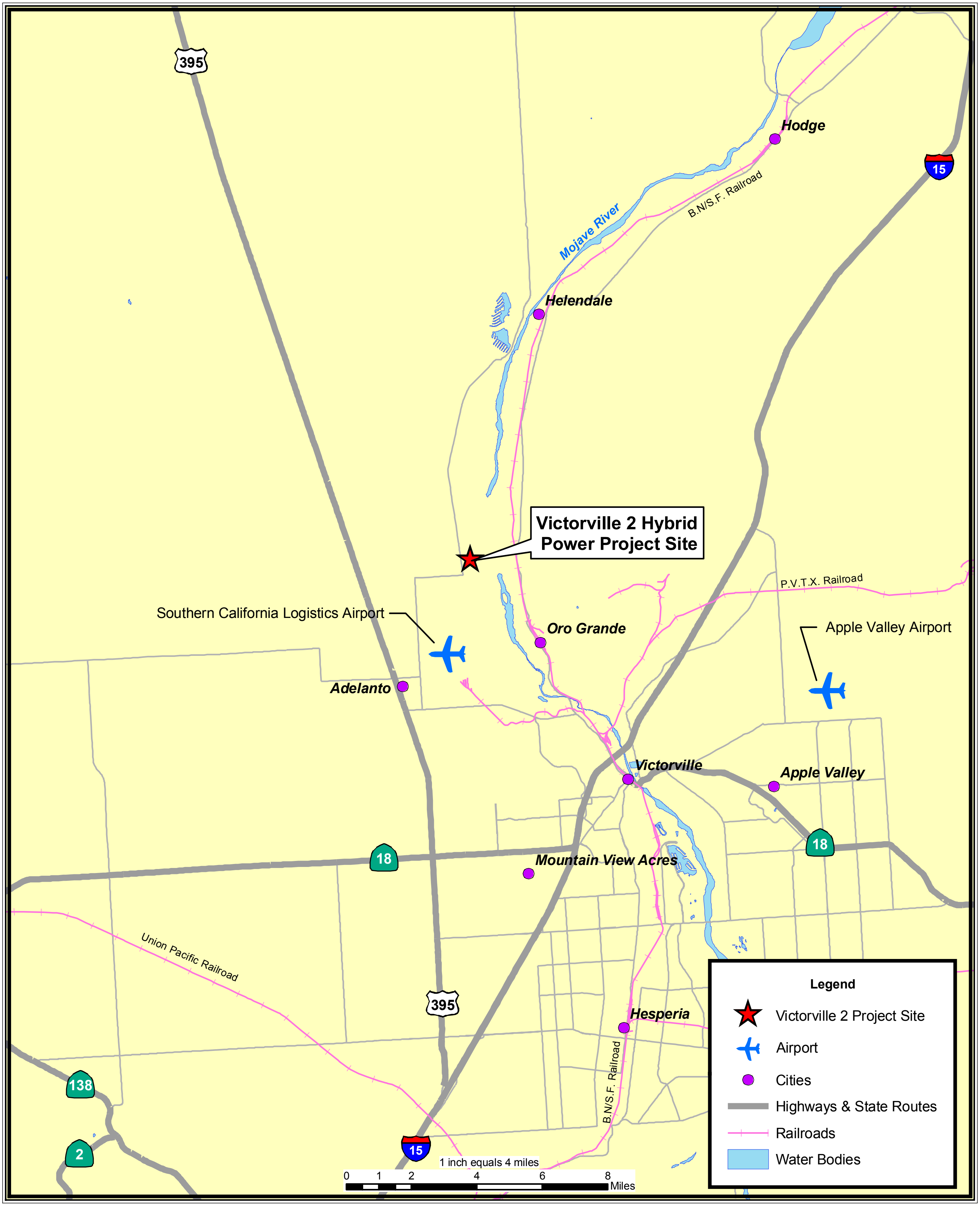
REFERENCES

Best, P. et al. 2003. Aviation Safety and Buoyant Plumes. Presented at the Clean Air Conference, Newcastle, New South Wales, Australia. By Peter Best, Lena Jackson, Mark Kanowski of Katestone Environmental, Toowong, Queensland, Australia and Kevin Spillane of Bendigo, Victoria, Australia.

Victorville 2007a – City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vol. 1&2. 2/27/07. Received 2/28/07.

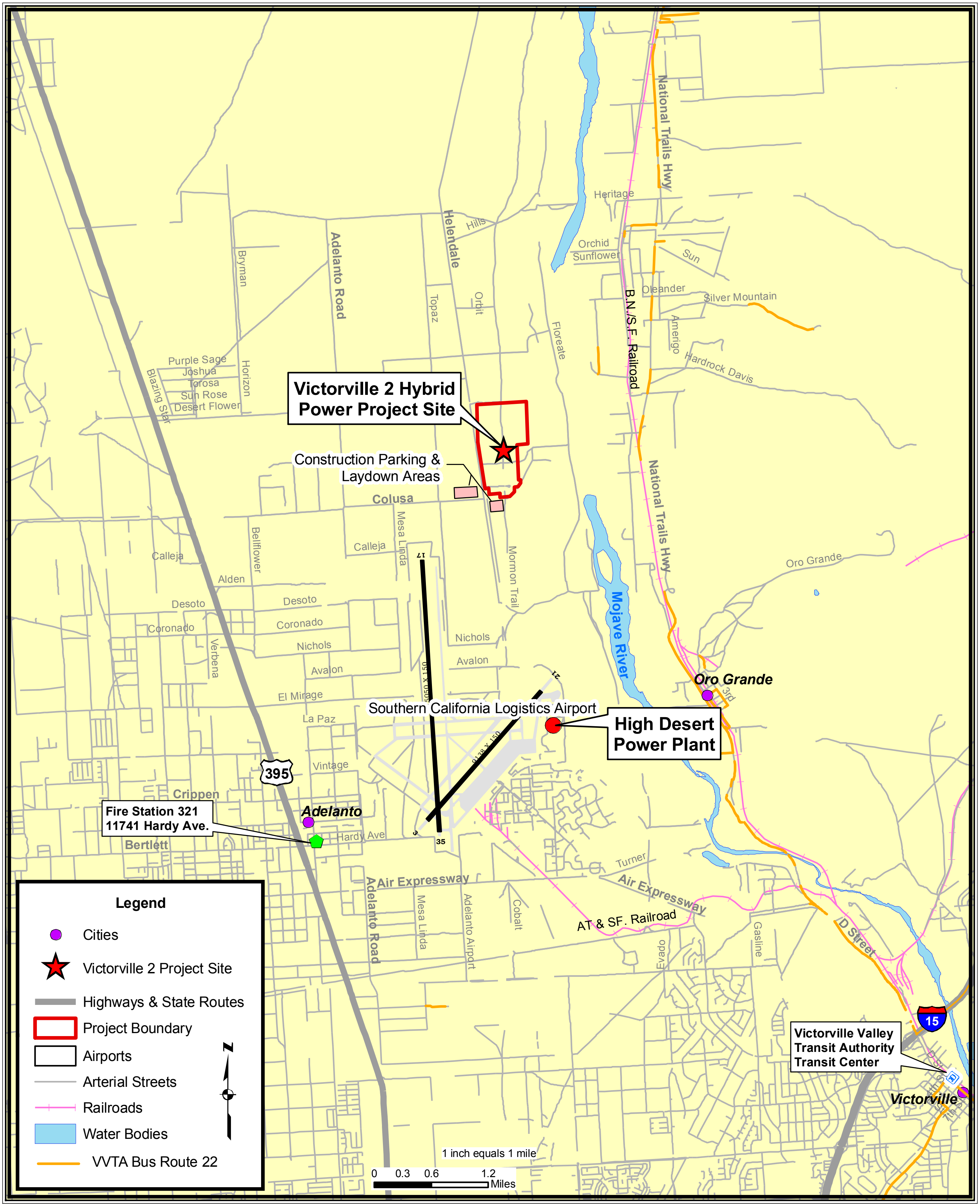
Victorville 2007c – City of Victorville (tn: 41644). Applicant's Responses to CEC's Data Request Set 1, #s 1 – 110. 7/23/07. Received 7/23/07.

TRAFFIC & TRANSPORTATION - FIGURE 1
Victorville 2 Hybrid Power Project - Regional Transportation Facilities



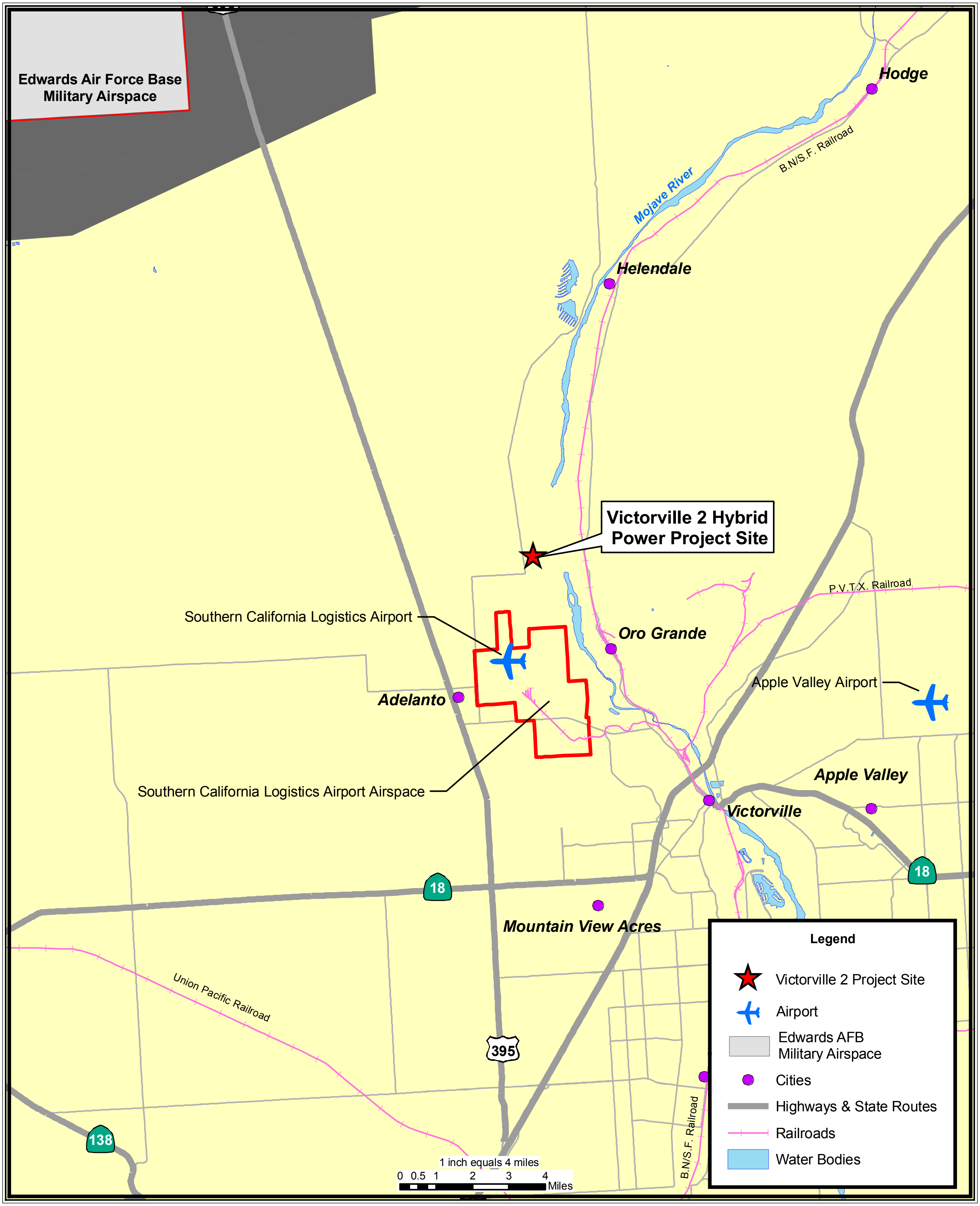
CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: California Energy Commission

TRAFFIC & TRANSPORTATION - FIGURE 2
Victorville 2 Hybrid Power Project - Local Transportation Facilities



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: California Energy Commission

TRAFFIC & TRANSPORTATION - FIGURE 3
Victorville 2 Hybrid Power Project - Proxmity to Edwards AFB Military Airspace



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: California Energy Commission

TRANSMISSION LINE SAFETY AND NUISANCE

Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The applicant, the City of Victorville, proposes to transmit the power from the proposed Victorville 2 Hybrid Power Project (Victorville 2) to the Southern California Edison (SCE) transmission grid through its existing 230-kV Victor Substation approximately 10 miles southwest of the project site. The 230 kV line to be used would traverse undisturbed desert land with no nearby residents thereby eliminating the potential for residential electric and magnetic field exposures. The proposed line would be owned and operated by SCE so its proposed design, erection, and maintenance plan would be according to standard SCE practices, which conform to applicable laws, ordinances, regulations and standards (LORS). With the five proposed conditions of certification, any line-related safety and nuisance impacts would be less than significant.

INTRODUCTION

The purpose of this analysis is to assess the proposed line design and operational plan for the project's transmission line to determine whether its related field and non-field impacts would constitute a significant environmental hazard in the area around the proposed route. All related health and safety laws LORS are currently aimed at minimizing such hazards. Staff's analysis focuses on the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- aviation safety;
- interference with radio-frequency communication;
- audible noise;
- fire hazards;
- hazardous shocks;
- nuisance shocks; and
- electric and magnetic field (EMF) exposure.

The following federal, state, and local laws and policies apply to the control of the field and non-field impacts of electric power lines. Staff's analysis examines the project's compliance with these requirements.

Transmission Line Safety and Nuisance (TLSN) TABLE 1
Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Aviation Safety	
Federal	
Title 14, Part 77 of the Code of Federal Regulations (CFR),"Objects Affecting the Navigable Air Space"	Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) "Notice of Proposed Construction or Alteration" in cases of potential obstruction hazards.
FAA Advisory Circular No. 70/7460-1G, " Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space"	Addresses the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA in cases of potential for an obstruction hazard.
FAA Advisory Circular 70/460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.
Interference with Radio Frequency Communication	
Federal	
Title 47, CFR, Section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication.
State	
California Public Utilities Commission (CPUC) General Order 52 (GO-52)	Governs the construction and operation of power and communications lines to prevent or mitigate interference.
Audible Noise	
Local	
San Bernardino County General Plan, Noise Element	**References the County's Ordinance Code for noise limits.**
City of Victorville Noise Element	**Sets sound level limits at residences and outdoor activity areas.**
City of Victorville Municipal Code, Chapter 13.01.	**Sets noise limits according to land use zoning and time of day.**
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
Title 8, California Code of Regulations (CCR) Section 2700 et seq. "High Voltage Safety Orders"	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	

Applicable LORS	Description
Institute of Electrical and Electronics Engineers (IEEE) 1119, “IEEE Guide for Fence Safety Clearances in Electric-Supply Stations”	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
GO-131-D, CPUC ”Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California”	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring electric and magnetic fields from an operating electric line.
Fire Hazards	
State	
14 CCR Sections 1250-1258, “Fire Prevention Standards for Electric Utilities”	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

SETTING

As noted in the **PROJECT DESCRIPTION** section, the site for the proposed Victorville 2 is within a 275-acre parcel in the northernmost portion of the City of Victorville and approximately 10 miles to the northeast of Southern California Edison’s (SCE’s) Victor Substation to which the project would be connected. According to the applicant, the City of Victorville (Victorville 2007a, pp. 1-1, 2-38 through 2-34, and 6.14-6), the project line would consist of three segments.

PROJECT DESCRIPTION

The proposed Victorville 2’s transmission elements will consist of the segments listed below:

- An overhead 230-kV line extending approximately 4.3 miles in a new right-of-way between the project site and a point 1.5 miles south of the existing High Desert Power Project (HDPP) where the line will connect to a transmission line that currently transmits the power from HDPP;
- A new 230 kV circuit erected on the support structures for the existing 5.7-mile long HDPP-Victor line;
- The project’s on-site 230-kV switchyard from which the conductors would extend to the connection points on the SCE transmission grid; and

- A system reliability upgrade involving (a) installation of new 230-kV towers and new conductors in the right-of-way of 230-kV line that runs from the Victor Substation to the Lugo Substation approximately 11 miles further south, (b) relocation of an existing 115-kV line within the right-of-way of the existing SCE Victor Substation-to-Lugo-Substation line to a new route approximately 200 feet from its present route, and (c) replacement of the wooden poles within a 3.1-mile segment with steel poles.

The proposed would be owned, operated and maintained by SCE so its conductors would be standard low-corona aluminum steel reinforced cables to be erected on new single tubular or lattice support structures. The applied design and construction would be in keeping with SCE guidelines necessary to ensure line safety and efficiency together with reliability, and maintainability.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

The potential magnitude of the line impacts of concern in this staff analysis depends on compliance with the listed design-related LORS and industry standards. These LORS have been established to maintain impacts below levels of potential significance. Thus, if staff determines that the project would comply with applicable LORS, we would conclude that any transmission line-related safety and nuisance impacts would be less than significant. The nature of these individual impacts is discussed below together with the potential for compliance with the LORS that apply.

DIRECT IMPACTS AND MITIGATION

Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace.

As noted by the applicant (Victorville 2007a, pp. 6.13-19 through 6.13-22 and 6.14-11), the Victorville 2 site is approximately one mile north of the Southern California Logistic Airport (SCLA), a civilian airport. Such closeness could pose a flight hazard to those utilizing the airport. However the height of the proposed line support towers would, at a maximum of 140 feet, be much less than the 200 feet regarded by the FAA as triggering the concern about aviation safety. Furthermore, the Victorville 2 site is further away from SCLA than the existing HDPP whose related transmission lines of similar structural dimensions do not pose an aviation hazard to area aircraft. Given these facts, staff considers the proposed line structures as not posing an obstruction-related aviation hazard to area aircraft as defined using current FAA criteria. As a result, FAA will not require the applicant to file a “Notice of Proposed Construction and Alteration (Form 7040).

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge, but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any such interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts is, therefore, minimized by reducing the line electric fields and locating the line away from inhabited areas.

The proposed line would be built and maintained in keeping with standard SCE practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for lines of 345-kV and above, and not the proposed 230-kV line. The proposed low-corona designs are used for all SCE lines of similar voltage rating to reduce surface-field strengths and the related potential for corona effects. Since these existing lines do not currently cause corona-related complaints along their existing routes, staff does not expect any corona-related radio-frequency interference or related complaints in the general project area. However, staff recommends Condition of Certification **TLSN-2** to ensure mitigation as required by the FCC in the unlikely event of complaints.

Audible Noise

The noise-reducing designs related to electric field intensity are not specifically mandated by federal or state regulations in terms of specific noise limits. As with radio noise, such noise is limited instead through design, construction or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability. Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345-kV or higher. It is, therefore, not generally expected at significant levels from lines of less than 345-kV as proposed for Victorville 2. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. Since the low-corona designs are also aimed at minimizing field strengths, staff does not expect the proposed line operation to add significantly to current background noise levels in the project area. For an assessment of the noise from the proposed line and related facilities, please refer to staff's analysis in the **NOISE AND VIBRATION** section.

Fire Hazards

The fire hazards addressed through the related LORS in **TLSN Table 1** are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

Standard fire prevention and suppression measures for similar SCE lines would be implemented for the proposed project line (Victorville 2007a, pp. 6.14-11 and 6.14-12). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this mitigation approach. **TLSN-4** is recommended to ensure compliance with important aspects of the fire prevention measures.

Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line, whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

The applicant's stated intention to implement the GO-95-related measures against direct contact with the energized line (Victorville 2007a, p. 6.14-10) would serve to minimize the risk of hazardous shocks. Staff's recommended Condition of Certification **TLSN-1** would be adequate to ensure implementation of the necessary mitigation measures.

Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line's electric and magnetic fields.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). For the proposed project line, the applicant will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

The potential for nuisance shocks around the proposed line would be minimized through standard industry grounding practices (Victorville 2007a, pp. 6.14-10 and 6.14-11). Staff recommends Condition of Certification **TLSN-5** to ensure such grounding for Victorville 2.

Electric and Magnetic Field Exposure

The possibility of deleterious health effects from EMF exposure has increased public concern in recent years about living near high-voltage lines. Both electric and magnetic fields occur together whenever electricity flows and exposure to them together is generally referred to as EMF exposure. The available evidence as evaluated by the CPUC, other regulatory agencies, and staff has not established that such fields pose a significant health hazard to exposed humans. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as staff does, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability and maintainability.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- The measures employed for such field reduction can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

State

In California, the CPUC (which regulates the installation and operation of high-voltage lines owned and operated by investor-owned utilities) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Publicly owned utilities, which are not within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local factors bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied in ways that prevent significant impacts on line operation and safety. The extent of such applications would be reflected by ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess the effectiveness of the applied reduction measures. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the support structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since most new lines in California are currently required by the CPUC to be designed according to the EMF-reducing guidelines of the electric utility in the service area involved, its fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Designing the proposed project line according to existing SCE field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management.

The CPUC has recently revisited the EMF management issue to assess the need for policy changes to reflect the available information on possible health impacts. The findings did not point to a need for significant changes to existing field management policies.

Industry's Approach to Reducing Field Exposures

The present focus is on the magnetic field because unlike electric fields, it can penetrate the soil, buildings and other materials to produce the types of human exposures at the root of the health concern of recent years. The industry seeks to reduce exposure, not by setting specific exposure limits but through design guidelines that minimize exposure in each given case. As one focuses on the strong magnetic fields from the more visible high-voltage power lines, staff considers it important, for perspective, to note that an individual in a home could be exposed to much stronger fields while using some common household appliances (National Institute of Environmental Health Services and the U.S. Department of Energy, 1998). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short-term, while the exposure from power lines are lower level, but long-term. Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

As with similar SCE lines, specific field strength-reducing measures would be incorporated into the design of the proposed line to ensure the field strength minimization currently required by the CPUC in light of the concern over EMF exposure and health.

The field reduction measures to be applied include the following:

1. Increasing the distance between the conductors and the ground;
2. Reducing the spacing between the conductors;
3. Minimizing the current in the line; and
4. Arranging current flow to maximize the cancellation effects from interacting of conductor fields.

The applicant has calculated the maximum field strengths at representative points along the proposed route to reflect the potential contribution of the Victorville 2 line to area EMF levels. Field strengths were calculated for specific points along the line's own right-of-way as well as the right-of-way it would share with existing lines (Victorville 2007a, pp. 6.14-8 through 6.14-10 through 6.14-12). Staff has verified the accuracy of the applicant's calculations with regard to parameters bearing on field strength dissipation and exposure assessment. As noted in Figures 6.14-1 through 6.14-6, the magnetic field intensity within the route would decrease from a maximum of 280 mG to 272 mG reflecting the interactive effects of fields from all conductors. The maximum electric field strength was calculated to remain the same at 1.4 kV/m. These field strengths reflect the effectiveness of SCE's field-reducing designs. Since these field strengths are similar to those of similar SCE lines, staff considers further mitigation to be unnecessary, but would seek to validate the applicant's assumed reduction efficiency from the field strength measurements recommended in Condition of Certification, **TLSN-3**.

CUMULATIVE IMPACTS AND MITIGATION

When field intensities are measures or calculated for a specific location, they reflect the interactive, and therefore, cumulative effects of fields from all contributing conductors. This interaction could be additive, or subtractive depending on prevailing conditions. Since the proposed project transmission line and switchyard would be designed according to applicable field-reducing SCE guidelines (as currently required by the CPUC for effective field management), any contribution to cumulative area exposures should be at levels expected for SCE lines of similar voltage and current-carrying capacity. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management. The actual field strengths and contribution levels for the proposed line design would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-3**.

COMPLIANCE WITH LORS

As previously noted, current CPUC policy on safe EMF management requires that any high-voltage line within a given area be designed to incorporate the field strength-reducing guidelines of the main area utility lines to be interconnected. The utility in this case is SCE. Since the proposed project line and related switchyard would be designed according to the respective requirements of GO-95, GO-52, GO-131-D, and Title 8, Section 2700 et seq. of the California Code of Regulations, and operated and maintained according to current SCE guidelines on line safety and field strength management, staff considers the presented design and operational plan to be in compliance with the health and safety LORS of concern in this analysis. The actual contribution to the area's field exposure levels would be assessed from results of the field strength measurements required in Condition of Certification **TLSN-3**.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no public or agency comments on the transmission line nuisance and safety aspects of the proposed Victorville 2.

CONCLUSIONS

Since the proposed transmission line does not pose an aviation hazard according to current FAA criteria, staff does not consider it necessary to recommend location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures to be implemented in keeping with current SCE guidelines (reflecting standard industry practices). These field-reducing measures would maintain the generated fields within levels not associated with radio-frequency interference or audible noise.

The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of PUC's General Order 95. Compliance with Title 14, California Code of Regulations, Section 1250, will minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the proposed route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed Victorville 2 and similar transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed line's design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information. The long-term, mostly residential magnetic exposure of health concern in recent years would be insignificant for the proposed line given the general absence of residences along the proposed route. On-site worker or public exposure would be short term and at levels expected for SCE lines of similar design and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

Since the proposed project line would be operated to minimize the health, safety, and nuisance impacts of concern to staff while located along a route without nearby residences, staff considers the proposed design, maintenance, and construction plan as complying with the applicable laws. With the conditions of certification proposed below, any such impacts would be less than significant.

PROPOSED CONDITIONS OF CERTIFICATION

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

Verification: At least thirty days before starting construction of the transmission line or related structures and facilities, the project owner shall submit to the Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the lines will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall ensure that every reasonable effort will be made to identify and correct, on a case-specific basis, any complaints of interference with radio or television signals from operation of the project-related lines and associated switchyards. The project owner shall maintain written records for a period of five years, of all complaints of radio or television interference attributable to plant operation together with the corrective action taken in response to each complaint. All complaints shall be recorded to include notations on the corrective action taken. Complaints not leading to a specific action or for which there was no resolution should be noted and explained. The record shall be signed by the project owner and also the complainant, if possible, to indicate concurrence with the corrective action or agreement with the justification for a lack of action.

Verification: All reports of line-related complaints shall be summarized for the project-related lines and included during the first five years of plant operation in the Annual Compliance Report.

TLSN-3 The project owner shall use a qualified individual to measure the strengths of the electric and magnetic fields from the line at the points of maximum intensity identified by the applicant in Figures 6.14-1 through 6.14-6. The measurements shall be made before and after energization according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures. These measurements shall be completed not later than six months after the start of operations.

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

TLSN-4 The project owner shall ensure that the rights-of-way of the proposed transmission line are kept free of combustible material, as required under the provisions of Section 4292 of the Public Resources Code and Section 1250 of Title 14 of the California Code of Regulations.

Verification: During the first five years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the right-of-way and provide such summaries in the Annual Compliance Report.

TLSN-5 The project owner shall ensure that all permanent metallic objects within the right-of-way of the project-related lines are grounded according to industry standards regardless of ownership. In the event of refusal by any property owner to permit such grounding, the project owner shall so notify the CPM. Such notification shall include, when possible, the owner's written objection. Upon receipt of such notice, the CPM may waive the requirement for grounding the object involved.

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

REFERENCES

Electric Power Research Institute (EPRI) 1982. Transmission Line Reference Book: 345 kV and Above.

National Institute of Environmental Health Services 1998. An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. A Working Group Report, August 1998.

Victorville 2007a. Application for Certification of the Victorville 2 Hybrid Power Project, Volumes I and II submitted to the California Energy Commission on February 28, 2007.

VISUAL RESOURCES

David Flores

SUMMARY OF CONCLUSIONS

Staff analyzed visual resources related information for the Victorville 2 Hybrid Power Project (Victorville 2), and has concluded that with the effective implementation of the mitigation measures identified by the applicant and contained in staff's recommended conditions of certification, this project would not cause any direct, indirect, or cumulative adverse visual resource impact, and would comply with applicable laws, ordinances, regulations, and standards (LORS) pertaining to visual resources.

INTRODUCTION

Visual resources are the viewable natural and manmade features of the environment. This analysis focuses on whether construction and operation of the Victorville 2 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	The project site does not involve federal managed lands, a recognized National Scenic Byway or All-American Road, or a designated State Scenic Highway. However, the National Trails Highway, also known as Route 66 and located east of the project site has been designated as a national preservation route (National Route Preservation Bill, enacted in 1999). The Bill was established to preserve significant views along Route 66, but there are no historical sites within the stretch of highway discussed in this visual analysis. Only small portions of present day Route 66 (Barstow area) are part of the original route.
State	
Local	
City of Victorville General Plan Land Use Element	Goal 4: Includes goal of Victorville as “an aesthetically pleasing community with development standards which reflect community needs”.
City of Victorville Municipal Code	Chapter 18.60.140: lists standards for landscape materials that are harmonious with the desert environment.
County of San Bernardino Desert Region Circulation and Infrastructure Plan	The National Trail-Route 66 is listed and mapped as a San Bernardino County scenic highway. As discussed above, although the program was established to preserve significant views along Route 66, there are no historical sites along this stretch of highway near the project site. Only small portions of present day Route 66 (Barstow area) are part of the original route. It is more than likely that the county will concentrate their efforts in this area of California in preserving the historic value of Route 66.
Southern California Logistics Airport Specific (SCLA) Plan	The SCLA Specific Plan says landscape development standards should encourage an attractive, visually coherent development compatible with local climatic conditions.

SETTING

The Victorville 2 would be built just north of the Southern California Logistics Airport (SCLA), the former George Air Force Base (AFB) in the city of Victorville, in San Bernardino County. The site lies approximately 3.5 miles east of U.S. Highway 395 and approximately 0.5 mile west of the Mojave River. The proposed project would be constructed on an approximately 275-acre site. The project site currently consists primarily of undisturbed land and does not contain significant scenic resources (see **Visual Resources Figure 1** – Aerial View of Site and Vicinity).

Notable landscape features in the regional project setting include the San Gabriel Mountains (approximately five miles to the east), the Quartzite Mountain range (approximately five miles to the east), and the San Bernardino Mountains (approximately 24 miles to the south).

The nearest residence with views to the project site is located on Colusa Road approximately one mile to the west. Several residences on the east side of the Mojave River near the National Historic Trail Route 66 would have views of the proposed project at a distance of approximately 1.5 miles from the natural gas fired power plant, and approximately 0.8 mile from the eastern edge of the solar array field.

PROJECT

The Victorville 2 is designed to use solar technology to generate a portion of the project's output. Primary equipment for the 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 Victorville 2 would include: two 145-foot tall HRSG stacks, one 68-foot tall cooling tower, and a 75-foot tall STG enclosure (see **Visual Resources Figure 2** – Plant Elevations Looking North).

During the construction period, approximately three acres would be used for vehicle parking, and the storage of construction equipment and materials. The project includes two laydown areas totaling 50 acres, and would also be used for construction vehicle parking as needed.

Transmission line

The transmission line route is divided into three (3) segments and extends approximately 21 miles from the plant site to the Lugo Substation in an unincorporated portion of San Bernardino County, south of Victorville and west of the city of Hesperia. Segment 1 consists of approximately 4.3 miles of transmission line to be constructed within a newly designated right-of-way (ROW). The full length of this segment is within the boundaries of the SCLA Plan Area, in an area designated for Industrial development. The property along this portion of the transmission route is largely undeveloped, except for the Victor Valley Wastewater Reclamation Authority (VVWRA) Regional Wastewater Treatment Facility (VVWRA facility) on the eastern boundary and former George AFB structures at the southern end of the segment that are scheduled for demolition.

All portions of Segments 2 and 3 are within existing transmission ROWs. Segment 2 extends from the transmission line’s connection point with the existing High Desert Power Project (HDPP) transmission tower structure to the SCE Victor Substation, a distance of approximately 5.7 miles. This portion of the project includes upgrades to the existing transmission facilities and structures, as well as the construction of three new transmission towers. Segment 2 lies entirely within the city of Victorville jurisdiction, although it skirts Victorville’s western boundary with the city of Adelanto just south of the

SCLA Plan Area. Property along this segment is largely undeveloped, with residential pockets along the eastern side of the route. Segment 3 is the final portion of the Victorville 2 project's transmission line route and connects the Victor Substation to SCE's Lugo Substation, and involves increasing the capacity of the existing SCE system between SCE's Victor Substation and Lugo Substation, for a distance of approximately 11 miles south of the Victor Substation. This would require the relocation of 6.6 miles of an existing 115 kV transmission line within the same right of way, and installing new steel poles or lattice towers and conductors for 11 miles of the proposed 21-mile long 230-kV Victorville 2 project transmission line.

Natural Gas

Natural gas would be delivered to the project through the Kern River-High Desert Power Project Lateral. The existing 24-inch natural gas pipeline runs adjacent to the southwestern corner of the proposed Victorville 2 site. The project would require the installation of a new 12-inch natural gas line to connect with the existing 24-inch line at a point adjacent to the southwest corner of the proposed site and extending approximately 450 feet beyond the boundary.

Water/Wastewater

Process water needs would be met by the use of reclaimed water supplied by the Victor Valley Wastewater Reclamation Authority (VVWRA) via a new 1.5 mile, 14-inch pipeline extending from the reclaimed water production system at the VVWRA treatment plant located southeast of the proposed site.

Potable water and emergency backup process water would be supplied by Victorville Water to the proposed project via a 3-mile pipeline extension along Perimeter Road serving drinking, sanitary and other washing needs, and requiring up to 3.6 acre-feet/year. 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 would be sent to the VVWRA treatment plant in a new 1.25-mile sanitary wastewater line.

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 2006 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.

Visual Resources Figure 3 - 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.

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 KOP 1, KOP 2 and KOP 3 viewsheds, based on staff's field reconnaissance, review of topographical maps, and review of the City of Victorville General Plan documents. The proposed project would not cause a significant visual impact to a scenic vista.

[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.

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 there are no identified scenic resources, based on staff's reconnaissance of the surrounding area, and in discussions with cultural resource staff members at the Energy Commission. KOP 1 and 2 were selected to evaluate the project's potential visual impacts from the National Historic Trail Route 66 (Route 66) which has been identified as a scenic highway by the San Bernardino County General Plan. There are no historical sites along this stretch of Route 66 near the project site. The proposed project would not cause a significant visual impact to viewers along Route 66 as explained in the **VISUAL CHARACTER OR QUALITY** section of this analysis (see KOP 1 and KOP 2 discussion).

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) <u>Construction Impacts</u>; and, 2) <u>Operation Impacts</u> – Analysis From Key Observation Points and Publicly Visible Water Vapor Plumes.

<u>Construction Impacts</u>

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 338 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. The nearest residence with possible views of the project site is located on Colusa Road which is approximately one mile to the west.

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. Because of the lack of residences in the immediate project area, no screening during the construction phase is needed in order to prevent adverse impacts.

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. The installation of the transmission lines would visually blend with the congestion of existing transmission structures and wires within the existing transmission corridors in Segment 2 and 3 as outlined earlier in the transmission line section of the report. Segment 1 of the transmission line proposal would require construction of tubular steel transmission poles for approximately 4.3 miles. KOP 1 and 2 were chosen to evaluate the project's power plant components, including the proposed transmission line and its potential visual impacts from National Historic Trail Route 66. 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 generate a less than significant visual effect.

Operation Impacts

Analysis from Key Observation Points

KOP 1 – National Historic Trail Route 66-Southbound

KOP 1 (see **Visual Resources Figure 4)** was selected to represent views by residents and travelers along National Historic Trail Route 66, and is approximately 500 feet south of Desert Flower Road and approximately 1.75 miles northeast from the Victorville 2 project site.

Visual Sensitivity

The major element in this view is the expanse of flat, open desert lands. The railroad embankment in the foreground provides a distinct variation from the typical high desert coloration. Scattered ranchettes are in the foreground, and the foothills are in the background. The estimated public appeal of the visual impression (quality) of the KOP 1 viewshed is considered to be low to moderate. The KOP 1 viewshed does not include a scenic resource or vista nor a view of a ridgeline within five miles.

Residential viewers are typically considered to be highly sensitive to modifications of a viewshed. However, from this KOP due to the screening provided by backyard fences, structures, and trees and vegetation in the foreground, the number of residential properties in this area from which the project has the potential to be visible (viewer exposure) is relatively small, probably numbering no more than about six. Nonetheless, the project has the potential to be seen to some degree from some short street segments, particularly portions of Peso Court and Jericho Road. Because this view is from a residential neighborhood, the level of viewer concern is considered high. Overall viewer exposure for residences in this area is considered moderate based on the moderate visibility, moderately low number of viewers, and moderate duration of view.

Route 66 is a north-south two-lane road that provides an additional access entry to the cities of Victorville and Apple Valley to the east. The road lies approximately one mile west of the project site, and is identified in the County of San Bernardino Desert Region Circulation and Infrastructure Plan as a scenic highway. Generally, motorists in this stretch of highway consist of workers in the area, due to the high concentration of industrial uses in this portion of Route 66. Typically, workers are not considered highly sensitive to visual change, so the estimated level of viewer concern of motorists along this segment of Route 66 is considered moderate.

The AFC states that the average vehicle volumes per hour along the road segment of Route 66 south of Air Expressway is 1,200 (Pg. 6.13-13,Table 6.13-5). If at least one individual per vehicle trip was exposed to a view of the project site with potential power plant structures, the estimated number of motorist exposures would be considered to be moderately low. Staff visited the project site and estimates the duration of view for motorists traveling north on Route 66 at the legal speed limit (45-miles per hour) through the KOP 1 viewshed is a potential exposure of the power plant site on the order of 10 to 20 seconds, which is considered to be low to moderate. Surrounding industrial uses (i.e., gravel industry) also disrupt the continuity of a motorist ground level view of the project site along this segment of Route 66. The taller power plant structures would be visible from a greater distance. The visibility of the project site is considered to be moderate to high. Overall exposure for motorist is considered to be moderate.

The overall visual sensitivity for residential viewers is considered moderate from the KOP 1 location. This assessment is the result of the moderately low visual quality, high viewer concern, and moderate overall viewer exposure.

The overall visual sensitivity for a motorist is considered moderate from the KOP 1 location. This assessment is the result of the moderately low visual quality, moderate viewer concern, and moderate overall viewer exposure.

Visual Change

Visual Resources Figure 5 presents a photo simulation of the proposed project's publicly visible structures after the completion of construction in the KOP 1 viewshed.

The most visible aspects of the power plant structures at KOP 1 would be the combustion turbine generators, exhaust stacks, and partial view of the cooling towers. The proposed project structures would increase the industrial character of the local area from this viewpoint.

The project would introduce vertical structural lines and linear forms, specifically the combustion generators and stacks. The introduced forms and lines would be inconsistent (i.e. contrast is high) with forms and lines already established by landforms in the vicinity (grazing land and rounded hills).

The applicant shows in their photo simulations and architectural rendering that the exteriors of major project structures would be treated with a gray finish intended to optimize its visual integration with the surrounding agricultural setting (**Visual Resources Figure 5**). The transmission line although not seen in this KOP will also be of a neutral color and non-reflective surface to help them to be absorbed into the overall view. Staff believes that a gray finish for the project structures may provide a noticeable contrast with landscape features such as the hills and grazing fields, but would integrate fairly well with the sky backdrop. The contrast with the sky would be greater with earth tone colors of the hills and varied colors of the seasonal desert setting. Staff has proposed Condition of Certification **VIS-1** which requires that all project features be colored to blend in with the existing landscape to the greatest extent feasible in accordance with a Surface Treatment Plan that would be approved by the CPM.

The photo simulation of the project structures shows the proportionate size relationship to other manmade and natural elements. The project would occupy a small portion of the total field-of-view of KOP 1. However, the structures would visually appear dominant when compared to other elements (building structures) in the KOP view. The overall visual scale of the structures as simulated in the KOP 1 viewshed is considered to be moderate.

The project would introduce publicly visible structures to the KOP viewshed; the degree of view disruption introduced by the structures is considered to be moderately low. There is no identified or designated scenic resource or vista in the KOP viewshed that would be blocked from view by project structures.

The overall visual change to KOP 1 viewshed is considered moderate as a result of high visual contrast, moderate scale, and low view disruption.

Staff concludes the introduction of the Victorville 2 project structures would not substantially degrade the existing viewshed at KOP 1. When considering the overall visual sensitivity of the various viewing groups at KOP 1 (residential viewer [moderate]; motorist views [moderate), and overall visual change of moderate, the introduction of the proposed project's publicly visible structures would generate a less than significant visual effect at this KOP.

KOP 2 – National Historic Trail Route 66-Northbound

KOP 2 (see **Visual Resources Figure 6)** was chosen to represent views by travelers along National Historic Trail Route 66, approximately 1.5 miles north of Oro Grande and approximately two miles southeast of the Victorville 2 project site. The view includes the switchyard in the southeast of the site where the project transmission line would exit the plant site. The transmission line at its nearest point would be located approximately 1.2 miles from this KOP.

Visual Sensitivity

The major elements in this view are the Mojave River valley landscape and the Victor Valley Wastewater Reclamation Authority Treatment Plant (VVWRA) in the foreground and middle ground, respectively. A single residence is located on the right hand side of the Figure 6 photo. This residence will be vacated under a purchase agreement with the city of Victorville; therefore this KOP only represents the travelers along Route 66. The KOP 2 viewshed does not include a scenic resource or vista. The estimated public appeal of the visual quality of the KOP 2 viewshed is considered to be low to moderate.

From this KOP, a traveler along this roadway is accustomed to a view of the VVWRA treatment plant, the foothills, and the tree foliage which surrounds the Mojave River. There is no focal point in the viewshed that draws the viewer's eye to a unique feature, especially with the dense tree foliage which obscures the view of the Mojave River. The estimated level of viewer concern towards preserving the existing KOP 2 viewshed is considered to be moderate.

Due to the topography, viewers in the area of KOP 2 would only be exposed to a partial view of the project's stacks. The visibility of the project site is considered low. The transmission lines will be visible in the middleground view, and the neutral color and non-reflective surface will reduce their visual contrast with their surrounding.

The project's potential to affect residential views at KOP 2 is considered insignificant, as the one residence in the viewshed will be removed through a purchase agreement with the city of Victorville. The duration of view and view exposure of the power plant structures from the travelers view is only considered from this KOP.

As previously noted, the AFC states that the ADT count of vehicle trips along the road segment of Road 66 is 1,200. The estimated number of motorist view exposures is considered to be moderately low. Staff visited the project site and estimates the duration of view for motorists traveling north on Route 66 in the KOP 2 viewshed to an exposure of potential power plant structures on the site is on the order of 10 to 20 seconds which is considered to be moderately low. Overall, view exposure for motorists 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 moderately low visual quality, moderately low viewer concern, and moderately low overall viewer exposure.

Visual Change

The applicant prepared a photo simulation of the publicly visible project structures after the completion of construction in the KOP 2 viewshed. The photo simulation shows that the project's publicly visible structures are barely noticeable from the KOP 2 location (see **Visual Resources Figure 7**). The project structures would not attract attention in the KOP 2 viewshed and as a result, contrast, visual scale, and view disruption are all low.

Staff concludes the introduction of the Victorville 2 structures would not substantially degrade the existing viewshed at KOP 2. When considering the overall visual sensitivity of the viewers at KOP 2 (motorist views [moderately low]), and overall visual change of low, the introduction of the proposed project's structures would generate a less than significant visual effect at this KOP.

KOP 3 – Horse Ranch/Residence on Colusa Road

KOP 3 (Visual Resources Figure 8) is located approximately 50 feet north of Colusa Road in front of the residence of a horse ranch. It was chosen to represent the view of the residents of the horse ranch and travelers along Colusa Road.

Visual Sensitivity

The view from KOP 3 towards the proposed project site includes the Mojave Desert landscape and Colusa Road. The background view is dominated by Quartzite Mountain range. The KOP 3 viewshed does not include a scenic resource or vista, based on review of the city of Victorville and County of San Bernardino general plans. The estimated public appeal of the visual quality of the KOP 3 viewshed is considered moderate. The residence represented by KOP 3 is surrounded by landscaping such that views are filtered in the direction of Victorville 2 site; therefore overall visibility from the KOP is moderately high. Viewer concern is rated high because the viewer is accustomed to an uninterrupted view of the Quartzite Mountain range from the property.

The estimated number of potential motorist exposures is considered low for local residents in the area. Overall viewer exposure is considered moderately low.

The overall visual sensitivity for residents of the horse ranch and motorist along Colusa Road from KOP 3 would be considered moderate. This assessment is the result of a moderate visual quality, high viewer concern, and moderate overall viewer exposure.

Visual Change

Visual Resources Figure 9 presents a photo simulation in the KOP 3 viewshed of the proposed project's publicly visible project structures after the completion of construction.

The project would be highly noticeable from the KOP 3 location with the vertical, cylindrical form of its 145-foot tall exhaust stacks, and solar array structures which would extend across the desert landscape for approximately one mile in length and 29 feet in height from KOP 3. The introduced forms and lines would be inconsistent with the desert setting in the area. The degree of contrast introduced by the project's structures is considered high when compared to the natural elements in the KOP viewshed.

The photo simulation of the project's structures shows the proportionate size relationship to the natural elements in the view. The project structures would occupy a moderate portion of the total field-of-view of KOP 3. In addition, the structures would visually appear dominant when compared to other elements in the KOP view (Joshua trees and shrubs) but would appear smaller than the mountains. The relative visual scale of the structures as simulated in the KOP 3 viewshed is considered to be high.

Although the project would introduce publicly visible structures to the KOP viewshed, the degree of view disruption introduced by the structures is considered to be moderate. There is no identified or designated scenic resource or vista in the KOP viewshed that would be blocked from view by project structures. A small view of the Quartzite Mountain would be partially disrupted by the project from the KOP location.

Staff concludes the introduction of the Victorville 2 Hybrid project would substantially degrade the existing viewshed at KOP 3. When considering the overall moderate visual sensitivity of the residential receptor at KOP 3, and overall moderately high visual change, the introduction of the proposed project structures would be substantially changed and degraded by the project, but the impacts are considered less than significant due to the fact that very few viewers are exposed to this view.

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 Victorville 2 project includes a 563 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 Victorville 2 cooling tower plumes. 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-2**). For this worst-case operating profile, visible water vapor plumes from the project’s cooling towers are predicted to occur 33.63% 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. It occurs very infrequently.

The 20th percentile plume dimensions from the proposed power plant's ten-cell cooling towers are approximately 68 feet high, 103 feet wide, and 71 feet long. Since the proposed cooling towers are 68 feet tall, the effective plume height above the ground would be 136 feet. Staff has prepared a photo simulation of the water vapor plumes for the project (see **Visual Resources Figure 11**). The 20th percentile plume dimensions for the project's cooling tower plumes are predicted to visually appear subordinate when compared to other elements in the KOP viewsheds.

As previously described, in the backdrop for both KOP 1 and 2 are the foothills, which are not identified as a scenic resource. The foothills go through an annual (seasonal) vegetation color change from dark green to light brown. The predicted plume height of 136 feet would exceed the silhouette-line of the foothills as viewed from the KOP locations. The 20th percentile plume would not block the hills or dominate the wide, panoramic views available for the few residences and traveling public represented by KOPs 1 and 2. Other than a small portion of the sky, the plumes would not block observed or documented important views or landscaped features. The color contrast of a potential emitted plume introduced to the KOP 1 and 2 viewsheds is anticipated to range between moderate and high during the year. The visual change introduced by the publicly visible water vapor plumes is considered low to moderate and would not substantially degrade the existing viewsheds at KOP 1 and KOP 2.

From KOP 3, the plume when present would increase the blockage of the Quartzite Mountain range, but would not dominate the wide, panoramic views available for the residence represented by KOP 3. The white plumes would contrast highly with the dark color of the mountains in the background. Therefore, overall visual change is moderate.

The introduction of the proposed project's plume would introduce a less than significant effect on visual resources. To ensure that the cooling tower is designed and operated as analyzed, staff has proposed Condition of Certification **VIS-5** to verify the cooling tower design prior to construction.

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 desert atmosphere, 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” (AFC pg. 6.15-11). 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 (AFC pg. 6.15-18).

Staff believes that the applicant’s general description of light mitigation would reduce offsite light impacts; however, the description does not specifically describe what the mitigations may consist of during the project’s construction and operation. There are many light mitigation options available that are extremely effective at limiting off-site light. With the effective implementation of some or all of these measures, staff believes that the Victorville 2 would not result in a substantial new source of light that could adversely affect existing nighttime views. Thus, staff has proposed Condition of Certification **VIS-2** which limits lighting during construction, and **VIS-3** which limits lighting during operation and requires submittal of a Lighting Mitigation Plan.

The Victorville 2 project site is approximately 5,200 feet (one mile) from the Southern California Logistics Airport runway. 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 residents in the surrounding area and to travelers on National Trails Highway. 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**). 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. In total, the solar thermal collection field will consist of approximately 250 acres, and is shown in **Visual**

Resources Figure 9 just left of the power plant structures. The height of the solar array support structures are approximately nine feet in height with the array system approximately 20 feet in height.

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. In total, the solar thermal collection field will consist of approximately 250 acres, and is shown in **Visual Resources Figure 9** just left of the power plant structures. The height of the solar array support structures are approximately nine feet in height with the array system approximately 20 feet in height.

In summer months, when solar input is high, the solar array typically operates for about 10 hours a day at full-rated electric output. For example, for an average day in August in the Mojave Desert the solar output of a trough plant is at full power from 7 am to 5 pm.

Based on information provided by the applicant, the Heat Collection Element (HCE) (Victorville 2007K) may cause a reflection or glow from the glass coating. To minimize possible glare to the horse ranch residents on Colusa Road, staff recommends Condition of Certification **VIS-6** which would require the project owner to plant additional tree screening around the perimeter of the horse ranch property if desired by the landowner. See **TRAFFIC AND TRANSPORTATION** section for further glare discussion.

The photo simulations of the power plant provided by the applicant show the use of a surface treatment on major project structures, buildings consisting of a neutral gray 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 are impaired; or (3) visual quality is diminished.

The proposed Victorville 2 would be built within the city limits of Victorville, within an expanse of open space with scattered residences. There is no identified scenic resource or vista in the KOP 1, KOP 2 and KOP 3 viewsheds that would be disrupted if the project were constructed.

While project-related nighttime light and daytime glare impacts of the Victorville 2 would be mitigated to a level that would be less than significant, existing light and glare levels in the vicinity of the project would increase cumulatively as a result of the project and, existing and planned 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 Victorville 2 project would introduce to the KOP 1, KOP 2, and KOP 3 viewsheds publicly visible structures that are industrial in nature to an area that is currently undeveloped with no plans for large-scale projects anticipated in the immediate future. The city of Victorville has slated this area for future growth in the city's general plan. There are ongoing discussions on projects planned as part of the overall planning process of developing the Southern California Logistic Airport (SCLA) into a major transportation hub, but there are no projects under review by the city of Victorville at this time. 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. The Victorville 2 in combination with existing and planned projects would generate a less than significant cumulative visual effect to the KOP 1, KOP 2, and KOP 3 viewsheds.

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, and a low income population less than 50% within the same radius (see the **SOCIOECONOMICS** section of this PSA, and **Socioeconomics Figure 1**).

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**).

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 visual resources related environmental justice issue.

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

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
Federal			
National Route Preservation Bill			
National Trails Highway, also known as Route 66	Program established to create a council to make recommendations on ways to best preserve the most representative and significant properties along Route 66.	YES	Although the program was established to preserve significant views along Route 66, there are no historical sites within this stretch of the highway. Only small portions of present day Route 66 (Barstow area) are part of the original route. It is more than likely that the council will concentrate their efforts in this area of California in preserving historic properties.
Local			
City of Victorville			
General Plan-Land Use Element Goal 4	Includes goal of Victorville as an aesthetically pleasing community with development standards which reflect community needs.	YES	Victorville 2 is consistent with the City's zoning and land use policies (see **LAND USE** section) so that if the project is consistent with the City's Land Use Map.
Southern California Logistics Airport Specific Plan	SCLA Specific Plan says landscape development standards should encourage an attractive, visually coherent development compatible with local climatic conditions	YES AS CONDITIONED	**VIS-4** requires the submittal and implementation of a landscaping plan consistent with the City's requirement of desert type landscaping (e.g., desert plants, relocation of 150 Joshua trees)
Municipal Code	Chapter 18.60.140: list standards for landscape materials that are harmonious for the desert environment	YES AS CONDITIONED	**VIS-4** requires the submittal and implementation of a landscaping plan consistent with the City's requirement of desert type landscaping. The applicant stated in the Data Response dated July 23, 2007, that the landscaping plan will conform to the city's landscaping requirements (Data Response pg. VR-1). The applicant has provided a landscaping plan at the project site (see **Visual Resources Figure 10**). The applicant's landscaping plan proposes the use of low profile drought tolerant plants, including approximately 150 Joshua trees which would be transplanted from

LORS		Consistency Determination	Basis for Consistency
Source	**Policy and Strategy Descriptions**		
			their current location on the project site. As shown in the landscaping plan, landscaping will only occur along the access road into the Victorville 2 site. Because of the desert setting and absence of sensitive receptors within close proximity of the project site, no additional landscaping is needed. This was also confirmed by a personal communication that the applicant had with city planning staff on July 16, 2007 (Data Response 91, dated July 23, 2007).
County of San Bernardino			
Desert Region Circulation and Infrastructure Plan	The National Historic Trail-Route 66 is listed and mapped as a San Bernardino County Scenic Highway.	YES	Although San Bernardino County lists Route 66 as scenic highway, there are no historical sites within this stretch of the highway. Only small portions of the existing Route 66 (Barstow area) are part of the original route. It is more than likely that San Bernardino County will concentrate their efforts in preserving the scenic highway in this area of the County.

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.

1. The proposed Victorville 2 is to be built in an area designated “Rural Residential” by the city of Victorville General Plan. Land uses surrounding the project site are visually described as industrial and undeveloped open space.

2. The power plant site does not use or have frontage on a segment of road recognized as a National Scenic Byway or All American Road, or designated as a State Scenic Highway.

3. The introduction of proposed Victorville 2 structures including the associated linear facilities would generate a less than significant visual effect at the three selected Key Observation Points.

4. The introduction of the proposed Victorville 2 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 Victorville 2's visible water vapor plumes would not substantially degrade the existing visual setting. The plumes would block small portions of the sky and the mountain range in the backdrop, but would not block observed or documented important views or landscaped features. The project would result in a less than significant visual effect related to publicly visible water vapor plumes

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 Victorville 2 would not cause any significant visual impacts, or contribute considerably to a cumulative visual impact.

The construction and operation of the Victorville 2 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

SURFACE TREATMENT OF PROJECT STRUCTURES AND BUILDINGS

VIS-1 The project owner shall 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. 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. 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;

E. A specific schedule for completing the treatment; and

F. 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 Victorville Department of Public Works and Planning, Development Services Division 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-2 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-3 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 Victorville 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 Victorville 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-4 The project owner shall provide landscaping consistent with the conceptual Landscape Plan, dated July 23, 2007, shown on **Visual Resources Figure 10.** The landscaping shall comply with the city of Victorville municipal code requirements stipulated in section 18-60.140 Landscape Development.

The project owner shall submit to the CPM for review and approval and simultaneously to city of Victorville, Planning Division for review and comment 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 Victorville 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 Victorville 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 Victorville Planning Division within seven days after completing installation of the landscaping, that the landscaping is ready for inspection.

PLUME FORMATION

VIS-5 The project owner shall ensure that the cooling tower is designed and operated as presented to the Energy Commission during the licensing of the Victorville 2 Project.

The cooling tower shall be designed and operated so that the exhaust air flow rate per heat rejection rate (1) will not be less than 15.8 kilograms per second per megawatt when the ambient conditions are 18 degrees F and 60% relative humidity, (2) will not be less than 16.4 kilograms per second per megawatt when the ambient conditions are 59 degrees F and 60% relative humidity; and (3) will not be less than 16.0 kilograms per second per megawatt when the ambient conditions are 77 degrees F and 40**%** relative humidity, and will otherwise be designed consistent with the fogging frequency curve provided for the cooling tower.

Verification: At least 90 days prior to ordering the cooling towers, the project owner shall provide to the CPM for review the final design specifications of the cooling tower to confirm that design mass flow rates for the cooling tower cells meet the requirements. The project owner shall not order the cooling tower until notified by the CPM that this design requirement has been satisfied.

The project owner shall provide the CPM written documentation demonstrating that the cooling towers have consistently been operated within the above-specified design parameters (except as necessary to prevent damage to the cooling tower) in the project's Annual Compliance Report, and at anytime as requested by the CPM. If requested by the CPM, the project owner shall provide the requested cooling tower operating data to the CPM at a date determined by the CPM.

The project owner's demonstration of compliance shall be determined using vendor supplied fan flow data, the number of cooling tower cells in operation, and hourly heat rejection values. In addition, compliance for ambient conditions between the three ambient points listed in the condition of certification shall be determined through interpolation.

If it is determined that the cooling tower has not operated within the specified design parameters, the project owner shall provide proposed remedial actions for CPM review and approval.

HORSE RANCH LANDSCAPE SCREENING

VIS-6 The project owner shall consult with the resident of the horse ranch on Colusa Road to determine the need, subject to approval of the CPM, to provide additional landscape screening along the property line of the horse ranch property, specifically in the area of the residential structure which faces the power plant facilities. This will assist in screening the residential home from views of the Victorville 2 facility and minimize glare from the solar array.

Verification: Prior to project start-up and at least 90 days prior to installing any landscaping, the project owner shall submit the proposed landscape-screening plan to the property owners of the horse ranch for review and comment, and to the CPM for approval. The project owner shall submit the property owners comments with the plan submitted to the CPM. Prior to operation, the project owner shall notify the CPM that the landscaping has been installed. If the landowner does not want landscaping to be planted on their property, the project owner shall provide written documentation to the CPM from the landowner verifying this.

REFERENCES

Victorville 2007a. City of Victorville. Application for Certification for the Victorville 2 Hybrid Power Plant. Volumes 1 and 2. Submitted to the California Energy Commission, February 27, 2007.

Victorville 2007c. City of Victorville. Data Response Set 2A, Responses to Data Requests 91-104 for the Victorville 2 Hybrid Power Plant. Submitted to the California Energy Commission, July 23, 2007.

SBC 2007. San Bernardino County General Plan, effective April 12, 2007.

VVGP. City of Victorville General Plan, adopted June/July 1997; revised as of August 1, 2007.

VV 2004. Southern California Logistics Airport Specific Plan. City of Victorville Planning Department; February 2004.

Victorville 2007k. City of Victorville. Applicant's Supplemental Responses to California Energy Commission's Visual Resources Data Request. 10/9/07.

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 20thpercentile 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
VISIBLE PLUME MODELING ANALYSIS

William Walters

INTRODUCTION

The following provides the assessment of the Victorville 2 Hybrid Power Project (Victorville 2) gas turbine/heat recovery steam generator (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

COOLING TOWER DESIGN AND OPERATING PARAMETERS

The following cooling tower design characteristics, presented below in **Visible Plume Table 1**, were obtained from the applicant’s data responses (Victorville 2007c). This data was used to model the cooling tower plume frequency and dimensions.

Visible Plume Table 1
Cooling Tower Operating and Exhaust Parameters

Parameter		**Cooling Tower Design Parameters**		
Number of Cells		10 Cells		
Cell Height		62.3 feet (19.0 meters)		
Cell Stack Diameter		28 feet (8.53 meters)		
Case	**Inlet Air Ambient Condition**	**Heat Rejection Rate (MW)**	**Exhaust Flow Rate (K lbs/hr)**	**Exhaust Temperature (°F)**
Full Load No Duct Firing No Solar				
1	18°F, 60% RH	311.8	55,367	56.27
2	59°F, 60% RH	306.2	63,571	73.14
3	77°F, 40% RH	303.8	61,495	79.38
Full Load Duct Firing No Solar				
1	18°F, 60% RH	443.0	62,594	63.00
2	59°F, 60% RH	435.5	63,571	79.33
3	77°F, 40% RH	432.8	61,992	84.85
Full Load Duct Firing and Solar				
1	18°F, 60% RH	473.5	62,673	65.02
2	59°F, 60% RH	467.0	64,075	80.70
3	77°F, 40% RH	464.4	62,007	86.07

Source: Victorville 2007c, Data Response #100.

3 This analysis uses a three year formatted meteorological data set for Victorville, with relative humidity from Lancaster, obtained from the applicant (Victorville 2007c).

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, No Solar/No Duct Firing		Full Load, No Solar/ Duct Firing		Full Load Solar and Duct Firing	
		Plume (hr)	Percent	Plume (hr)	Percent	Plum e (hr)	Percen t
All Hours	25,468	5,502	21.60%	8,606	33.79%	9,265	36.38%
Daylight Hours	12,897	1,642	12.73%	2,870	22.25%	3,163	24.53%
Daylight Clear Hours	11,808	1,215	10.29%	2,164	18.33%	2,407	20.38%
Seasonal Daylight Clear Hours*	5,025	1,127	22.43%	1,921	38.23%	2,113	42.05%

*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. In order to evaluate the 20th percentile plume dimensions, staff determined a worst case operating profile of full load no duct firing no solar for seasonal hours up to 10 a.m. daily with full load solar and duct firing occurring the rest of the day. The plume frequencies determined for this operating profile are provided in **Visible Plume Table 3.**

Visible Plume Table 3
Predicted Seasonal Daylight Clear Hours with Cooling Tower Steam Plumes
Staff's Selected Worst-Case Operating Profile
Victorville 2002-2004 Meteorological Data

Case	Modeled Hours	Plume (hr)	Percent
Seasonal Daylight Clear Hours*	5,025	1,690	33.63%

*Seasonal conditions occur anytime from November through April.

The plume frequency for this worst-case operating profile remains well over 20% of the seasonal (from November through April), daylight clear hours, therefore the seasonal daylight clear cooling tower plume dimensions were estimated. The plume dimensions by frequency for the staff's selected worst case operating profile during seasonal clear hours were estimated using the CSVP model and are presented in **Visible Plume Table 4**.

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

	Cooling Tower Seasonal "Clear" Hours Plume Dimensions Feet (Meters)		
Percentile	**Length**	**Height**	**Width**
5%	348 (106)	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, 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.

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 clearness index and solar insulation values being for New York City rather than using values from a location nearer the site, such as Inyokern. Staff corrected these issues and found that the SACTI model does not predict frequent large plumes from the Victorville 2 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.

HRSG VISIBLE PLUME MODELING ANALYSIS

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
Cooling Tower Operating and Exhaust Parameters

Parameter		HRSG Exhaust Parameters		
Stack Height		145 feet (44.2 meters)		
Stack Diameter		18.5 feet (5.64 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	18°F, 60% RH	7.52	3,878.7	197.3
2	59°F, 60% RH	8.62	3,640.2	194.8
3	77°F, 40% RH	9.12	3,548.9	195.3
Full Load Duct Firing No Solar				
1	18°F, 60% RH	9.22	3,884.4	179.4
2	59°F, 60% RH	10.41	3,636.3	178.6
3	77°F, 40% RH	10.94	3,545.4	178.8
Full Load Duct Firing and Solar				
1	18°F, 60% RH	8.38	3,880.9	176.7
2	59°F, 60% RH	9.52	3,645.6	174.5
3	77°F, 40% RH	10.03	3,542.2	174.6

Source: From or calculated from Victorville 2007a; Victorville 2007c, Data Response #94.

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, No 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%	4,357	17.11%	3,063	12.03%
Daylight Hours	12,897	210	1.63%	1,320	10.23%	924	7.16%
Daylight Clear Hours	11,808	190	1.61%	1,053	8.92%	767	6.50%
Seasonal Daylight Clear Hours*	5,025	190	3.78%	1,008	20.06%	740	14.73%

*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.

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. 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 before providing any subsequent VIZDET modeling results to the Commission.

CONCLUSIONS

Visible water vapor plumes from the proposed Victorville 2 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 twenty percentile plume size has been completed in the Visual Resources section.

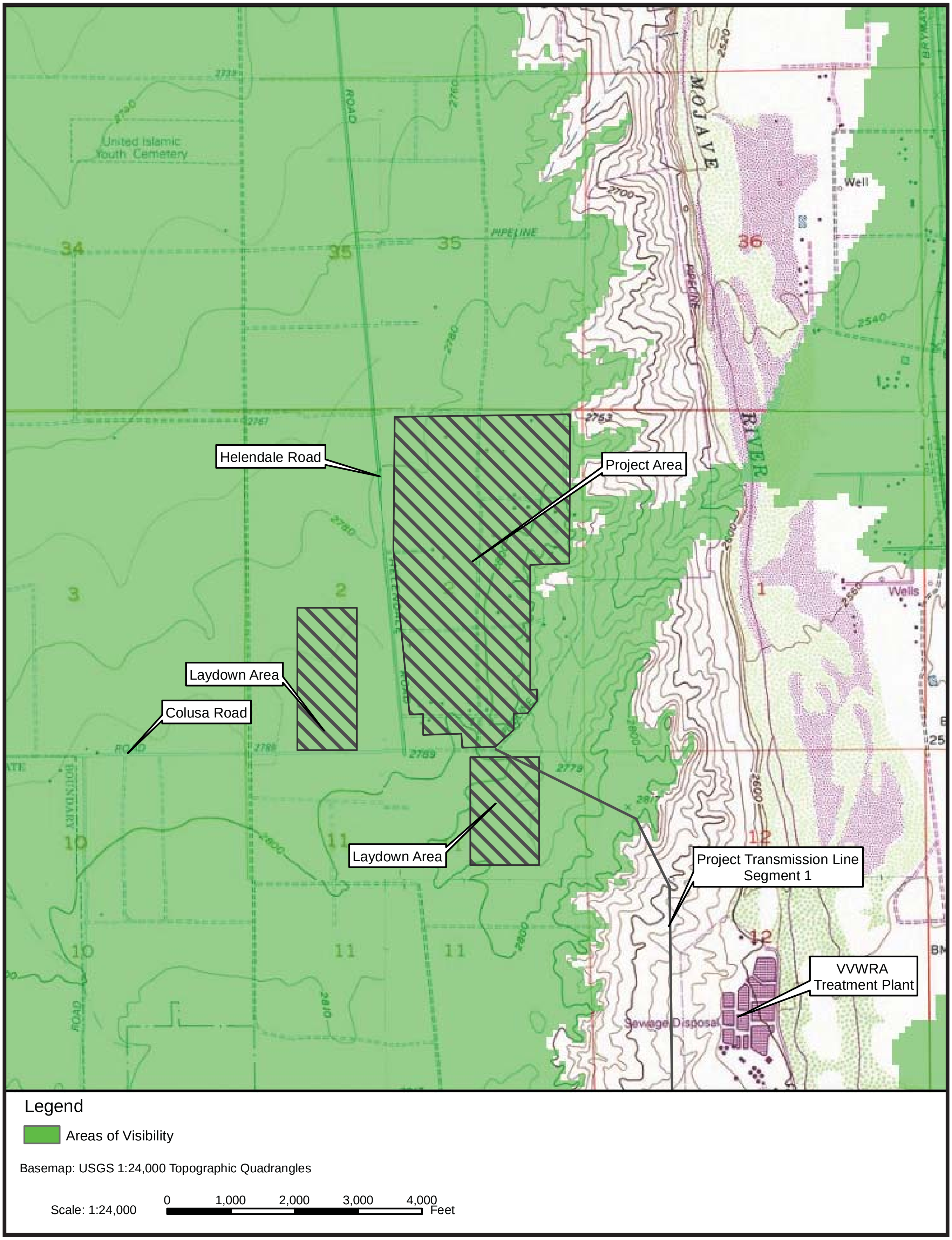
Visible water vapor plumes from the proposed Victorville 2 gas turbine/HRSG exhaust stacks are not expected to occur more than 20% of seasonal daylight clear hours considering worst-case maximum facility operation. Therefore, further visual impact analysis of worst-case plume frequencies and plume sizes has not been completed.

REFERENCES

Victorville 2007a – City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vol. 1&2. 2/27/07. Received 2/28/07.

Victorville 2007c – City of Victorville (tn: 41644). Applicant's Responses to CEC's Data Request Set 1, #s 1 – 110. 7/23/07. Received 7/23/07.

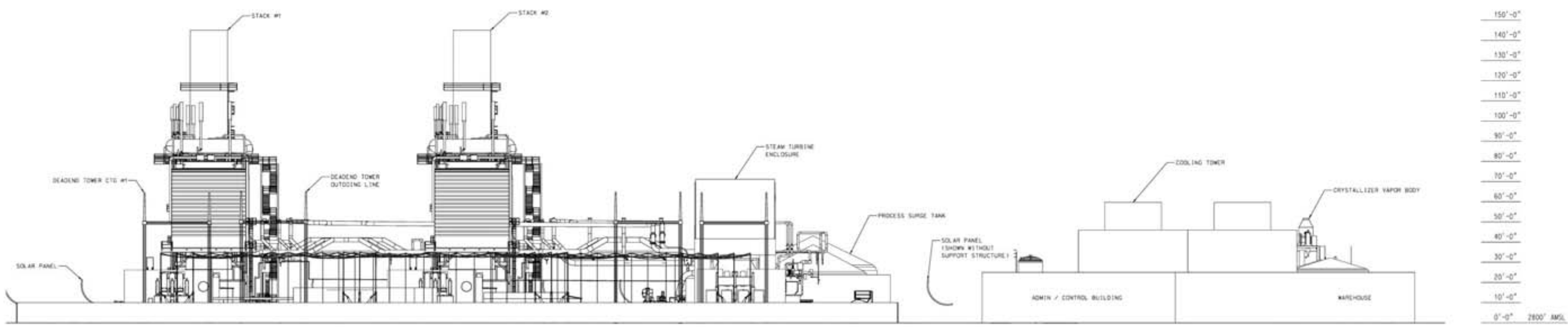
VISUAL RESOURCES - FIGURE 1
Victorville 2 Hybrid Power Project - Aerial View of Site and Vicinity



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: AFC Figure 6.15-3

VISUAL RESOURCES - FIGURE 2

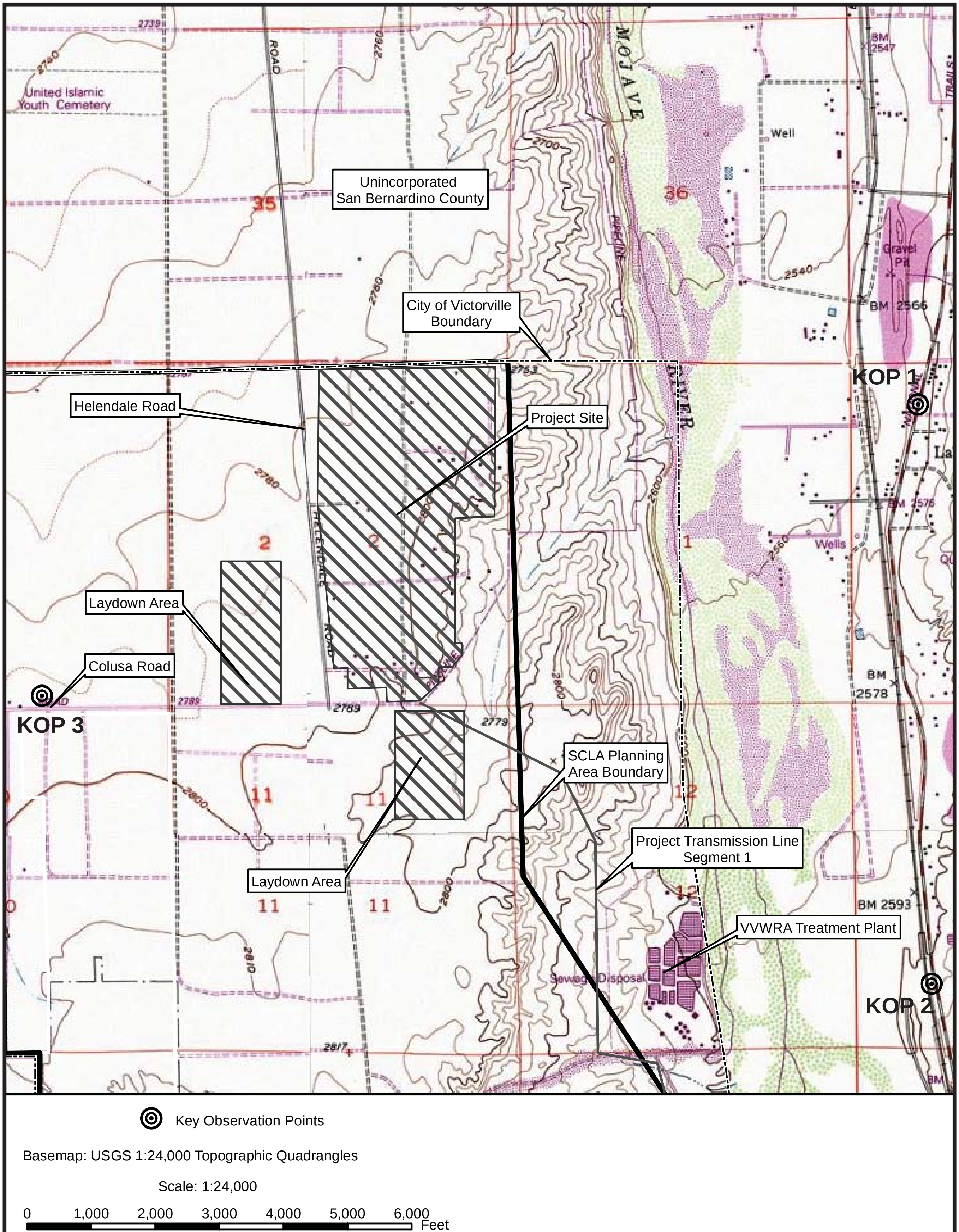
Victorville 2 Hybrid Power Project - Plant Elevations Looking North



ELEVATION LOOKING NORTH

SOURCE: AFC Figure 2-6a

VISUAL RESOURCES - FIGURE 3
Victorville 2 Hybrid Power Project - KOP Locations



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: AFC Figure 6.15-1

VISUAL RESOURCES - FIGURE 4

Victorville 2 Hybrid Power Project - View From KOP 1 Looking Southwest Toward Victorville 2 Site from (Existing Condition)

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 6.15-5a

VISUAL RESOURCES - FIGURE 5

Victorville 2 Hybrid Power Project - View From KOP 1 Looking Southwest Toward Victorville 2 Site (Simulated Condition)

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 6.15-5b

VISUAL RESOURCES - FIGURE 6

Victorville 2 Hybrid Power Project - View From KOP 2 Looking Northwest Toward Victorville 2 Site and Segment 1 ROW from (Existing Condition)

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 6.15-6a

VISUAL RESOURCES - FIGURE 7

Victorville 2 Hybrid Power Project - View From KOP 2 Looking Northwest Toward Victorville 2 Site and Segment 1 ROW (Simulated Condition)

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 6.15-6b

VISUAL RESOURCES - FIGURE 8

Victorville 2 Hybrid Power Project - View From KOP 3 Looking East Toward Victorville 2 Site from (Existing Condition)

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 6.15-7a

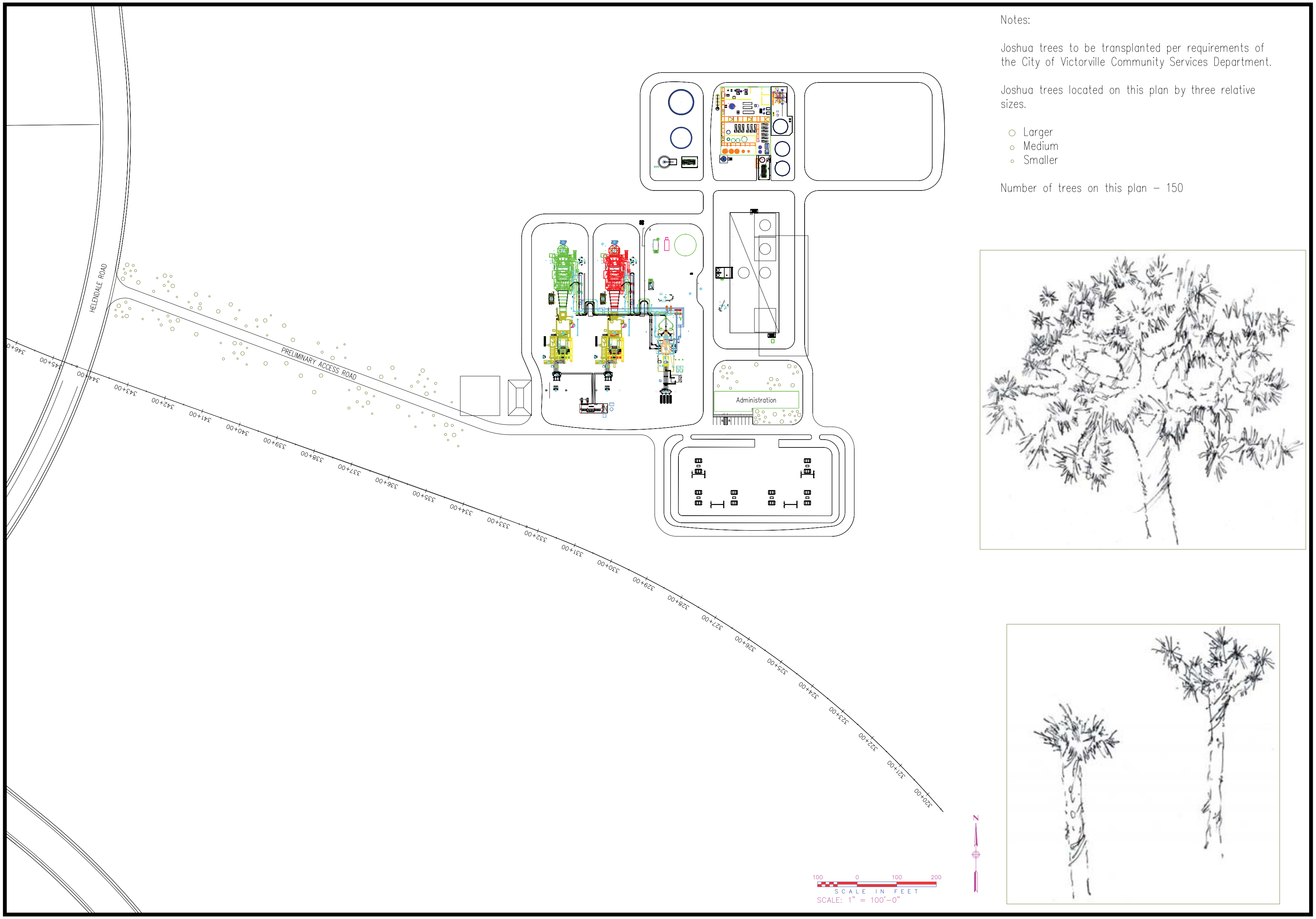
VISUAL RESOURCES - FIGURE 9

Victorville 2 Hybrid Power Project- View From KOP 3 Looking East Toward Victorville 2 Site (Simulated Condition)

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: AFC Figure 6.15-7b

VISUAL RESOURCES - FIGURE 10

Victorville 2 Hybrid Power Project- Conceptual Landscape Plan



SOURCE: AFC Figure DR 91-1

VISUAL RESOURCES - FIGURE 11

Victorville 2 Hybrid Power Project - View from KOP 1 - Visual Plume Simulation

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2007

SOURCE: AFC Figure 6.15-6, Modified by Bill Kanemoto

WASTE MANAGEMENT

Cheryl Closson

SUMMARY OF CONCLUSIONS

Management of the waste generated during construction and operation of the Victorville 2 Hybrid Power Project (Victorville 2) would not result in any significant adverse impacts, and would comply with applicable waste management laws, ordinances, regulations, and standards, if the measures proposed in the Application for Certification (AFC) and staff's proposed conditions of certification are implemented.

INTRODUCTION

This Preliminary Staff Assessment (PSA) presents an analysis of issues associated with wastes generated from the proposed construction and operation of the Victorville 2 project. The technical scope of this analysis encompasses solid wastes existing onsite and those to be generated during facility construction and operation. Management and discharge of wastewater is addressed in the **SOIL AND WATER RESOURCES** section of this document. Additional information related to waste management may also be covered in the **WORKER SAFETY** and **HAZARDOUS MATERIALS MANAGEMENT** sections of this document.

The Energy Commission staff's objectives in conducting this waste management analysis are to ensure that:

- The management of project wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project would be managed in an environmentally safe manner.
- The disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities.
- Upon project completion, the site is managed in such a way that project wastes and waste constituents would not pose a significant risk to humans or the environment.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental laws, ordinances, regulations and standards (LORS) have been established to ensure the safe and proper management of both solid and hazardous wastes in order to protect human health and the environment. Project compliance with the various LORS is a major component of staff's determination regarding the significance and acceptability of the Victorville 2 project with respect to management of waste.

Waste Management Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 42, United States Code (U.S.C.), §§6901, et seq. Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al).	The Solid Waste Disposal Act, as amended and revised by the Resource Conservation and Recovery Act (RCRA) et al, establishes requirements for the management of solid wastes (including hazardous wastes), landfills, underground storage tanks, and certain medical wastes. The statute also addresses program administration, implementation and delegation to states, enforcement provisions and responsibilities, as well as research, training, and grant funding provisions. RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing: • Generator record keeping practices that identify quantities of hazardous wastes generated and their disposition; • Waste labeling practices and use of appropriate containers; • Use of a manifest when transporting wastes; • Submission of periodic reports to the United States Environmental Protection Agency (USEPA) or other authorized agency; and • Corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities. RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills. RCRA is administered at the federal level by USEPA and its ten regional offices. The Pacific Southwest regional office (Region 9) implements USEPA programs in California, Nevada, Arizona, and Hawaii.
Title 42, U.S.C., §§ 9601, et seq. Comprehensive Environmental Response, Compensation and Liability Act	The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as Superfund, establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things, the statute addresses: • Reporting requirements for releases of hazardous substances; • Requirements for remedial action at closed or abandoned hazardous waste sites, and brownfields; • Liability of persons responsible for releases of hazardous substances or waste; and • Requirements for property owners/potential buyers to conduct “all appropriate inquiries” into previous ownership and uses of the property to 1) determine if hazardous substances have been or may have been released at the site, and 2) establish that the owner/buyer did not cause or contribute to the release. A Phase I Environmental Site Assessment is commonly used to satisfy CERCLA “all appropriate inquiries” requirements.
Title 40, Code of Federal Regulations (CFR), Subchapter I –	These regulations were established by USEPA to implement the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic

Solid Wastes.	criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes. • Part 246 addresses source separation for materials recovery guidelines. • Part 257 addresses the criteria for classification of solid waste disposal facilities and practices. • Part 258 addresses the criteria for municipal solid waste landfills. • Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and lamps). USEPA implements the regulations at the federal level. However, California is an authorized state so the regulations are implemented by state agencies and authorized local agencies in lieu of USEPA.
Title 49, CFR, Parts 172 and 173. Hazardous Materials Regulations	U.S. Department of Transportation established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with Title 40, CFR, section 262.20.
State	
California Health and Safety Code (HSC), Chapter 6.5, §25100, et seq. Hazardous Waste Control Act of 1972, as amended.	This California law creates the framework under which hazardous wastes must be managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than federal requirements. The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) administers and implements the provisions of the law at the state level. Certified Unified Program Agencies (CUPAs) implement some elements of the law at the local level.
Title 22, California Code of Regulations (CCR), Division 4.5. Environmental Health Standards for the Management of Hazardous Waste	These regulations establish requirements for the management and disposal of hazardous waste in accordance with the provisions of the California Hazardous Waste Control Act and federal RCRA. As with the federal requirements, waste generators must determine if their wastes are hazardous according to specified characteristics or lists of wastes. Hazardous waste generators must obtain identification numbers, prepare manifests before transporting the waste off-site, and use only permitted treatment, storage, and disposal facilities. Generator standards also include requirements for record keeping, reporting, packaging, and labeling. Additionally, while not a federal requirement, California requires that hazardous waste be transported by registered hazardous waste transporters. The standards addressed by Title 22, CFR include: • Identification and Listing of Hazardous Waste (Chapter 11, §§66261.1, et seq.) • Standards Applicable to Generator of Hazardous Waste (Chapter

	12, §§66262.10, et seq.) • Standards Applicable to Transporters of Hazardous Waste (Chapter 13, §§66263.10, et seq.) • Standards for Universal Waste Management (Chapter 23, §§66273.1, et seq.) • Standards for the Management of Used Oil (Chapter 29, §§66279.1, et seq.) • Requirements for Units and Facilities Deemed to Have a Permit by Rule (Chapter 45, §§67450.1, et seq.) The Title 22 regulations are established and enforced at the state level by DTSC. Some generator standards are also enforced at the local level by CUPAs.
HSC, Chapter 6.11 §§25404 – 25404.9 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)	The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs listed below. • Aboveground Storage Tank Program • Business Plan Program • California Accidental Release Prevention (CalARP) Program • Hazardous Material Management Plan / Hazardous Material Inventory Statement Program • Hazardous Waste Generator / Tiered Permitting Program • Underground Storage Tank Program The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as Certified Unified Program Agencies (CUPAs). The Victorville Fire Department, Hazardous Materials Division is the CUPA for the Victorville 2 project. Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program. Other elements of the Unified Program may be addressed in the Hazardous Materials and/or Worker Health and Safety analysis sections.
Title 27, CCR, Division 1, Subdivision 4, Chapter 1, §15100, et seq. Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses. • Article 9 – Unified Program Standardized Forms and Formats (§§ 15400-15410). • Article 10 – Business Reporting to CUPAs (§§15600 – 15620).
Public Resources Code, Division 30, §40000, et seq. California	The California Integrated Waste Management Act of 1989 (as amended) establishes mandates and standards for management of solid waste. Among other things, the law includes provisions addressing solid waste source reduction and recycling, standards for design and construction of municipal landfills, and programs for county waste management plans

Integrated Waste Management Act of 1989.	and local implementation of solid waste requirements.
Title 14, CCR, Division 7, §17200, et seq. California Integrated Waste Management Board	These regulations further implement the provisions of the California Integrated Waste Management Act and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions. • Chapter 3 -- Minimum Standards for Solid Waste Handling and Disposal. • Chapter 3.5 – Standards for Handling and Disposal of Asbestos Containing Waste. • Chapter 7 – Special Waste Standards. • Chapter 8 – Used Oil Recycling Program. • Chapter 8.2 – Electronic Waste Recovery and Recycling
HSC, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq. Hazardous Waste Source Reduction and Management Review Act of 1989 (also known as SB 14).	This law was enacted to expand the State's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (~ 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a four year cycle, with a summary progress report due to DTSC every 4th year.
Title 22, CCR, §67100.1 et seq. Hazardous Waste Source Reduction and Management Review.	These regulations further clarify and implement the provisions of the Hazardous Waste Source Reduction and Management Review Act of 1989 (noted above). The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the Act.
Local	
City of Victorville Municipal Code, Chapter 6.49 and City of Victorville Fire Regulations City of Victorville Fire Department, Hazardous Materials Division	The City of Victorville Municipal Code and Fire Regulations establish requirements for the generation, use, storage, and disposal of hazardous materials and hazardous wastes within the city. The City of Victorville Fire Department serves as the local Certified Unified Program Agency (CUPA) authorized to implement the provisions of the six California Unified Program elements (noted above in the State LORS section).
County General Plan Public Facilities Element	Will ensure all new development complies with applicable provisions of County Integrated Solid Waste Management Plan.

SETTING

PROJECT AND SITE DESCRIPTION

The proposed Victorville 2 project is a 563 MW natural gas-fired, combined cycle generating facility integrated with approximately 250 acres of solar-thermal collectors and associated heat transfer equipment. The combined cycle equipment will consist of two combustion turbine generators (CTG), two heat recovery steam generators (HRSG), and one steam turbine generator (STG). The solar-thermal equipment will utilize arrays of parabolic sunlight collectors to heat a working fluid/heat transfer fluid (Therminol) and generate steam in the plant STG. In addition to the main power plant and solar facilities, the project would include construction of electrical transmission lines (three segments) and pipelines for natural gas and water/wastewater.

The project site is located immediately north of the site of the former George Air Force Base, now known as the Southern California Logistics Airport (SCLA). The footprint of the power plant would require the grading of approximately 338 acres in order to provide a usable area of 275 acres for the power block and solar field. Construction laydown would also require temporary use of two separate areas consisting of 20 and 30 acres each. The proposed project site, laydown areas, pipeline areas, and transmission line corridors are all located in areas of dominantly undeveloped land that is generally characterized as native desert landscape. One occupied rural residence and areas of abandoned structures and vehicles currently exist on the proposed power plant and solar array property.

The construction phase of the proposed Victorville 2 project is estimated to take 27 months (Victorville 2007a). Construction of the proposed power plant would require demolition of any existing structures on the main project site. In addition, construction of segment three of the electric transmission line would require replacing 3.5 miles of wooden transmission tower poles with new steel poles.

Once constructed, the plant would be capable of operating seven days a week, 24 hours a day, with a planned operational life of 30 years. Operation and maintenance of the plant and associated facilities will generate a variety of wastes, including hazardous wastes. Process wastewater generated by the plant would be treated using a zero liquid discharge (ZLD) system that distills the wastewaters (such as cooling tower blowdown) into a solid waste. The ZLD solid waste would then be disposed at a permitted offsite disposal facility. Sanitary wastewater would be disposed to an existing sewer system and Publicly Owned Treatment Works (POTW) via a new 1.25-mile sanitary wastewater pipeline. To control air emissions, the project’s combined cycle units would use selective catalytic reduction (SCR) and oxidation catalyst equipment and chemicals, which generate both solid and hazardous waste.

Please see the project AFC (Victorville 2007a) for a more detailed description of the project elements.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This Waste Management analysis addresses: a) existing project site conditions and the potential for contamination associated with prior activities on or near the project site, and b) the impacts from the generation and management of wastes during project construction and operation.

a) For any site in California proposed for the construction of a power plant, the applicant must provide documentation about the nature of any potential or existing releases of hazardous substances or contamination at the site. If potential or existing releases or contamination at the site are identified, the significance of the release or contamination would be determined by site-specific factors, including, but not limited to: the amount and concentration of contaminants or contamination; the proposed use of the area where the contaminants/contamination is found; and any potential pathways for workers, the public, or sensitive species or environmental areas to be exposed to the contaminants. Any unmitigated contamination or releases of hazardous substances that pose a risk to human health or environmental receptors would be considered significant by Energy Commission staff.

   As a first step in documenting existing site conditions, the Energy Commission's power plant site certification regulations require that a Phase I Environmental Site Assessment (ESA) be prepared[1] and submitted as part of an application for certification. The Phase I ESA is conducted to identify any conditions indicative of releases and threatened releases of hazardous substances at the site and to identify any areas known to be contaminated (or a source of contamination) or near the site.

   In general, the Phase I ESA uses a qualified Environmental Professional (EP) to conduct inquiries into past uses and ownership of the property, research hazardous substance releases and hazardous waste disposal at the site and within a certain distance of the site, and visually inspect the property, making observations about the potential for contamination and possible areas of concern. After conducting all necessary file reviews, interviews, and site observations, the EP then provides findings about the environmental conditions at the site. In addition, since the Phase I ESA does not include sampling or testing, the EP may also give an opinion about the potential need for any additional investigation. Additional investigation may be needed, for example, if there were significant gaps in the information available about the site, an ongoing release is suspected, or to confirm an existing environmental condition.

   If additional investigation is needed to identify the extent of possible contamination, a Phase II ESA may be required. The Phase II ESA usually includes sampling and testing of potentially contaminated media to verify the level of contamination and the potential for remediation at the site.

[1] Title 20, California Code of Regulations, Section 1704(c) and Appendix B, section (g)(12)(A). Note that the Phase I ESA must be prepared according to American Society for Testing and Materials protocol or an equivalent method agreed upon by the applicant and the Energy Commission staff.

In conducting its assessment of a proposed project, Energy Commission staff will review the project's Phase I ESA and work with the appropriate oversight agencies as necessary to determine if additional site characterization work is needed and if any mitigation is necessary at the site to ensure protection of human health and the environment from any hazardous substance releases or contamination identified.

b) Regarding the management of project-related wastes generated during construction and operation of the proposed project, staff reviews the applicant's proposed solid and hazardous waste management methods and determines if the methods proposed are consistent with the LORS identified for waste disposal and recycling. The federal, state, and local LORS represent a comprehensive regulatory system designed to protect human health and the environment from impacts associated with management of both non-hazardous and hazardous wastes. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management.

   Staff then reviews the capacity available at off-site treatment and disposal sites and determines whether or not the proposed power plant's waste would have a significant impact on the volume of waste a facility is permitted to accept. Staff uses a waste volume threshold equal to 10% of a disposal facility's remaining permitted capacity to determine if the impact from disposal of project wastes at a particular facility would be significant.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Site Conditions

A draft Phase I Environmental Site Assessment (ESA) of the proposed project site, dated June 2006, was prepared by ENSR Corporation in accordance with the American Society for Testing and Materials (ASTM) Standard Practice E 1527-00 for ESAs. The Phase I ESA is included as Appendix M in volume 2 of the project AFC (Victorville 2007a).

As noted in the Phase I ESA, the proposed project site, laydown areas, pipeline areas, and transmission line corridors are all located in areas of dominantly undeveloped land that is generally characterized as native desert landscape.

The Phase I ESA conducted for the Victorville 2 project identified the following environmental conditions and recommendations associated with the proposed project site and linear facility corridors. Energy Commission staff's evaluation of the findings and recommendations are provided below as well.

1) *Phase I ESA Finding: The presence of TCE-impacted groundwater near the VVWRA treatment plant was identified as a Recognized Environmental Condition (REC) associated with Segment 1of the proposed transmission line corridor.*

   Phase I ESA Recommendation: While the TCE groundwater plume was identified as an REC, the Phase I ESA states that project construction is unlikely to encounter the plume due to the depth of the plume (approximately 210 to 250 feet below the ground surface) and the shallowness of the excavations for the

VV2 linear structures (less than 30 feet below ground surface). However, the Phase I ESA does recommend that construction planning take into account the presence of the groundwater plume beneath portions of the linear facilities.

This finding and recommendation is addressed in the **SOIL AND WATER RESOURCES** section of this document.

2) *Phase I ESA Finding: The potential for hazardous materials or wastes associated with the abandoned structures and vehicles observed on the main project site may represent an area of concern.*

   Phase I ESA Recommendation: Construction planning should include consideration of the possible presence of hazardous substances or wastes associated with abandoned structures and vehicles on the site, and appropriate measures should be taken to ensure the issue is properly addressed and any wastes found are properly managed and disposed.

In the CEC Staff Data Request #110 (Victorville 2007c), staff requested additional information on the project site to more fully characterize the amount of waste that may be present, in addition to the abandoned structures and vehicles observed from a distance. The applicant responded that they currently do not have access to the site, but once they have access the onsite waste will be characterized and disposed according to applicable law and regulations (Victorville 2007c). In addition, DTSC noted the potential for hazardous waste onsite and commented that any environmental investigations, sampling and/or remediation for the site should be conducted under an approved workplan and oversight by a regulatory agency that has jurisdiction to oversee hazardous substance cleanup. DTSC also commented that, if demolition of structures or asphalt or concrete-paved areas is planned as part of the project, an investigation should be conducted for the presence of lead-based paint, asbestos, mercury or other hazardous substances (DTSC 2007a).

Because the original project Phase I ESA was prepared in June 2006, and the entirety of the property has not yet been fully assessed, Energy Commission staff proposes a condition of certification (**WASTE -1**) to be completed before site construction is begun. **WASTE-1** would require the applicant to conduct an updated Phase I ESA, according to the most recent and updated ASTM standards, that more fully identifies the potential wastes and impacts associated with any existing structures and vehicles or debris found on the site. The updated Phase I must also include a visual inspection of the grounds and area around the structures and abandoned vehicles and an evaluation of the potential for asbestos, lead-based paint, mercury (from abandoned vehicles, switches, etc.), or other hazardous substance releases in the area. The updated Phase I ESA must be submitted to both the Energy Commission and the appropriate DTSC office not less than 120 days prior to the planned start of project construction.

Initiation of construction activities will not be allowed until the site is assessed. In the event that potential releases are identified or site sampling is recommended, any additional work must be conducted under the oversight of the Energy Commission and the appropriate regulatory agency with jurisdiction to oversee hazardous substance cleanup at the project site. If additional site characterization, sampling or remediation is deemed necessary, construction shall be delayed as necessary until any contaminated areas are remediated. Furthermore, staff recommends that proposed conditions of certification **WASTE-2** and **WASTE-3** be applied to site characterization and demolition activities, as well as construction activities, to address any soil contamination contingency that may be encountered. **WASTE-2** would require that an experienced and qualified Professional Engineer or Professional Geologist be available for consultation in the event contaminated soil is encountered. If contaminated soil is identified, **WASTE-3** would require that the Professional Engineer or Professional Geologist inspect the site, determine what is required to characterize the nature and extent of contamination, and provide a report to the Energy Commission and DTSC with findings and recommended actions.

Construction Impacts and Mitigation

Site preparation and construction of the proposed power plant and associated facilities would last approximately 27 months, and would generate both nonhazardous and hazardous wastes in solid and liquid forms (Victorville 2007a, section 6.16.3.1). Before construction can begin, the project owner would be required to develop and implement a Construction Waste Management Plan, per proposed condition of certification **WASTE-6**.

Non-hazardous Wastes

Non-hazardous solid wastes generated during construction would include approximately 4,644 cubic yards of scrap wood, concrete, steel/metal, paper, glass, and plastic waste (Victorville 2007a, Table 6.16-5). All non-hazardous wastes would be recycled to the extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed in a solid waste disposal facility, per Title 14, California Code of Regulations, §17200 et seq.

Non-hazardous liquid wastes would also be generated during construction, including sanitary wastes, dust suppression drainage, and equipment wash water. Sanitary wastes would be collected in portable, self-contained toilets and pumped periodically for disposal at an appropriate facility. Potentially contaminated equipment wash water will be contained at designated wash areas and transported to a sanitary wastewater treatment facility. Please see the **SOIL AND WATER RESOURCES** section of this document for more information on the management of project wastewater.

Hazardous Wastes

Hazardous wastes anticipated to be generated during construction include empty hazardous material containers, solvents, waste paint, oil absorbents, used oil, oily rags, batteries, and HRSG cleaning wastes. These amounts would be minor and, if handled in the manner identified in the AFC (Victorville 2007a, section 6.16.3.1) and applicant responses to data requests (Victorville 2007c, DR 108), would present an insignificant risk to workers, the public, and the environment.

Construction wastes generated by the project will also include wooden transmission line poles. These poles are usually treated with chemical preservatives and may be subject to hazardous waste management requirements as “treated wood waste”. However, the project applicant has noted in data response #105 (Victorville 2007c) that Southern California Edison will be replacing the poles as part of the transmission line construction. Therefore, the wooden poles would be exempt from management as a hazardous waste according to the “utility” exemption and management requirements provided in HSC §25143.1.5. However, if other “non-utility” treated wood waste is identified in any project-related construction or demolition activities, it may be subject to hazardous waste management according to the Alternative Management Standards for Treated Wood Waste established in Title 22, §67386.1, et seq.

Both the construction contractor and the project owner/operator could be considered the generator of hazardous wastes at the site during the construction period. Because hazardous waste generator status is determined by site, the project owner would be required to obtain a unique hazardous waste generator identification number for the site prior to starting construction, pursuant to proposed condition of certification **WASTE-4**. Wastes would be accumulated onsite for less than 90 days and then properly manifested, transported and disposed at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. Staff reviewed the disposal methods described in AFC Section 6.16.3.1 and in the responses to data requests, and concluded that all wastes would be disposed in accordance with all applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed condition of certification **WASTE-5,** to notify the Compliance Project Manager (CPM) whenever the owner becomes aware of any such action.

In the event that construction excavation, grading or trenching activities for the proposed project encounter potentially contaminated soils, specific handling, disposal, and other precautions may be necessary pursuant to hazardous waste management LORS. Staff finds that proposed conditions of certification **WASTE-2** and **WASTE-3** would be adequate to address any soil contamination contingency that may be encountered during construction of the project and would ensure compliance with LORS. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management activities.

Operation Impacts and Mitigation

The proposed Victorville 2 project would generate non-hazardous and hazardous wastes in both solid and liquid forms under normal operating conditions. (Table 6.16-6 of the project AFC gives a summary of the operation waste streams, expected waste volumes and generation frequency, and management methods proposed.) Before operations can begin, the project owner would be required to develop and implement an Operations Waste Management Plan pursuant to proposed condition of certification **WASTE-7**.

Non-hazardous Solid Wastes

Non-hazardous solid wastes expected to be generated during project operation include routine maintenance wastes (such as used air filters, spent demineralizer resins, sand and filter media, and ZLD water treatment solids) as well as domestic and office wastes (such as office paper, newsprint, aluminum cans, plastic, and glass). All non-hazardous wastes will be recycled to the extent possible, and non-recyclable wastes would be regularly transported offsite to a local solid waste disposal facility (Victorville 2007a, section 6.16.3.2).

The ZLD water treatment solids would represent the greatest volume of non-hazardous wastes generated by operation of the facility. At absolute maximum capacity and operation, the plant would generate approximately 14.64 tons of these solids (mainly salts) per day. While this appears to be a large volume of waste, it does not exceed the 10% significance threshold for impacts to the nearest solid waste disposal facility, which is the Victorville Landfill (Victorville 2007a, Table 6.16-4). However, while the water treatment solids are currently identified as non-hazardous, the actual composition of the waste is not known at this time. If the water treatment solids contain metals or other toxic constituents, they may require management as hazardous wastes. Therefore, staff proposes condition of certification **WASTE-8** requiring testing of the water treatment solids to determine waste category and proper disposal requirements.

Non-hazardous Liquid Wastes

Non-hazardous liquid wastes would be generated during facility operation, and are discussed in the **SOIL AND WATER RESOURCES** section of this document.

Hazardous Wastes

The project owner/operator would be considered the generator of hazardous wastes at the site during facility operations. Therefore, the project owner's unique hazardous waste generator identification number, obtained prior to construction in accordance with proposed condition of certification **WASTE-4**, would be retained and used for hazardous waste generated during facility operation.

Hazardous wastes expected to be generated during routine project operation include used hydraulic fluids, oils, greases, oily filters and rags, spent SCR catalyst, waste heat transfer fluid (Therminol), cleaning solutions and solvents, and batteries. In addition, spills and unauthorized releases of hazardous materials or hazardous wastes may generate contaminated soils or materials that may require corrective action and management as hazardous waste. Proper hazardous material handling and good housekeeping practices will help keep spill wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, staff proposes condition of certification **WASTE-9** requiring the project owner/operator to report, clean-up, and remediate as necessary, any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements. [More information on hazardous material management, spill reporting, containment, and spill control and countermeasures plan provisions for the project are provided in the project AFC Hazardous Material Handling section (Victorville 2007a, pages 6.7-10 through 6.7-19).]

The amounts of hazardous wastes generated during the operation of Victorville 2 project would be modest, with source reduction and recycling of wastes implemented whenever possible. The hazardous wastes would be temporarily stored on-site, transported offsite by licensed hazardous waste haulers, and recycled or disposed at authorized disposal facilities in accordance with established standards applicable to generators of hazardous waste (Title 22, CCR, §66262.10 et seq.). Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed condition of certification **WASTE-5** to notify the CPM whenever the owner becomes aware of any such action.

Impact on Existing Waste Disposal Facilities

Non-hazardous Solid Wastes

During construction of the proposed project, approximately 4,644 cubic yards of solid waste will be generated and recycled or disposed in a Class III landfill (Victorville 2007a, Table 6.16-5). The non-hazardous solid wastes generated yearly at Victorville 2 would also be recycled if possible, or disposed in a Class III landfill.

Table 6.16-4 of the project AFC identifies four non-hazardous (Class III) waste disposal facilities that could potentially take the non-hazardous construction and operation wastes generated by the Victorville 2 project. These Class III landfills are all located in southern California in San Bernardino County. The remaining capacity for the four landfills combined is over 164 million cubic yards. The total amount of nonhazardous waste generated from project construction and operation will contribute less than 1% of the available landfill capacity. Staff finds that disposal of the solid wastes generated by the Victorville 2 project can occur without significantly impacting the capacity or remaining life of any of these facilities.

Hazardous Wastes

Section 6.16.2.2 of the project AFC discusses the two Class I landfills in California: The Clean Harbor Landfill (Buttonwillow) in Kern County, and the Chemical Waste Management Landfill (Kettleman Hills) in Kings County. The Kettleman Hills facility also accepts Class II and Class III wastes. In total, there is in excess of 15 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with approximately 30 years of remaining operating lifetimes. The Victorville 2 project construction and operation wastes will likely be sent to the Buttonwillow facility.

Hazardous wastes generated during construction and operation would be recycled to the extent possible and practical. Those wastes that cannot be recycled will be transported offsite to a permitted treatment, storage, or disposal facility. The volume of hazardous waste from the Victorville 2 project requiring offsite disposal would be far less than staff's threshold of significance and would therefore not significantly impact the capacity or remaining life of the Class I waste facilities.

CUMULATIVE IMPACTS AND MITIGATION

As proposed, the amount of non-hazardous and hazardous wastes generated during construction and operation of the Victorville 2 project would add to the total quantity of waste generated in the State of California. However, project wastes would be generated in modest quantities, waste recycling would be employed wherever practical, and sufficient capacity is available at several treatment and disposal facilities to handle the volumes of wastes generated by the project. Therefore, staff concludes that the waste generated by the Victorville 2 project would not result in significant cumulative waste management impacts.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed Victorville 2 project would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. The applicant is required to recycle and/or dispose hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during both project construction and operation, the Victorville 2 project would be required to obtain a hazardous waste generator identification number from USEPA. The Victorville 2 project would also be required to properly store, package and label all hazardous waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records, and appropriately train employees, in accordance with state and federal hazardous waste management requirements.

In the **SOCIOECONOMICS** section of this staff analysis, staff presents census tract information that shows that there are minority populations within one mile and six miles of the project. Since staff has added conditions of certification that would reduce the risk associated with hazardous waste to a less than significant level, staff concludes that there will be no significant impact from construction or operation of the power plant on minority populations. Therefore, there are no environmental justice issues for Waste Management.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comments on the proposed Victorville 2 project AFC were provided by DTSC on September 10, 2007 (DTSC 2007a). Project mitigation measures and conditions of certification have been established that address the comments provided by DTSC.

CONCLUSIONS

Staff has proposed conditions of certification **WASTE-1** through **9** (below) requiring that:

- the project owner provide an updated Phase I ESA for the project site to assess waste and impacts in areas not previously accessible to the project owner;
- the project owner have an experienced and qualified Professional Engineer or Professional Geologist available for consultation during site characterization (if needed), demolition, excavation and grading activities in the event that contaminated soils are encountered;
- if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities, the Professional Engineer or Professional Geologist shall inspect the site, determine the need for sampling nature, file a written report, and seek guidance from the Compliance Project Manager (CPM) and the appropriate regulatory agencies;

- the project owner shall obtain a unique hazardous waste generator identification number in accordance with federal and State hazardous waste management requirements;
- the project owner shall notify the CPM whenever the owner becomes aware of any impending waste management-related enforcement action;
- the project owner shall prepare and submit a construction waste management plan for all wastes generated during construction of the facility and submit the plan to the CPM;
- the project owner shall prepare and submit an operation waste management plan for all wastes generated during operation of the facility and submit the plan to the CPM;
- the project owner shall test the ZLD treatment solids to properly classify the waste and determine appropriate waste management and disposal methods; and
- the project owner shall ensure that all spills or releases of hazardous substances, hazardous materials, or hazardous wastes are reported, cleaned-up, and remediated as necessary, in accordance with all applicable federal, state, and local requirements.

Staff concludes that management of the waste generated during construction and operation of the Victorville 2 project would not result in any significant adverse impacts, and would comply with applicable LORS, if the waste management practices and mitigation measures proposed in the Victorville 2 project AFC and Staff's proposed conditions of certification are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall prepare an updated Phase I ESA for the project site, according to the most recent and updated ASTM standards, and include all of the following:

- An evaluation of the wastes and possible hazardous substance releases associated with residences, abandoned structures, abandoned vehicles, tanks, or dump sites found on the site. This evaluation shall include a visual inspection of the structures and grounds around the structures, vehicles, and associated facilities.
- An evaluation of the potential for asbestos, lead-based paint, mercury (from abandoned vehicles, switches, etc.), or other hazardous substance releases in the area of the residential structures and abandoned
- An assessment of whether or not illegal dumping, waste burning, shooting range activities, clandestine drug lab, or other activities on the site may have generated waste or contamination.
- Recommendations for any additional site characterization if possible contamination is identified.

Verification: The project owner shall submit the updated Phase I ESA to both the Energy Commission Compliance Project Manager (CPM) and the appropriate

Department of Toxic Substances Control office not less than 120 days prior to the planned start of project construction. In the event that potential releases are identified or site characterization and sampling is recommended, the project owner shall conduct any additional work required by the CPM and Department of Toxic Substances Control prior to starting project construction. Any additional work shall be conducted under the oversight of the CPM and the appropriate regulatory agency with jurisdiction to oversee hazardous substance cleanup at the project site. Project construction shall be delayed as necessary to address any site remediation that may be required.

WASTE-2 The project owner shall provide the resume of an experienced and qualified Professional Engineer or Professional Geologist, who shall be available for consultation during site characterization (if needed), demolition, excavation and grading activities, to the CPM for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The Professional Engineer or Professional Geologist shall be given full authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil.

<u>Verification:</u> At least 30 days prior to the start of site mobilization, the project owner shall submit the resume to the CPM for review and approval.

WASTE-3 If potentially contaminated soil is identified during site characterization, demolition, excavation, or grading at either the proposed site or linear facilities, as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the Professional Engineer or Professional Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and provide a written report to the project owner, representatives of Department of Toxic Substances Control, and the CPM stating the recommended course of action.

Depending on the nature and extent of contamination, the Professional Engineer or Professional Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the Professional Engineer or Professional Geologist, significant remediation may be required, the project owner shall contact the CPM and representatives of the Department of Toxic Substances Control for guidance and possible oversight.

<u>Verification:</u> The project owner shall submit any final reports filed by the Professional Engineer or Professional Geologist to the CPM within five days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-4 The project owner shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency prior to generating any hazardous waste during construction and operations.

Verification: The project owner shall keep a copy of the identification number on file at the project site and provide the number to the CPM in the next Monthly Compliance Report.

WASTE-5 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the way project-related wastes are managed.

WASTE-6 The project owner shall prepare a Construction Waste Management Plan for all wastes generated during construction of the facility, and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

- A description of all construction waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Management methods to be used for each waste stream, including temporary onsite storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans.

Verification: The project owner shall submit the Construction Waste Management Plan to the CPM for approval no less than 30 days prior to the initiation of construction activities at the site.

WASTE-7 The project owner shall prepare an Operation Waste Management Plan for all wastes generated during operation of the facility, and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

- A detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
- Management methods to be used for each waste stream, including temporary onsite storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
- Information and summary records of conversations with the local Certified Unified Program Agency and the Department of Toxic Substances Control regarding any waste management requirements

necessary for project activities. Copies of all required waste management permits, notices, and/or authorizations shall be included in the plan and updated as necessary;

- A detailed description of how facility wastes will be managed, and any contingency plans to be employed, in the event of a unplanned closure or planned temporary facility closure; and
- A detailed description of how facility wastes will be managed and disposed upon closure of the facility.

Verification: The project owner shall submit the Operation Waste Management Plan to the CPM for approval no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions to the CPM within 20 days of notification from the CPM that revisions are necessary.

The project owner shall also document in each Annual Compliance Report the actual volume of wastes generated and the waste management methods used during the year; provide a comparison of the actual waste generation and management methods used to those proposed in the original Operation Waste Management Plan; and update the Operation Waste Management Plan as necessary to address current waste generation and management practices.

WASTE-8 The project owner shall ensure that the ZLD salt cake is tested twice the first year of operation as per 22 CCR 66262.10 and report the findings to the CPM.

Verification: The project owner shall include the results of salt cake testing in the Annual Compliance Report provided to the CPM. If two consecutive tests, taken six months apart, show that the sludge is non-hazardous, the project owner may apply to the CPM to discontinue testing.

WASTE-9 The project owner shall ensure that all spills or releases of hazardous substances, hazardous materials, or hazardous waste are reported, cleaned-up, and remediated as necessary, in accordance with all applicable federal, state, and local requirements.

Verification: The project owner shall document all unauthorized releases and spills of hazardous substances, materials, or wastes that occur on the project property or related pipeline and transmission corridors. The documentation shall include, at a minimum, the following information: location of release; date and time of release; reason for release; volume released; amount of contaminated soil/material generated; how release was managed and material cleaned-up; if the release was reported; to whom the release was reported; release corrective action and cleanup requirements placed by regulating agencies; level of cleanup achieved and actions taken to prevent a similar release or spill; and disposition of any hazardous wastes and/or contaminated soils and materials that may have be generated by the release. Copies of the unauthorized spill documentation shall be provided to the CPM within 30 days of the date the release was discovered.

REFERENCES

CEC 2007f - California Energy Commission/J. Kessler (tn: 41119). Data Request Set 1 (#s1 – 110). 6/22/07. Received 6/22/07.

CURE 2007a – California Unions for Reliable Energy/G. Smith (tn: 40951). CURE's Data Request Set 1. Received 6/12/07

CURE 2007b – California Unions for Reliable Energy/G. Smith (tn: 41778). CURE's Data Request Set 2. Received 7/30/07

DTSC 2007a – Department of Toxic Substances Control/G. Holmes (tn: 42237). Letter from G. Holmes – DTSC to B.B. Blevins – CEC providing comments to AFC. 9/10/07. Received 9/11/07.

ENSR 2007c – ENSR/S. Head (tn: 41481). Response to CURE's Data Request Set 1. Received 7/12/07.

ENSR 2007d – ENSR/S. Head (tn: 42131). Response to CURE's Data Request Set 2. 8/28/07. Received 8/29/07.

Inland Energy 2007a – Inland Energy Inc./T. Penna (tn: 40150). Applications for Authority to Construct and Permit to Operate. 4/19/07. Received 4/25/07.

LRWQCB 2007b – Lahontan Regional Water Quality Control Board/M. Dellavalle (tn: 40581). Data Request Set 1. 5/23/07. Received 5/24/07.

Victorville 2007a – City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vol. 1&2. 2/27/07. Received 2/28/07.

Victorville 2007b – City of Victorville (tn: 39934). Application for Certification Data Adequacy Supplement. Vol. 3. 4/6/07. Received 4/9/07.

Victorville 2007c – City of Victorville (tn: 41644). Applicant's Responses to CEC's Data Request Set 1, #s 1 – 110. 7/23/07. Received 7/23/07.

WORKER SAFETY AND FIRE PROTECTION

Alvin J. Greenberg, Ph.D. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff concludes that if the applicant for the proposed Victorville 2 Hybrid Power Plant Project (Victorville 2) provides project construction safety and health and project operations and maintenance safety and health programs, as required by conditions of certification **WORKER SAFETY -1, -2, -3, -4, -5,** and **-6**, the project would incorporate sufficient measures to both ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards (LORS). These proposed conditions of certification ensure that these programs, proposed by the applicant, will be reviewed by the appropriate agencies before they are implemented. The conditions also require verification that the proposed plans adequately ensure worker safety and fire protection and comply with applicable LORS.

Staff also concludes that the proposed project would not have significant impacts on local fire protection services. The proposed facility would be located near an industrial area that is currently served by the local fire department. The fire risks at the proposed facility do not pose significant added demands on local fire protection services. Staff also concludes that the Victorville Hazmat Team and the San Bernardino County Fire Department are adequately equipped and staffed to respond to hazardous materials incidents at the proposed facility with an adequate response time, given the remote location of this project (Becker 2007).

INTRODUCTION

Worker safety and fire protection are regulated through federal, state, and local LORS. Industrial workers at the facility both operate equipment and handle hazardous materials daily, and could face hazards resulting in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or minimize their risk through special training, protective equipment, and procedural controls.

The purpose of this preliminary staff assessment (PSA) is to assess the worker safety and fire protection measures proposed by the Victorville 2 applicant and determine whether the applicant has proposed adequate measures to:

- Comply with applicable safety LORS;
- Protect workers during the construction and operation of the facility;
- Protect against fire; and
- Provide adequate emergency response procedures.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Worker Safety And Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
29 U.S. Code sections 651 et seq (Occupational Safety and Health Act of 1970)	This Act mandates safety requirements in the workplace, with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC § 651).
29 CFR sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR sections 1952.170 to 1952.175	These sections provide federal approval of California's plan for enforcement of its own safety and health requirements, in lieu of most of the federal requirements found in 29 CFR §1910.1 to 1910.1500.
State	
8 CCR all applicable sections (Cal/OSHA regulations)	Requires that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during the construction, commissioning, and operation of power plants, as well as safety around electrical components, fire safety, and hazardous materials usage, storage, and handling.
24 CCR section 3, et seq.	Incorporates the current addition of the Uniform Building Code.
California Health and Safety Code, section 25531 to 25543.4	The California Accidental Release Program (Cal-ARP) requires the preparation of a Risk Management Plan (RMP) and Off-site Consequence Analysis (OCA) and submittal to the local Certified Unified Program Authority (CUPA) for approval.
Health and Safety Code sections 25500 to 25541	Requires a Hazardous Materials Business plan detailing emergency response plans for hazardous materials emergencies at a facility.

Local (or locally enforced)	
City of Victorville Municipal Code Title 6 (Hazardous Materials Releases) and Title 8 (Fire)	Adopts state requirements and guidelines governing hazardous materials release response plans and inventories, as well as the California fire code for the city.
2001 Edition of California Fire Code and all applicable NFPA standards (24 CCR Part 9)	NFPA standards are incorporated into the California Uniform Fire Code. The fire code contains general provisions for fire safety, including road and building access, water supplies, fire protection and life safety systems, fire-resistive construction, storage of combustible materials, exits and emergency escapes, and fire alarm systems. The city of Victorville uses the Uniform Fire Code, year 2000 edition, in its entirety; it includes provisions for the storage and handling of hazardous materials including fire protection, emergency venting, and hazardous materials thresholds for permitting requirements.
Title 24, California Code of Regulations (24 CCR § 3, et seq.)	The California Building Code is comprised of 11 parts containing building design and construction requirements as they relate to fire, life, and structural safety. It incorporates current editions of the Uniform Building Code, including the electrical, mechanical, energy, and fire codes applicable to the project.

SETTING

Fire support services to the site will be under the jurisdiction of the Victorville Fire Department (VFD). Station 312 is 10 miles from the project site, located at 15182 El Evado Road, and would be the first responder to Victorville 2, with a response time of approximately 20 minutes. Station 311 has two fire engines and is 12 miles from the site, located at the county fairgrounds. Together, these two stations have four engines, two trucks, and nine firefighters. Although Station No. 319, located at 18550 Readiness Street, is the nearest station to the project, it currently serves only the Southern California Logistics Airport and would not respond to emergencies at Victorville 2. It is possible in the future that additional personnel may be added to support the Victorville 2 project and the surrounding developing area (Becker 2007). The San Bernardino County Fire Department (SBCFD) has two fire stations that can provide back-up support, if available, to the Victorville 2 site. Station 321, located at 11711 Hardy Street (about three miles away from the project site), has a response time of approximately seven minutes; and SBCFD Station 322, located at 10370 Rancho Road, has a response time of approximately 11 minutes (Victorville 2007a, section 6.12.2.6 and Becker 2007).

In Victorville, hazardous materials permits and spills are handled and investigated by both the VFD and San Bernardino County. Station 314 houses the county’s HazMat unit, and is located at 17008 Silica Drive. The fire department is able to respond to incidents involving aqueous ammonia, which is the only identified hazardous material of concern at Victorville 2 (Victorville 2007a, Section 6.7.4.2). The VFD response time to a HazMat emergency call from Victorville 2 is approximately 30 to 45 minutes (Becker 2007).

Worker Safety and Fire Protection Table 2
Equipment and Personnel at Victorville Fire Department*

VFD Station	Response Time	Distance to Victorville 2	Equipment (# engines)	# of Firefighters per shift	EMS Capability
Station 312	20	10 miles	2	3	Yes
Station 311	25	12 miles	2	6	Yes

***Source: Telephone communication with VFD Chief John Becker, June 27, 2007.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are assessed in **WORKER SAFETY AND FIRE PROTECTION**:

1. The potential for impacts on the safety of workers during demolition, construction, and operation activities; and
2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety is essentially a LORS compliance matter and if all LORS are followed, workers will be adequately protected. Thus, the standard for staff's review and determination of significant impacts on worker health is whether the applicant has demonstrated adequate knowledge of and commitment to implementation of all pertinent and relevant Cal-OSHA standards.

Staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant, as well as the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the Victorville 2 site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates local fire department capabilities and response times, and interviews local fire officials to determine if they feel adequately trained, staffed, and equipped to respond to the needs of a power plant. Staff then determines if the presence of the power plant would cause a significant impact on a local fire department. If it does, staff will recommend that the applicant mitigate this impact by providing additional resources to the fire department.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Worker Safety

Industrial environments are potentially dangerous during both construction and operation. Workers at the proposed project will be exposed to loud noises, moving equipment, trenches, and confined space entry and egress. Workers may sustain falls, trips, burns, lacerations, and other injuries. They may be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks or electrocution. It is important that Victorville 2 has well-defined policies and procedures, training, and hazard recognition and control to minimize these hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

A Safety and Health Program will be prepared by the applicant to minimize worker hazards during construction and operation of the project. “Safety and Health Program,” for staff, refers to measures that will be taken to ensure compliance with the applicable LORS during the construction and operation of the project.

Construction Safety and Health Program

Victorville 2 includes the construction and operation of a hybrid, combined-cycle, natural gas-fired power plant and solar thermal generating equipment. For the Power Block, workers will be exposed to hazards typical of construction and operation of a gas-fired combined-cycle facility; while the solar component will present similar construction risks and minimal operational risks to workers.

Construction safety orders are published at Title 8 of the California Code of Regulations, sections 1502, et seq. These requirements are promulgated by Cal/OSHA and apply to the construction phase of the project. The construction safety and health program will include the following:

- Construction injury and illness prevention program (8 CCR § 1509);
- Construction fire prevention plan (8 CCR § 1920);
- Personal protective equipment program (8 CCR §§ 1514 - 1522); and
- Emergency action program and plan.

Additional programs under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) will include:

- Electrical safety program;
- Motor vehicle and heavy equipment safety program;
- Forklift operation program;
- Excavation/trenching program;
- Fall protection program;
- Scaffolding/ladder safety program;

- Articulating boom platforms program;
- Crane and material handling program;
- Housekeeping and material handling and storage program;
- Respiratory protection program;
- Employee exposure monitoring program;
- Hand and portable power tool safety program;
- Hearing conservation program;
- Back injury prevention program;
- Hazard communication program;
- Heat and cold stress monitoring and control program;
- Pressure vessel and pipeline safety program;
- Hazardous waste program;
- Hot work safety program;
- Permit-required confined space entry program; and
- Demolition procedure (if applicable).

The AFC includes adequate outlines for each of the above programs (Victorville 2007a, section 6.18.3.1). Prior to the project's start of construction, detailed programs and plans will be provided pursuant to Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start-up of Victorville 2, an operations and maintenance safety and health program will be prepared. This program will include the following programs and plans:

- Injury and illness prevention program (8 CCR § 3203);
- Fire prevention program (8 CCR § 3221);
- Personal protective equipment program (8 CCR §§ 3401 to 3411); and
- Emergency action plan (8 CCR § 3220).

In addition, the requirements under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) will apply to this project. Written safety programs for Victorville 2, which the applicant will develop, will ensure compliance with those requirements.

The AFC includes adequate outlines for an injury and illness prevention program, an emergency action plan, a fire prevention program, and a personal protective equipment program (Victorville 2007a, section 6.18.3.1). Prior to operation of Victorville 2, all detailed programs and plans will be provided pursuant to Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

As mentioned above, the applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. The major items required in both Safety and Health Programs are as follows:

Injury and Illness Prevention Program (IIPP)

The IIPP will include the following components (Victorville 2007a, section 6.18.3.1):

- Identify persons with the authority and responsibility for implementing the program;
- Establish the safety and health policy of the plan;
- Define work rules and safe work practices for construction activities;
- Establish a system for ensuring that employees comply with safe and healthy work practices;
- Establish a system to facilitate employer-employee communication;
- Develop procedures for identifying and evaluating workplace hazards and establish necessary program(s);
- Establish methods for correcting unhealthy/unsafe conditions in a timely manner;
- Determine and establish training and instruction requirements and programs;
- Specify safety procedures; and
- Provide training and instruction.

Fire Prevention Plan

The California Code of Regulations requires an operations fire prevention plan (8 CCR § 3221). The AFC outlines a proposed fire prevention plan that is acceptable to staff (Victorville 2007a, section 6.18.3.1). The plan will include the following:

- Determine general program requirements;
- Determine fire hazard inventory, including ignition sources and mitigation;
- Develop good housekeeping practices and proper materials storage;
- Establish employee alarms and/or communication system(s);
- Provide portable fire extinguishers at appropriate site locations;
- Locate fixed fire fighting equipment in suitable areas;
- Specify fire control requirements and procedures;
- Establish proper flammable and combustible liquid storage facilities;
- Identify the location and use of flammable and combustible liquids;
- Provide proper dispensing and determine disposal requirements for flammable liquids;

- Establish and determine training and instruction requirements and programs; and
- Identify contacts for information on plan contents.

Staff proposes that the applicant submit a final fire prevention plan to the California Energy Commission compliance project manager (CPM) for review and approval and to the VFD for review and comment to satisfy proposed conditions of certification **WORKER SAFETY-1** and **WORKER SAFETY-2**.

Personal Protective Equipment Program

California regulations require personal protective equipment (PPE) and first aid supplies whenever hazards in the environment, or from chemicals or mechanical irritants, could cause injury or impair bodily function through absorption, inhalation, or physical contact (8 CCR sections 3380 to 3400). The Victorville 2 operational environment will require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and will carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information about protective clothing and equipment:

- Proper use, maintenance, and storage;
- When protective clothing and equipment are used;
- Benefits and limitations; and
- When and how protective clothing and equipment are replaced.

The PPE program ensures that employers comply with applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential hazards in the workplace, and will be required as per proposed Conditions of Certification **WORKER SAFETY-1 and -2**.

Emergency Action Plan

California regulations require an emergency action plan (8 CCR § 3220). The AFC contains a satisfactory outline for an emergency action plan (Victorville 2007a, section 6.18.3.1).

The outline lists the following features:

- Establishes emergency procedures for the protection of personnel, equipment, the environment, and materials;
- Identifies fire and emergency reporting procedures;
- Determines response actions for accidents involving personnel and/or property;
- Develops response and reporting requirements for bomb threats;
- Specifies site assembly and emergency evacuation route procedures;

- Defines natural disaster responses (for example, earthquakes, high winds, and flooding);
- Establishes reporting and notification procedures for emergencies (including on-site, off-site, local authorities, and/or state jurisdictions);
- Determines alarm and communication systems needed for specific operations;
- Includes a spill response, prevention, and countermeasure (SPCC) plan;
- Identifies emergency personnel (response team) responsibilities and notification roster;
- Specifies emergency response equipment and strategic locations; and
- Establishes and determines training and instruction requirements and programs.

An emergency action plan will be required as per proposed Conditions of Certification **WORKER SAFETY-1 and -2**

Written Safety Program

In addition to the specific plans listed above, additional LORS called "safe work practices" apply to the project. Both the construction and operations safety programs will address safe work practices in a variety of programs. The components of these programs include, but are not limited to, the programs found under the heading "Construction Safety and Health Program" in this staff assessment.

In addition, the project owner would be required to provide personnel protective equipment and exposure monitoring for workers involved in activities where contaminated soil and/or contaminated groundwater exist, per staff's proposed Conditions of Certification **WORKER SAFETY-1** and**-2**.

These proposed conditions of certification ensure that workers are properly protected from any hazardous wastes presently at the site.

Safety Training Programs

Employees will be trained in the safe work practices described in the above-referenced safety programs.

Additional Safety Issues

This "hybrid" power plant will present a unique work environment that includes a solar field located in the high desert. The solar field features thousands of mirrors that heat a heat transfer fluid (HTF) to approximately 750°F. The pipe containing the HTF will reach temperatures at the mirror focal point as high as 1100 °F. Experience at existing solar generating stations shows that these mirrors break, the pipes age, and HTF can leak and catch fire from ball joints or frayed flex hoses. The area under the solar arrays must be kept free from weeds and thus herbicides will be applied as necessary. Exposure to workers via inhalation and ingestion of dusts containing herbicides poses a health risk. Finally, workers will inspect the solar array for HTF leaks and broken mirrors at least once each day by driving up and down dirt paths between the rows of mirrors and even under the mirrors. Cleaning the mirrors will also be conducted on a routine schedule. All these activities will take place year-round and especially during the summer months of peak solar power generation, when outside ambient temperatures routinely reach 115 °F and above.

The applicant has indicated that workers will be adequately trained and protected, but has not included precautions against heat stress and exposure to herbicides. Therefore, to ensure that workers are indeed protected, staff has proposed additional requirements found in Conditions of Certification **WORKER SAFETY-6**. This requirement consists of the following provisions:

- A worker heat stress protection plan that implements and expands on existing Cal OSHA regulations (8 CCR 3395) requiring heat illness prevention; and
- The development and implementation of Best Management Practices (BMP) for the storage and application of herbicides used to control weeds beneath and around the solar array.

Staff believes that effective implementation of a Heat Stress Protection Plan will mitigate the potential for significant risks to workers from heat during both construction and operations. A BMP requiring proper herbicide storage and application, as recommended in Condition of Certification **WORKER SAFETY-6,** will mitigate potential risks to workers from exposure to herbicides and reduce the chance that herbicides will contaminate either surface water or groundwater. Staff suggests that a BMP follow either the guidelines established by the U.S. EPA (EPA 1993), or more recent guidelines established by the State of California or U.S. EPA.

Additional Mitigation Measures

Protecting construction workers from injury and disease is one of the greatest challenges today in occupational safety and health. The following facts are reported by NIOSH:

- More than seven million persons work in the construction industry, representing 6% of the labor force. Approximately 1.5 million of these workers are self-employed;
- Of approximately 600,000 construction companies, 90% employ fewer than 20 workers. Few have formal safety and health programs;
- From 1980-1993, an average of 1,079 construction workers were killed on the job each year, with more fatal injuries than any other industry;
- Falls caused 3,859 construction worker fatalities, or 25.6% of the total, between 1980 and 1993;
- 15% of workers' compensation costs are spent on construction injuries;
- Ensuring safety and health in construction is a complex task involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity to one another;
- In 1990, Congress directed NIOSH to conduct research and training to reduce diseases and injury among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex industrial projects like gas-fired power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire a construction safety supervisor to ensure a safe and healthful environment for all workers. This has been evident in the audits of power plants recently conducted by the staff. The Federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as construction safety supervisors, construction health and safety officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors to improve their safety and health performance; to assist them in striving to eliminate the four major construction hazards (falls, electrical, caught in/between, and struck-by hazards) that account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections; to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and to recognize subcontractors that have exemplary safety and health programs.

There are no OSHA or Cal-OSHA requirements that an employer hire or provide for a construction safety officer. OSHA and Cal-OSHA regulations do, however, require that safety be provided by an employer and the term “Competent Person” appears in many OSHA and Cal-OSHA standards, documents, and directives. A “Competent Person” is defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3,** which would require the applicant/project owner to designate and provide for a project site construction safety supervisor.

As discussed above, the hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex industrial projects like gas-fired power plants.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past because of both the failure to recognize and control safety hazards and the inability to adequately monitor compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits, conducted in 2005, at several power plants under construction. The findings of the audit include, but are not limited to, safety oversights like:

- Lack of posted confined-space warning placards/signs;
- Confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;

- Confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to the commissioning team, and then to operations;
- Dangerous placement of hydraulic elevated platforms under one another;
- Inappropriate placement of fire extinguishers near hotwork;
- Dangerous placement of numerous power cords in standing water on the site, increasing the risk of electrocution;
- Construction of an unsafe aqueous ammonia unloading pad;
- Inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility, but too close to the perimeter fence; and
- Lack of adequate employee or contractor written training programs that address the proper procedures to follow in the event of the discovery of suspicious packages or objects either onsite or offsite.

In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to require a professional Safety Monitor on-site to track compliance with Cal-OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to the operations staff. These requirements are outlined in Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner but reporting to the Chief Building Official (CBO) and the Compliance Project Manager (CPM), will serve as an extra set of eyes to ensure that safety procedures and practices are fully implemented during construction at all power plants certified by the Energy Commission. During audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged them in questions about the team's findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provides a fresh perspective" of the site.

Fire Hazards

During construction and operation of the proposed Victorville 2 there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, insulating fluid at the project power plant switchyard or flammable liquids, explosions, and overheated equipment, may cause small fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely at power plants. Fires and explosions of natural gas or other flammable gasses or liquids are rare. Compliance with all LORS will be adequate to ensure protection from all fire hazards.

Staff reviewed the information provided in the AFC and spoke to representatives of the city of Victorville and the VFD to determine if available fire protection services and equipment would adequately protect workers, and to further determine the project's impact on fire protection services in the area. The project will rely on both onsite fire protection systems and local fire protection services. The onsite fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the VFD. San Bernardino County Fire Department would be called upon if needed, and provided as available (Victorville 2007a, 6.18.3.1 and Becker 2007).

Construction

During construction, portable fire extinguishers will be located and maintained throughout the site; safety procedures and training will also be implemented (Victorville 2007a, section 6.18.3.1). Station 312 of the VFD will provide fire protection backup for larger fires that cannot be extinguished using the project's portable suppression equipment (Becker 2007).

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the California Fire Code, all applicable recommended NFPA standards (including Standard 850, which addresses fire protection at electric generating plants), and all Cal-OSHA requirements. Fire suppression elements in the proposed plant will include both fixed and portable fire extinguishing systems.

A dedicated 250,000-gallon portion of the 740,000-gallon raw water storage tank located on the project site will supply water to extinguish fires. A sophisticated diesel and electric pump system will ensure a continuous adequate water supply to the fire protection water-piping network, which includes fire hydrants throughout the site, a sprinkler system at each unit transformer, and a sprinkler system in the operations building (Victorville 2007a, Section 2.3.5.7).

A carbon dioxide (CO_2) fire protection system will be provided for the combustion turbine generators and accessory equipment. The system will have fire detection and gas sensors that will trigger alarms, turn off ventilation, close ventilation openings, and automatically activate the system. A fire involving the Heat transfer Fluid (HTF) in the solar field will extinguish itself after burning the limited volume of fuel leaked since the lines will be isolated (see discussion of required isolation valves in the Hazardous Materials Management section of this staff assessment) and the remainder of the field is nonflammable (Victorville 2007a, section 2.4.5.7).

In addition to the fixed fire protection system, smoke detectors, flame detectors, temperature detectors, appropriate class of service portable extinguishers, and fire hydrants must be located throughout the facility at code-approved intervals. These systems are standard requirements of the fire code, NFPA, and are described in the AFC and staff has determined that they will ensure adequate fire protection.

The applicant would be required by conditions of certification **WORKER SAFETY-1** and**-2** to provide a final fire protection and prevention program to both staff and the VFD prior to the construction and operation of the project in order to confirm the adequacy of proposed fire protection measures.

Emergency Medical Services Response

A statewide survey was conducted by staff to determine the frequency of emergency medical services (EMS) and off-site fire-fighters for natural gas-fired power plants in California. The purpose of this analysis was to determine what impact, if any, power plants might have on local emergency services. Staff concludes that incidents at power plants requiring fire or EMS responses are infrequent and represent an insignificant impact on local fire departments, except, in rare instances, where a rural fire department has a primarily volunteer fire-fighting staff. However, staff has determined that the potential for both work-related and non-work related heart attacks exists at power plants. In fact, staff's research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work related incidences, including visitors. The need for prompt response within a few minutes is well documented in the medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site defibrillator; the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for many private and public locations including airports, factories, and government buildings, all of which maintain on-site cardiac defibrillation devices. Therefore, staff concludes that with the availability of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain these devices on-site in order to treat cardiac arrythmias resulting from industrial accidents or other non-work related causes. Therefore, an additional condition of certification, **WORKER SAFETY-5**, is proposed so that a portable automatic cardiac defibrillator will be located on site.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the construction and operation of Victorville 2, combined with the existing High Desert Power Plant, to determine what, if any impact the two facilities together could have on the fire and emergency service capabilities of the VFD. Staff agrees with the applicant that combined impacts would not be significant and that local services would adequately provide emergency services for both plants.

CONCLUSIONS

Staff concludes that if the applicant for the proposed Victorville 2 project provides project construction safety and health and project operations and maintenance safety and health programs, as required by conditions of certification **WORKER SAFETY -1**, and **-2**; and fulfills the requirements of conditions of certification **WORKER SAFETY-3** through**-6**, Victorville 2 would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that the proposed project would not have significant impacts on local fire protection services.

PROPOSED CONDITIONS OF CERTIFICATION

WORKER SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- A Construction Personal Protective Equipment Program;
- A Construction Exposure Monitoring Program;
- A Construction Injury and Illness Prevention Program;
- A Construction Emergency Action Plan; and

- A Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable Safety Orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Victorville Fire Department for review and comment prior to submittal to the CPM for approval.

<u>Verification:</u> At least thirty (30) days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Victorville Fire Department stating the Fire Department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-2 The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- An Operation Injury and Illness Prevention Plan;
- An Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Program (8 CCR § 3221); and;
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable Safety Orders. The Operation Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Victorville Fire Department for review and comment.

<u>Verification:</u> At least thirty (30) days prior to the start of first-fire or commissioning, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Victorville Fire Department stating the Fire Department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-3 The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards, is capable of identifying workplace hazards relating to the construction activities, and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- Have over-all authority for coordination and implementation of all occupational safety and health practices, policies, and programs;

- Assure that the safety program for the project complies with Cal/OSHA & federal regulations related to power plant projects;
- Assure that all construction and commissioning workers and supervisors receive adequate safety training;
- Complete accident and safety-related incident investigations, emergency response reports for injuries, and inform the CPM of safety-related incidents; and
- Assure that all the plans identified in Worker Safety 1 and 2 are implemented.

Verification: At least thirty (30) days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement (CSS) shall be submitted to the CPM within one business day.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- Record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- Summary report of safety management actions and safety-related incidents that occurred during the month;
- Report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- Report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO, and will be responsible for verifying that the Construction Safety Supervisor, as required in Worker Safety 3, implements all appropriate Cal/OSHA and Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: At least thirty (30) days prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that a portable automatic cardiac defibrillator is located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During construction and commissioning, the following persons shall be trained in its use and shall be on-site whenever the workers that they supervise are on-site: the Construction Project Manager or delegate, the Construction Safety Supervisor or delegate, and all shift foremen. During operations, all power plant employees shall be trained in its use. The training program shall be submitted to the CPM for review and approval.

Verification: At least thirty (30) days prior to the start of site mobilization the project owner shall submit to the CPM proof that a portable automatic cardiac defibrillator exists on site and a copy of the training and maintenance program for review and approval.

WORKER SAFETY-6 The project owner shall prepare and implement a worker Heat Stress Protection Plan and a Best Management Practices (BMPs) for the storage and application of herbicides used to control weeds beneath and around the solar array. These plans shall be submitted to the CPM for review and approval.

Verification: At least thirty (30) days prior to the start of site mobilization, the project owner shall submit to the CPM for review and approval a copy of the worker Heat Stress Protection Plan and Best Management Practices (BMPs) for the storage and application of herbicides.

REFERENCES

Becker, John 2007. Telephone communication with VFD Chief, June 27th.

California Fire Code 2001. Published by the International Fire Code Institute comprised of the International Conference of Building Officials, the Western Fire Chiefs Association, and the California Building Standards Commission. Whittier, Ca.

Uniform Fire Code 2001, Vol. 1. Published by the International Fire Code Institute comprised of the International Conference of Building Officials and the Western Fire Chiefs Association, Whittier, Ca.

USOSHA (United States Occupational Safety and Health Administration). 1993. *Process Safety Management / Process Safety Management Guidelines For Compliance*. U.S. Department of Labor, Washington, DC.

Victorville 2007a – City of Victorville. Application for Certification of the Victorville 2 Hybrid Power Project, Volumes 1 & 2. Rec’d February 28, 2007.

Victorville Fire Department website, http://ci.victorville.ca.us/city-departments/fire

ENGINEERING ASSESSMENT

FACILITY DESIGN

Steve Baker

SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that the design, construction, and eventual closure of the project and its linear facilities would likely comply with applicable engineering laws, ordinances, regulations and standards. The proposed conditions of certification, below, would ensure compliance with these laws, ordinances, regulations and standards.

INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering design of the Victorville 2 Hybrid Power Plant (Victorville 2). The purpose of this analysis is to:

- Verify that the laws, ordinances, regulations and standards (LORS) that apply to the engineering design and construction of the project have been identified;
- Verify that both the project and its ancillary facilities are sufficiently described, including proposed design criteria and analysis methods, in order to provide reasonable assurance that the project will be designed and constructed in accordance with all applicable engineering LORS, in a manner that also ensures the public health and safety;
- Determine whether special design features should be considered during final design to address conditions unique to the site which could influence public health and safety; and
- Describe the design review and construction inspection process and establish the conditions of certification used to monitor and ensure compliance with the engineering LORS, in addition to any special design requirements.

Subjects discussed in this analysis include:

- Identification of the engineering LORS that apply to facility design;
- Evaluation of the applicant's proposed design criteria, including identification of criteria essential to public health and safety;
- Proposed modifications and additions to the application for certification (AFC) necessary for compliance with applicable engineering LORS; and
- Conditions of certification proposed by staff to ensure that the project will be designed and constructed to ensure public health and safety and comply with all applicable engineering LORS.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in the AFC (Victorville 2007a, Appendix D). Key LORS are listed in **Facility Design Table 1** below.

Facility Design Table 1
Key Engineering Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Federal	Title 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health standards
State	2007 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	San Bernardino County regulations and ordinances
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

SETTING

The Victorville 2 project will be built on a 275-acre site, located in the city of Victorville, San Bernardino County, approximately 3.5 miles east of Highway 395. The site lies in Seismic Zone 4. For more information on the site and its related project description, please see the **PROJECT DESCRIPTION** section of this document. Additional engineering design details are contained in the AFC, appendices C and D (Victorville 2007a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project would be built to applicable engineering codes and ensure public health and life safety. This analysis further verifies that applicable engineering LORS have been identified and that the project and its ancillary facilities have been described in adequate detail. It also evaluates the applicant’s proposed design criteria, describes the design review and construction inspection process, and establishes conditions of certification that would monitor and ensure compliance with engineering LORS and any other special design requirements. These conditions allow both the California Energy Commission (Energy Commission) compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme that will verify compliance with these LORS.

SITE PREPARATION AND DEVELOPMENT

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage, and site access, in addition to the criteria for designing and constructing linear support facilities such as natural gas and electric transmission interconnections. The applicant proposes the use of accepted industry standards (see Victorville 2007a, Appendix D, for a representative list of applicable industry standards), design practices, and construction methods in preparing and developing the site. Staff concludes that this project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes conditions of certification (see below and the **GEOLOGY AND PALEONTOLOGY** section of this document) to ensure that compliance.

MAJOR STRUCTURES, SYSTEMS, AND EQUIPMENT

Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS. Major structures and equipment are identified in the proposed condition of certification (**GEN-2),** below.

Victorville 2 shall be designed and constructed to the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect when the design and construction of the project actually begin. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2007 CBSC takes effect, the 2007 CBSC provisions shall be replaced with the updated provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed according to their appropriate lateral force procedure, staff has included condition of certification **STRUC-1**, below, which, in part, requires the project CBO's review and approval of the owner's proposed lateral force procedures before construction begins.

PROJECT QUALITY PROCEDURES

The project's AFC (Victorville 2007a, Appendix D) describes a quality program intended to inspire confidence that its systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with all appropriate power plant technical codes and standards. Compliance with design requirements will be verified through specific inspections and audits. Implementation of this quality assurance/quality control (QA/QC) program will ensure that Victorville 2 is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the CBO is authorized and directed to enforce all provisions of the CBC. The Energy Commission itself serves as the building official, and has the responsibility to enforce the code, for all of the energy facilities it certifies. In addition, the Energy Commission has the power to interpret the CBC and adopt and enforce both rules and supplemental regulations that clarify application of the CBC's provisions.

The Energy Commission's design review and construction inspection process conforms to CBC requirements and ensures that all facility design conditions of certification are met. As provided by section 104.2.2 of the CBC, the Energy Commission appoints experts to perform design review and construction inspections and act as delegate CBOs on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to provide technical expertise that is not provided by the local official alone. The applicant, through permit fees provided by the CBC, pays the cost of these reviews and inspections. While building permits in addition to Energy Commission certification are not required for this project, the applicant pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will invite the city of Victorville, San Bernardino County, or a third-party engineering consultant to act as CBO for this project. When an entity has been assigned CBO duties, Energy Commission staff will complete a memorandum of understanding (MOU) with that entity to outline both its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed conditions of certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities, and qualifications of the engineers who will design and build the proposed project (conditions of certification **GEN-1** through **GEN-8**). These engineers must be registered in California and sign and stamp every submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that every element of the project's construction (subject to CBO review and approval) be approved by the CBO before it is performed. They also require that qualified special inspectors perform or oversee special inspections required by all applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written so that no element of construction (of permanent facilities subject to CBO review and approval) which could be difficult to reverse or correct can proceed without prior CBO approval. Elements of construction that are not difficult to reverse may proceed without approval of the plans. The applicant bears the responsibility to fully modify construction elements in order to comply with all design changes resulting from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service (decommissioning) when it reaches the end of its useful life ranges from "mothballing," to the removal of all equipment and appurtenant facilities and subsequent restoration of the site. Future conditions that could affect decommissioning are largely unknown at this time.

In order to ensure that decommissioning will be completed in a manner that is environmentally sound, safe, and protects the public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval before the project's decommissioning begins. The plan shall include a discussion of:

- Proposed decommissioning activities for the project and all appurtenant facilities that were constructed as part of the project;
- All applicable LORS, local/regional plans, and proof of adherence to those applicable LORS and local/regional plans;
- The activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
- Decommissioning alternatives other than complete site restoration.

Satisfying the above requirements should serve as adequate protection, even in the unlikely event that the project is abandoned. Staff has proposed general conditions (see **GENERAL CONDITIONS**) to ensure that these measures are included in the Facility Closure Plan.

CONCLUSIONS AND RECOMMENDATIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents directly apply to the project.

2. Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the record, and concludes that the design, construction, and eventual closure of the project will likely comply with applicable engineering LORS.

3. The proposed conditions of certification will ensure that Victorville 2 is designed and constructed in accordance with applicable engineering LORS. This will be accomplished through design review, plan checking, and field inspections that will be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

4. Though future conditions that could affect decommissioning are largely unknown at this time, it can reasonably be concluded that if, the project owner submits a decommissioning plan as required in the **GENERAL CONDITIONS** portion of this document prior to decommissioning, decommissioning procedures will comply with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The proposed conditions of certification be adopted to ensure that the project is designed and constructed in a manner that protects the public health and safety and complies with all applicable engineering LORS;

2. The project be designed and built to the 2007 CBSC (or successor standards, if in effect when initial project engineering designs are submitted for review); and

3. The CBO reviews the final designs, checks plans, and performs field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

CONDITIONS OF CERTIFICATION

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

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

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

Verification: Within 30 days following receipt of the certificate of occupancy, the project owner shall submit to the CPM a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO.

Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

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

Verification: At least 60 days (or a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the master drawing and master specifications lists of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 2,** below. Major structures and equipment shall be added to or deleted from the table only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

Facility Design Table 2
Major Structures and Equipment List

Equipment/System	Quantity (Plant)
Combustion Turbine (CT) Foundation and Connections	2
CT Generator Foundation and Connections	2
SCR Stack Structure Foundation, and Connections	2
CT Exhaust Duct Structure, Foundation, and Connections	2
CT Step-up Transformer Foundation and Connections	2
CT Auxiliary Skid Foundation and Connections	2
CT Inlet Air Filter House Structure Foundation, and Connections	2
Heat Recovery Steam Generator Structure	2
Heat Recovery Steam Generator Foundation and Connections	2
Heat Recovery Steam Generator High Pressure Tubing	2
Packaged Electrical Electronic Control Center Structure Foundation, and Connections	1
Generator Breaker Foundation and Connections	3
Auxiliary Transformer Foundation and Connections	2
Fuel Gas Compressors with Acoustical Enclosure Structure Foundation, and Connections	1
Black Start Diesel Generator Foundation and Connections	1
Air Compressor Skid Foundation and Connections	1
CO Catalyst Structure, Foundation, and Connections	2
CEMS Equipment Structure, Foundation and Connections	2
Ammonia Vaporizer Foundation and Connections	2
Ammonia Storage Tank Foundation and Connections	1
Ammonia Forwarding Pump Skid Foundation and Connections	2
Ammonia Injection Skid Foundation and Connections	2
Gas Filter/Separator Skid Foundation and Connections	2
Auxiliary Boiler Foundation and Connections	1
Cooling/Purge Air Fans Foundation and Connections	2
Solar Steam Boiler Foundation and Connections	1
Cooling Tower Structure, Foundation and Connections	1
Solar Heat Transfer Fluid Field Piping	1 Lot
Solar Heat Transfer Fluid Heater Foundation and Connections	1
Cooling Tower Circulating Water Pump Foundation and Connections	2
Recycled Water Storage Tank Foundation and Connections	1
Operations/Warehouse Building Structure, Foundation and Connections	1
Water Treatment Building Structure, Foundation and Connections	1
Oil/Water Separator Foundation and Connections	1
Fire Water Pump Building Structure Foundation and Connections	1
Raw Water/Fire Water Storage Tank Structure, Foundation and Connections	1
Raw Water Pumps Foundation and Connections	2

Equipment/System	Quantity (Plant)
Demineralized Water Storage Tank Structure, Foundation and Connections	1
Demineralized Water Pumps Foundation and Connections	2
Wastewater Collection Tank Structure, Foundation and Connections	1
Wastewater Drains Tank Structure, Foundation and Connections	2
Wastewater Forwarding Pumps Foundation and Connections	2
Equipment Firewall Structure, Foundation and Connections	2
Electrical Building Structure, Foundation and Connections	2
Cooling Tower Transformers Foundation and Connections	2
Cooling Tower MCC and Chemical Feed Building Structure, Foundation and Connections	1
Dead End Structure Foundation and Connections	2
Storm Water Retention Pond	1
Drainage Systems (including sanitary drain and waste)	1 Lot
High Pressure and Large Diameter Piping and Pipe Racks	1 Lot
HVAC and Refrigeration Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
Building Energy Conservation Systems	1 Lot
Switchyard, Buses and Towers	1 Lot
Electrical Duct Banks	1 Lot

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

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

GEN-4 Prior to the start of rough grading, the project owner shall assign a California-registered architect, or a structural or civil engineer, as the resident engineer (RE) in charge of the project. All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

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

The RE shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;

2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these conditions of certification, approved plans, and specifications;

3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;

4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets of stamped drawings, plans, specifications, and any other required documents;

5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and

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

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

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

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

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

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

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (for example, proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit, to the CBO for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project.

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

A. The civil engineer shall:

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

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

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

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

1. Review all the engineering geology reports;

2. Prepare the foundation investigations, geotechnical, or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement or collapse when saturated under load;

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the 2007 CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both); and

4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to the predicted conditions used as the basis for design of earthwork or foundations.

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare a final soils grading report; and

2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2007 CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both).

D. The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;

2. Provide consultation to the RE during design and construction of the project;

3. Monitor construction progress to ensure compliance with engineering LORS;

4. Evaluate and recommend necessary changes in design; and

5. Prepare and sign all major building plans, specifications, and calculations.

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

F. The electrical engineer shall:

1. Be responsible for the electrical design of the project; and

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

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

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

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

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

GEN-6 Prior to the start of an activity requiring special inspection, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2007 CBC. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

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

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;

2. Observe the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action; and

4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications, and other provisions of the applicable edition of the CBC.

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

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

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend required corrective actions. The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification and, if appropriate, applicable sections of the CBC and/or other LORS.

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

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications, and calculations (including all approved changes) at the project site or at an alternative site approved by the CPM during the operating life of the project. Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by the CPM.

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

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

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

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils, geotechnical, or foundation investigations reports required by the 2007 CBC.

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

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area.

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

CIVIL-3 The project owner shall perform inspections in accordance with the 2007 CBC. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

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

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

<u>Verification:</u> Within 30 days (or project owner- and CBO-approved alternative time frame) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final grading plans (including final changes) and the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes, along with a copy of the transmittal letter to the CPM. The project owner shall submit a copy of the CBO's approval to the CPM in the next monthly compliance report.

STRUC-1 Prior to the start of any increment of construction of any major structure or component listed in **Facility Design Table 2** of condition of certification **GEN 2**, above, the project owner shall submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for the following items (from **Table 2**, above):

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

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

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;

2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (for example, highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications;

3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures prior to the start of on-site fabrication and installation of each structure, equipment support, or foundation;

4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations, and specifications shall be signed and stamped by the responsible design engineer; and

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS.

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

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

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

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);

2. Concrete pour sign-off sheets;

3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2007 CBC.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the condition(s) of certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

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

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 2007 CBC, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

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

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

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

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

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in **Facility Design Table 2**, condition of certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of that construction.

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

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

The CBO may deputize inspectors to carry out the functions of the code enforcement agency.

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

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

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

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

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

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

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

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of that construction. The final plans, specifications and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS.

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

ELEC-1 Prior to the start of any increment of electrical construction for all electrical equipment and systems 480 Volts or higher (see a representative list, below), with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications, and calculations. Upon approval, the above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **TRANSMISSION SYSTEM ENGINEERING** section of this document.

A. Final plant design plans shall include:

1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and
2. system grounding drawings.

B. Final plant calculations must establish:

1. short-circuit ratings of plant equipment;
2. ampacity of feeder cables;
3. voltage drop in feeder cables;
4. system grounding requirements;
5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
6. system grounding requirements; and
7. lighting energy calculations.

C. The following activities shall be reported to the CPM in the monthly compliance report:

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

<u>**Verification:**</u> At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped

statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

REFERENCES

Victorville 2007a — City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vol. 1 and 2. 2/27/07. Received 2/28/07.

GEOLOGY AND PALEONTOLOGY

Dal Hunter, Ph.D., C.E.G.

SUMMARY OF CONCLUSIONS

The proposed Victorville 2 Hybrid Power Project (Victorville 2) is located in an active geologic area north of the San Bernardino Mountains, northeast of the San Andreas Fault in southern California. Because of its geologic setting, the site could be subject to significant levels of earthquake-related ground shaking. While the potential for earthquake ground rupture is low, the site is within 25 miles of several active faults. The effects of strong ground shaking must be mitigated, to the extent practical, through structural designs required by the California Building Code (CBC, 2007) and recommended in the project geotechnical report (Kleinfelder, 2006). Compressible soils should be mitigated to reduce structure settlement, based on the recommendations in the geotechnical report. The CBC, 2007, requires that structures be designed to resist seismic stresses from ground acceleration. The design-level geotechnical investigation required for the project by the CBC and conditions of certification **GEN-1**, **GEN-5** and **CIVIL-1**, present standard engineering design recommendations for the mitigation of ground shaking and excessive settlement from compressible soils, including those subject to dynamic compaction and hydrocompaction.

There are no known viable geologic or mineralogical resources in the vicinity of the project. Paleontological resources have been documented in the general area of the project, though no significant fossils were found during field explorations at either the plant site or along the transmission line route. Potential impacts to paleontological resources from construction activities will be mitigated through worker training and monitoring by qualified paleontologists, as required by conditions of certification **PAL-1** through **PAL-7**.

Based on this information, the Energy Commission staff believes that the potential is low for significant adverse direct, indirect, and cumulative impacts to the project from geologic hazards during both its design life and to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project. It is staff's opinion that the Victorville 2 can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS), and in a manner that both protects environmental quality and assures public safety, to the extent practical.

INTRODUCTION

In this section, California Energy Commission (Energy Commission) staff discusses the potential impacts of the proposed Victorville 2 upon geologic hazards and geologic, mineralogic, and paleontologic resources. Staff's objective is to ensure that there will be no consequential adverse impacts to significant geological and paleontological resources during the project's construction, operation, and closure, and that operation of the plant will not expose occupants to high-probability geologic hazards. A brief geological and paleontological overview is provided. The section concludes with staff's proposed monitoring and mitigation measures for geologic hazards and geologic, mineralogic, and paleontologic resources, with proposed conditions of certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS are listed in the application for certification (AFC) (Victorville 2007a, §§8.4.5, 8.8.5). The following briefly describes the current LORS for both geologic hazards and resources and mineralogic and paleontologic resources.

Geology and Paleontology Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	The proposed Victorville 2 is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
State	
California Building Code (2007)	The CBC, 2007, includes a series of standards used in project investigation, design, and construction (including grading and erosion control). The CBC, 2007 has adopted provisions in the Uniform Building Code (UBC).
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), Section 2621–2630	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. The site is not located within a designated Alquist-Priolo fault zone.
The Seismic Hazards Mapping Act, PRC Section 2690–2699	Areas are identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches.
PRC, Chapter 1.7, Sections 5097.5 and 30244	Regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.
Warren-Alquist Act, PRC, Sections 25527 and 25550.5(i)	The Warren-Alquist Act requires the Energy Commission to “give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical, archaeological, and cultural sites…” With respect to paleontologic resources, the Energy Commission relies on guidelines from the Society for Vertebrate Paleontology (SVP), indicated below.
California Environmental Quality Act (CEQA), PRC Sections 15000 et seq., Appendix G	Mandates that public and private entities identify the potential impacts on the environment during proposed activities. Appendix G outlines the requirements for compliance with CEQA and provides a definition of significant impacts on a fossil site.

Applicable Law	Description
Society for Vertebrate Paleontology (SVP), 1995	The “Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures” is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by SVP, a national organization of professional scientists.
Local	
San Bernardino County 2007 Development Code, Chapter 82.20	Defines criteria for site evaluation for paleontological resources in the county, including preliminary field surveys, monitoring during construction, and specimen recovery; also defines qualifications for professional paleontologists.
City of Victorville Building Code Enforcement	Requires compliance with a number of development standards, including grading requirements and acquisition of building permits.

SETTING

The proposed Victorville 2 will be constructed on a 275-acre site located in the northwestern portion of the city of Victorville, California, just north of the Southern California Logistics Airport. The hybrid power plant will be capable of generating 563 megawatts (MW) of electricity from combined natural gas-fired and solar facilities. Two natural gas-fired combustion turbine generators, two heat recovery steam generators, and one steam turbine generator will power the primary facility. The solar plant, which will cover roughly 250 acres of the site, will provide 50 MW of electricity during high-peak demand hours. A high-pressure natural gas pipeline will connect to an existing pipeline approximately three miles south of the site, and potable water will be obtained from the city of Victorville’s potable water system via an approximately 3-mile-long pipeline (Victorville 2007c). A new 1.25-mile section of sewer pipeline, and a 1.5-mile section of reclaimed water line, will connect to existing pipelines off-site.

Three segments of 230 kilovolt (kv) electrical transmission line, extending a total 20.82 miles, will be constructed from the site to the Victor and Lugo substations located approximately 10 and 21 miles to the south, respectively. The first section will involve installation of 4.3 miles of new transmission line in a new right-of-way (ROW), beginning at the Victorville 2 site. The second segment will use a 5.7-mile section of existing transmission line by adding new lines to existing towers and constructing three new towers. The third segment will upgrade power lines in an existing 11-mile ROW by constructing new 230-kv towers and relocating other existing lines.

REGIONAL SETTING

The Victorville 2 site is located at the west end of the Mojave Desert north of the San Bernardino Mountains, which is in the southwestern portion of the Mojave Desert geomorphic province (Norris and Webb, 1990). The western half of the region is characterized by northwest-trending right-lateral strike-slip faults, which include the San Andreas Fault, which separates the Mojave Desert province from the Transverse Ranges geomorphic province to the south. Normal faulting associated with strike-slip motion is also common. Only minor northeast-striking, left-lateral strike-slip faults similar to the Garlock Fault (which defines the northwest geomorphic boundary), occur within the province.

The power plant site is located at the north end of the Victorville Basin (Cox, et al., 2003). The Victorville Basin is a structural depression associated with right-lateral strike-slip movement on the nearby San Andreas Fault. Approximately 1,300 feet of Tertiary and Quaternary sediments, much of which were shed, in a northeastward direction, from the San Gabriel Mountains and in a northwesterly direction from the San Bernardino Mountains, have filled the basin (Cox, et al., 2003). The oldest deposits are Miocene age arkosic sandstones, siltstones and conglomerates of the Crowder and Cajon Formations (Cox, et al., 2003 and CDMG, 1986). These sediments were deposited by a south-flowing Mojave River. A coarsening upward sequence of lacustrine, fluvial and alluvial fan sands, silts, and gravels belonging to the Phelan Peak Formation, overlie the Miocene units. These deposits are Pliocene to early Pleistocene in age, and were derived primarily from a southern source. However, some earlier deposits originated from the north, before the course of the Mojave River changed from south-flowing to north-flowing.

Weakly consolidated sand and gravel of the early Pleistocene Epoch and younger Victorville Fan, which were derived from the San Gabriel Mountains, overlie the Phelan Peak Formation. The oldest unit is the Harold Formation, which is overlain by the Shoemaker Gravel, then the Older Alluvium of Noble (1954). Well-dissected alluvial fans of Bortugno and Spittler (CDMG, 1986) also appear to be part of the Victorville Fan complex. The older alluvial fans were subsequently incised by the ancestral Mojave River Drainage System, and Pleistocene-age fluvial and floodplain sediments were deposited (Cox, et al., 2003). Younger undifferentiated alluvial fan deposits cap older alluvium and some ancestral fluvial deposits, and Holocene sand and gravel wash deposits associated with the modern Mojave River are present along the current course of the river.

PROJECT SITE DESCRIPTION

Several structural features related to regional strike-slip faulting and compressional tectonics are present within 25 miles of both the power plant site and the transmission line route. The most common are northwest-striking right-lateral strike-slip faults. The San Bernardino segment of the San Andreas and associated sub-parallel structures nearest to the project facilities are located 24 miles to the southwest of the plant site and 8.5 miles southwest of the southern terminus of the transmission line (CDMG, 1994). The main segment, which has observed Holocene surface displacement, has historic movement recorded in approximately 1812 and in 1857. Other strike-slip faults with Holocene displacement include the Helendale Fault, located eight miles to the northeast of the plant site, the Lenwood Fault, located 22.5 miles northeast of the plant site, and the Llano Fault, located 24 miles southeast of the plant site and 21.5 miles from the nearest segment of the transmission line. The Mirage Valley Fault, the south end of which is located 9.5 miles to the west of the plant site, offsets units that indicate movement between 10,000 and 700,000 years ago (pre-Pleistocene). The Blake Ranch Fault, the south end of which is located 10 miles to the northwest of the plant site, offsets units that indicate movement between 700,000 and 1.6 million years ago.

The San Bernardino and San Gabriel mountains, southeast and southwest of the project, respectively, are cut by numerous south-dipping thrust faults related to Transverse Range crustal shortening (CDMG, 1994). The most prominent fault, which is at the base, on the north side of the San Bernardino Mountains, is the North Frontal Fault Zone. This zone is 17 miles southwest of the plant site, eight miles east of the southern terminus of the transmission line, and has Holocene and older displacement. The Cleghorn Fault, located near Silverwood Lake 22.5 miles south of the plant site and 4.5 miles from the southern terminus of the transmission line, may be a transitional structure with both strike-slip and reverse movement from the Pleistocene Epoch.

Cox, et al., (2003) noted an east-west-striking anticlinal up-warp in the vicinity of the site. This structure resulted from compressional tectonics related to the continuing crustal shortening and regional uplift of the Transverse Ranges (Norris and Webb, 1990). Several northwest-trending faults that offset ancestral Mojave River sediments and the George surface, which indicate movement as recently as 60,000 years ago, are located southwest of the Southern California Logistics Airport and approximately 0.5 miles south-southwest of the site (Cox, et al., 2003). These faults could be southeastern extensions of the Mirage Valley Fault.

The geologic mapping and interpretation of depositional units in the Victorville 2 site and along the transmission line route are inconsistent (Dibblee, 1967; CDMG, 1986; and Cox, et al., 2003). Older reports (Dibblee, 1967; CDMG, 1986), as well as the most recent study (Cox, et al., 2003), agree that most of the eastern half of the plant site and a short section of the transmission line route (MP 0.2-MP 1.0) are underlain by well-dissected alluvial fans. However, Dibblee (1967) and Bortugno and Spittler (CDMG, 1986), indicate that the western half of the plant site and the lay down area are undifferentiated Quaternary sediments. The remainder of the transmission line route south of MP 1.0 is mapped as Older Alluvium and undifferentiated Quaternary alluvium. However, the more recent report (Cox, et al., 2003) shows the transmission line section between the plant site and MP 3.6, as well as MP 8.5 to the southern terminus, as Victorville Fan deposits. The intervening area is interpreted to be ancestral Mojave River sediments, which would have replaced alluvial material that eroded and was carried away. No undifferentiated Quaternary unit is shown. Some of the discrepancies between the older and more recent studies can be resolved by assuming that much of the mapped undifferentiated sediments are only a thin veneer several feet thick over older units, and that more interpretive recent studies simply did not include the Holocene deposits. The mapped units at the plant site, and along the transmission route indicated by Cox, et al. (2003), will be referred to in this report.

Four deep drill holes were advanced in and around the Southern California Logistics Airport (formerly the George Air Force Base), which is located about one mile south of the Victorville 2 site (Cox, et al., 2003). The borings intercepted three distinct units. The Lower Alluvial Unit, which is composed of Pliocene to early Pleistocene age braided stream, sheet flow, alluvial fan and playa lake sediments, was encountered between 200 feet (north) and 300 feet (south) below the ground surface. Sediment clasts are composed of granite, meta-volcanics, meta-sediments, and non-metamorphosed volcanics derived from bedrock sources in the Mojave Desert (to the north), and the unit is tentatively interpreted to correlate with the Phelan Peak Formation. A Middle Lacustrine Unit overlies the Lower Alluvial Unit; however, it thins in a northerly direction and is expected to pinch out south of the Victorville 2 plant site. The Upper Fluvial Unit is composed of a homogeneous package of granitic sands and gravels similar to the arkosic sediments derived from the San Bernardino Mountains and deposited by the Mojave River. The braided channel and floodplain deposits are late Pliocene to mid Pleistocene, extend to depths of 150 to 190 feet below the surface, and are considered to be ancestral Mojave River sediments.

The ancestral Mojave River has deeply incised a broad fluvial platform into much of the older alluvial and fluvial sediments (Cox, et al., 2003). This easily recognizable erosional feature, called the George surface, is marked by a well-developed paleosoil horizon, dated at 60 to 70 thousand years. The river terrace represents the flood plain of the ancestral Mojave River, and has been recognized in the Southern California Logistics Airport area beneath a thin veneer of Holocene sediments.

A preliminary geotechnical Investigation was conducted on the plant site by Kleinfelder (2006). The majority of the drilling encountered relatively homogeneous interbeds of poorly graded sand, poorly graded sand with silt, and silty sand containing generally low percentages of fines. Higher contents of fines, ranging up to 47%, were observed locally. No plasticity index testing was reported for these materials; however, the classification of the soils indicates that the fines were predominantly non-plastic. The only fine grained soil encountered was fat clay, which contained fines with a plasticity index of 47, and a sandy silt unit in the only deep boring, at a depth of 65 to 74 feet. The maximum depth of drilling was 76.5 feet, and ground water was not encountered.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section considers two types of impacts. The first is geologic hazard, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impact the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

No federal LORS concerning geologic hazards and geologic and mineralogic resources apply to this project. The California Building Standards Code (CBSC) and CBC (2007) provide geotechnical and geological investigation and design guidelines, which engineers must follow when designing a facility. As a result, the criteria used to assess the significance of a geologic hazard include evaluating each hazard’s potential impact on the design and construction of the proposed facility. Geologic hazards include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, and seiches.

The California Environmental Quality Act (CEQA) guidelines, Appendix G, provide a checklist of questions that lead agencies typically address.

- Section (V) (c) includes guidelines that determine if a project will either directly or indirectly destroy a unique paleontological resource or site, or a unique geological feature.

- Sections (VI) (a), (b), (c), (d), and (e) focus on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) concern the project's effects on mineral resources.

Staff has reviewed geologic and mineral resource maps for the surrounding area, as well as site-specific information provided by the applicant, to determine if geologic and mineralogic resources exist in the area.

Staff also reviewed existing paleontologic information for the surrounding area, as well as site-specific information generated by the applicant for the Victorville 2. All research was conducted in accordance with accepted assessment protocols (SVP, 1995) to determine whether any known paleontologic resources exist in the general area. If present or likely to be present, conditions of certification, which outline required construction procedures to mitigate impacts to potential resources, are proposed as part of the project's approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking and structure settlement represent the main geologic hazards at this site. These potential hazards can be effectively mitigated through facility design by incorporating the recommendations contained in the project geotechnical report (Kleinfelder, 2006). Conditions of certification **GEN-1, GEN-5,** and **CIVIL-1** in the **FACILITY DESIGN** section should also mitigate these impacts to less than significant levels.

No viable geologic or mineralogic resources are known to exist within one mile of the Victorville 2 site, the laydown area, or transmission line route. Two significant aggregate deposits are located within 2.5 miles east and northeast of the site, along the east bank of the Mojave River (CDMG, 1993). Additionally, the Holocene deposits of the modern Mojave River, which may be as close as 100 feet west of the transmission line route, are mapped as Mineral Resource Zone 2b (CDMG, 1993). MRZ-2b is highly likely to contain a significant aggregate deposit.

Sediments of the ancestral Mojave River and the Victorville Fan, which represent nearly all soils that will be potentially impacted by project grading and trenching, have a high paleontological sensitivity. The possibility of impacting significant paleontological resources in the ancestral Mojave River deposits is high because numerous paleontological sites are located within one mile of the transmission line route from mileposts 4 to 8.5 (Scott, 2007). This includes the Victorville Mammoth site, which is located within 1,500 feet (east of Milepost 5.3) of the transmission line route (Cox, et al., 2003). The potential of impacting significant paleontological resources in the Victorville Fan is considered to be high on the plant site, along the proposed sewer and reclaimed water pipeline routes, and on the transmission line route north of Milepost 4 because of the presence of a recorded fossil site from the Shoemaker Gravel within two miles north of the plant site (McCleod, 2007). However, the potential to impact paleontological resources in the Victorville Fan on the transmission line route south of Milepost 8.5 is low based on a lack of recorded fossil sites (Scott, 2007). The potential to encounter significant paleontological resources in Holocene sediments, which may only occur as a veneer several feet thick over highly sensitive materials, is low to negligible because the fluvial and alluvial deposits represent a high-energy environment and/or are too young to yield fossils of scientific significance.

No important paleontological resources were observed either on the site or along the transmission line route during the paleontological field survey conducted for the AFC (Inland Energy, 2007). Since the proposed Victorville 2 site, as well as pipeline and transmission line construction, will include significant amounts of grading, foundation excavation, pile driving, and utility trenching, staff considers the probability that paleontological resources will be encountered during such activities to be high in fluvial and alluvial materials below Holocene sediments north of Milepost 8.5. This assessment is based on SVP criteria and the confidential paleontological report appended to the AFC. Proposed conditions of certification **PAL-1** to **PAL-7** are designed to mitigate paleontological resource impacts, as discussed above, to less than significant levels. These conditions essentially require a worker education program, in conjunction with the monitoring of earthwork activities by qualified professional paleontologists (paleontologic resource specialist; PRS).

The proposed conditions of certification allow the Energy Commission's compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

Based on the information below, staff believes that the potential is very low for significant adverse direct and/or indirect impacts from the proposed project to geologic hazards and to potential geologic, mineralogic, and paleontologic resources.

GEOLOGICAL HAZARDS

The AFC (Inland Energy, 2007) provides documentation of potential geologic hazards at the Victorville 2 plant site, in addition to some subsurface exploration information. Review of the AFC, coupled with staff's independent research, indicates that the possibility of geologic hazards at the plant site, during its practical design life, is low.

Staff's independent research included the review of available geologic maps, reports, and related data of the Victorville 2 plant site. Geological information was available from the California Geological Survey (CGS), (CDMG), and other governmental organizations.

Faulting and Seismicity

Energy Commission staff reviewed the CDMG publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions* (1994) and Alquist-Priolo Special Studies Zone mapping and reports (CDMG, 1982, 1983, 1991, and 2003). No active faults are shown on published maps to cross the boundary of new construction on the proposed Victorville 2 site. The closest mapped active faults to the plant site are the Helendale Fault, located eight miles to the northeast, and the Mirage Valley Fault, located 9.5 miles to the west. Both are northwest-striking, right-lateral strike-slip faults similar in orientation and sense of movement to the San Andreas Fault. The San Bernardino segment of the San Andreas

Fault, which is the only structure within 25 miles of the proposed project facilities that has experienced historic movement (within 200 years), is located 24 miles southwest of the plant site and 8.5 miles from the southern terminus of the transmission line. Other active strike-slip faults between 10 and 25 miles of the project include the Blake Ranch, Lenwood and Llano faults. The North Frontal Fault Zone and, possibly, the Cleghorn Fault are south-dipping thrust faults at the northern base of the San Bernardino Mountains. The North Frontal Fault Zone is located 17 miles southwest of the plant site and eight miles east of the southern terminus of the transmission line, whereas the Cleghorn Fault is 22.5 miles south of the plant site and 4.5 miles from the end of the power lines.

The San Bernardino segment of the San Andreas Fault is a designated Type A fault (CDMG, 1994; ICBO, 1998). The Helendale, Lenwood, North Frontal, and Cleghorn faults are Type B. Type A faults have slip-rates of $\geq$5 mm/yr and are capable of producing an earthquake magnitude of 7.0 or greater. Type B faults have slip-rates of 2 to 5 mm/yr and are capable of producing an earthquake magnitude 6.5 to 7.0.

Several northwest-trending faults that offset ancestral Mojave River sediments and the George surface, which indicates movement as recently as 60,000 years ago, are located southwest of the Southern California Logistics Airport, approximately 0.5 miles south-southwest of the site. These faults could be southeastern extensions associated with the Mirage Valley Fault. Unless further study of these faults is undertaken, the structures are potentially active based on the last known movement occurring between 11,000 and 2 million years ago (Cox, et al., 2003).

The Alquist-Priolo Act of 1973 and subsequent California state law (California Code of Regulations, 2001) require that all occupied structures be set back 50 feet or more from the surface trace of an active fault. Since the faults southwest of the Southern California Logistics Airport are only potentially active, and no other faults have been documented within the Victorville 2 power plant site, setbacks from occupied structures will not be required.

Numerous earthquakes of Magnitude 5.5 (M5.5) or greater have occurred on active faults between 24 and 31 miles south, southeast and southwest of the site (CGS, 2007). The most significant have taken place on the San Bernardino segment of the San Andreas Fault and related strike-slip faults. Some earthquakes, however, appear to be associated with thrust faulting or a combination of strike-slip and thrust faulting, including the Cucamonga Fault and structures in the Lytle Creek area. Recorded earthquakes in the nearby San Gabriel and San Bernardino Mountains include those occurring near Wrightwood (1812, M7.3), Cucamonga (1892, M5.5), the Lytle Creek region (1894, M6.2 and 1899, M6.4), Lytle Creek-Cajon Pass (1899, M5.9), and the San Bernardino region (1858, M6.0 and 1907, M5.8), (CGS, 2007). Furthermore, ground rupture associated with the massive Ft. Tejon earthquake (1957, M7.9) took place as far south as the San Bernardino segment of the San Andreas Fault (CDMG, 1994).

The project is located within Seismic Zone 4, as illustrated in Figure 16A-2 of the 2007 edition of the CBC. The soil profile for this site is classified as S_D. Only six standard penetration test blowcounts, of which five were measured at a depth of five feet, were below 15 blows/foot in all 21 test borings. Given that the project site is more than 15 kilometers from a known Type A seismic source (San Andreas Fault), and greater than 10 km from a known Type B seismic source (Helendale Fault), the seismic coefficients of C_a = 0.44 and C_v = 0.64 were derived (ICBO, 1998). These values are consistent with the results presented in the draft geotechnical report submitted with the AFC (Kleinfelder, 2006).

The estimated peak horizontal ground acceleration for the power plant is 0.489 times the acceleration of gravity (0.489g) for bedrock based on 2% probability of exceedence in 50 years under 2007 CBC criteria (http://eqdesign.cr.usgs. gov/cgi.bin/). The applicant has recognized this potential acceleration from a seismic event as part of its design criteria for the Victorville 2 project.

Liquefaction

Liquefaction is a condition where soil that lacks cohesion may lose shear strength because of a sudden increase in pore water pressure. Standard penetration tests taken during advancement of hollow-stem auger borings commonly yielded blowcounts of less than 25 blows per foot in the upper 10 feet of the site (Kleinfelder, 2006). However, blowcounts are greater than 25 blows/ft below 10 feet, and the soils are dense to very dense, with few exceptions. The high blowcounts of the dense soils below 10 feet, coupled with a deep ground water table of at least 77 feet, indicate no potential for liquefaction during an earthquake.

Dynamic Compaction

Dynamic compaction of compressible soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains increase in density. This decrease in volume can result in the settling of overlying structural improvements.

The potential for dynamic compaction is considered to be very low below 10 feet since geotechnical exploration borings indicate a dense to very dense granular soil profile (Kleinfelder, 2006). However, granular materials commonly occurring above 10 feet, with blowcounts less than 25 blows/ft, have low-to-moderate potential for dynamic compaction during an earthquake. The preliminary geotechnical investigation (Kleinfelder, 2006) recommends mitigations for the effects of seismically induced settlement (dynamic compaction). Assuming these recommendations are implemented, this potential for dynamic compaction would be minimal. Common mitigation methods include deep foundations (driven piles; drilled shafts) for severe conditions, geogrid reinforced fill pads for moderate severity and over-excavation and replacement for areas of minimal hazard.

Hydrocompaction

Hydrocompaction (also known as hydro-collapse) is generally limited to young soils that were deposited rapidly in a saturated state, most commonly by a flash flood. The soils dry quickly, leaving an unconsolidated, low density deposit with a high percentage of voids. Foundations built on these types of compressible materials can settle excessively, particularly when landscaping irrigation dissolves the weak cementation that is preventing the immediate collapse of the soil structure.

The collapse potential testing provided in the preliminary geotechnical investigation (Kleinfelder, 2006) yielded collapse potential values of 0.1 to 2.6%, which indicate a low-to-moderate potential for loss of soil volume during ground-wetting conditions. Kleinfelder's (2006) report provides recommendations for mitigating the effects of settlement from collapsible soils by over-excavation and replacement as well as drainage control. Assuming these recommendations are followed, this collapsible soil potential would be minimal.

Subsidence

Local subsidence, or settlement, may occur when compressible soils are subjected to foundation loads. Consolidation tests performed on the granular materials in the preliminary geotechnical report (Kleinfelder, 2006) indicate that some settlement may occur beneath the heaviest structures. However, these impacts will be mitigated by following the recommendations outlined in the geotechnical report. These recommendations are preliminary but include over-excavation/replacement, mat foundations or deep foundations, depending on severity and foundation loads.

Regional ground subsidence is typically caused by petroleum or ground water withdrawal, which increases the effective unit weight of the soil profile and in turn, increases the effective stress on deeper soils. This causes the consolidation, or subsidence, of the underlying soils. There are no known petroleum or gas fields within 45 miles of the project site (CDC, 2001). Treated effluent from the nearby Victor Valley Wastewater Reclamation Facility will be obtained for the cooling tower and for other industrial uses (Inland Energy, 2007). Back-up industrial water and potable water would be provided by an approximately 3-mile-long new waterline tapping the city of Victorville's potable water system (Victorville 2007c). Regional subsidence is not expected to affect or be affected by development of the Victorville 2 project.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist in place at a moisture content below their plastic limits. Moisture from irrigation, capillary tension, water line breaks, and other conditions cause the clay soils to absorb water which in turn causes an increase in the overall soil volume. This increase in volume can cause a corresponding movement in overlying structural improvements. The preliminary geotechnical report (Kleinfelder, 2006) does not indicate that potentially expansive clay soils are present on the Victorville 2 site at depths shallow enough to affect structural improvements.

Landslides

Landslide potential at the Victorville 2 site is negligible since the proposed energy facility is located on a broad, relatively flat-lying escarpment above the Mojave River. It is conceivable that the Mojave River, which is located roughly 2,200 feet east of and 90 vertical feet below the eastern boundary of the site, could undercut the escarpment and cause large-scale slumping. However, the potential for the occurrence of slope failure on the eastern side of the plant site, caused by the Mojave River within the expected operating life of the facility, is negligible.

Flooding

The Victorville 2 lies on a relatively flat-lying, gently north-sloping escarpment located above the Mojave River. The Federal Emergency Management Agency (FEMA) has identified the site as within Unshaded Zone X, which is not subject to 500-year flooding (FEMA, 1966).

Tsunamis and Seiches

The proposed Victorville 2 site is not near a large body of water, such as a lake or the open ocean. The site cannot be inundated by a tsunami or seiche.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff has reviewed applicable geologic maps and reports for this area (CDC, 2001; CDMG, 1986; CDMG, 1990; CDMG, 1993; CDMG, 1994; CDMG, 1998; CDMG, 1999; CDMG, 2003; Holroyd, 2007; McCleod, 2007; Scott, 2007). Staff did not identify any geological resources at either the project location or at the proposed utility connections. Two aggregate pits, located one mile east (Brynam Pit) and 2.5 miles northeast (Brynam Road Pit) of the plant site, are designated as significant aggregate deposits (CDMG, 1993). These pits have produced sand and gravel deposits from younger alluvium on the east bank of the Mojave River for use as concrete aggregate and asphalt concrete sand. The sediments within the modern Mojave River drainage basin are likely to contain additional significant aggregate deposits. Small quantities of gold were extracted (between 1880 and 1930) from the Oro Grande district, located approximately 1.5 to 3.5 miles east of the plant site, and from the northernmost portion of the transmission line (CDMG, 1998). Three pits in the same area have recently produced significant amounts of cement and silica from Paleozoic limestone (CDMG, 1999). No known petroleum or gas fields exist within 45 miles of the project site (CDC, 2001). Given the soil profile developed through geotechnical exploration (Kleinfelder, 2006), there is low potential for this site to have economically valuable sand and gravel, or other mineral deposits.

Energy Commission staff has reviewed the paleontological resources assessment in section 8.8 of the AFC as well as the attached confidential paleontologic site report (Inland Energy, 2007). Staff has also reviewed paleontological literature, and records searches conducted by the San Bernardino County Museum (Scott, 2007), the Natural History Museum of Los Angeles County (McCleod, 2007), and the University of California, Museum of Paleontology (Holroyd, 2007). No paleontological finds have been documented on the Victorville 2 site or along the proposed linears.

Sediments of the ancestral Mojave River and the Victorville Fan, which represent nearly all soils to be impacted by project grading and trenching, have a high paleontological sensitivity. The potential to impact significant paleontological resources is high in the ancestral Mojave River deposits, located between mileposts 4 to 8.5 on the transmission line route. The potential to impact significant paleontological resources in the Victorville Fan is high on the plant site, along the proposed sewer and reclaimed water pipeline routes, and on the transmission line route north of Milepost 4. However, the potential to impact paleontological resources in the Victorville Fan on the transmission line route south of Milepost 8.5 is low. The likelihood of encountering significant paleontological resources in Holocene sediments, which may occur only as veneers several feet thick over highly sensitive materials, is low to negligible since the fluvial and alluvial deposits represent a high energy environment and/or are too young to yield fossils of scientific significance. Older mapping shows the undifferentiated and young Quaternary alluvium on the west side of the plant site, and along segments of the transmission line route (Dibblee, 1967; CDMG, 1986), although the thickness of these deposits is unknown.

Numerous paleontological sites are documented within several miles of the proposed Victorville 2 project. The most important is the Victorville Mammoth (*Mammuthus meridionalis*), which is located within 1,500 feet east of Milepost 5.3 on the transmission line route (Cox, et al., 2003). The specimen is Pleistocene in age and was recovered from a sand and gravel horizon near the top of the Upper Fluvial Unit, which is part of the ancestral Mojave River sediments (Cox, et al., 2003). The vertebrate fossils from the ancestral Mojave River sediments in the Victorville area include remains of shrew, giant ground sloth, jack rabbit, cotton tail, antelope ground squirrel, pocket gopher, pocket mouse, kangaroo rat, desert wood rat, cotton rat, meadow vole, short-faced bear, Scott's horse, long-limbed giant camel, and llama (Scott, 2007). The San Bernardino County Museum collection contains many fossils of these types from the Victorville area. The majority of the remains within one mile of the plant site and transmission line were present between mileposts 4 and 8.5 of the transmission line route.

More recent stratigraphic interpretations (Cox, et al., 2003) show that most paleontological resources in the project area occur in ancestral Mojave River sediments, while the occurrence of fossil remains in the Victorville Fan is less common (Scott, 2007). However, specimens of horse and mammoth (*Mammuthus columbi)* were recovered from the Shoemaker Gravel several miles to the north of the plant site, just south of Bryman (McCleod, 2007). This unit has also produced remains of extinct horse, extinct bison, and camel from sites further away, mostly to the east. The Shoemaker Gravel, which is part of the Victorville Fan, is generally exposed on the east-facing bluff that defines the west bank of the modern Mojave River drainage. The Victorville Fan, and possibly the Shoemaker Gravel, is mapped in the eastern half of the plant site, between mileposts 0 and 4.5 of the transmission line. The Victorville Fan is also present south of Milepost 8.5 to the terminus of the transmission main; however, no paleontological sites are recorded in the San Bernardino County Museum, the Natural History Museum of Los Angeles, or the University Of California Museum Of Paleontology (Scott, 2007; McCleod, 2007; and Holroyd, 2007).

Construction Impacts and Mitigation

Compressible soils that could settle through dynamic compaction, hydrocompaction or local subsidence, under heavy foundation loads should be addressed during construction, as directed by the geotechnical engineering report, project plans and specifications (see **PROPOSED CONDITIONS OF CERTIFICATION, FACILITY DESIGN**).

As noted above, no viable geologic or mineralogic resources are known to exist on the west side of the Mojave River although sand, gravel, limestone, and gold deposits are present both on the east bank of the river and in the hills to the east.

Significant paleontological resources have been documented in Pleistocene sediments within one mile of the project site. Therefore, all materials below what could be a localized veneer of Holocene alluvium may exhibit a high sensitivity rating for significant paleontologic resources. Construction of the proposed project will include grading, foundation excavation, and utility trenching. Staff believes there is a high probability of encountering paleontological resources on the plant site, along buried pipelines connecting to the plant, and on the transmission line route from Milepost 0 to Milepost 8.5 based upon the soils profile, SVP assessment criteria, and the near surface occurrence of sensitive soils. However, the potential to encounter significant paleontological resources along the transmission line south of Milepost 8.5 is considered to be low because of a scarcity of known fossil sites in the area. Excavations for ancillary facilities, new pipelines, and on-site excavations deeper than three feet outside the footprint may be more likely to encounter high sensitivity materials, although sensitive materials could still occur near the surface. Proposed conditions of certification **PAL-1 to PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to less than significant levels. Essentially, these conditions require a worker education program, in conjunction with the monitoring of earthwork activities by qualified professional paleontologists, or paleontologic resource specialists (PRS). Earthwork would be halted any time that potential fossils are recognized by either the paleontologist or any worker, followed by evaluation by a professional and recovery, if appropriate. When implemented as presented, the conditions of certification will produce a net gain to the science of paleontology since fossils that would not otherwise be discovered will be collected, identified, studied, and properly curated. A paleontological resource specialist would produce a monitoring and mitigation plan, conduct worker training, and perform monitoring. During the monitoring, the PRS can and often does petition the Energy Commission for changes in monitoring protocols. Most commonly, this is a request for reduced monitoring after ample monitoring has verified little chance of finding significant fossils. In other cases, the PRS can propose increased monitoring in the event of unexpected fossil discoveries or repeated out-of-compliance incidents by the earthwork contractor.

Based upon the literature and archives search, field surveys, and compliance documentation for the Victorville 2, the applicant has proposed that monitoring and mitigation measures be followed during construction of the Victorville 2. Energy Commission staff believes that the proposed conditions of certification will ensure that the project is designed and constructed to minimize the effects of geologic hazards during its design life, and that impacts to vertebrate fossils encountered during construction will be mitigated to levels of insignificance.

Operation Impacts and Mitigation

The operation of this proposed gas-fired and solar-powered generating facility should not have any adverse impacts on geologic, mineralogic, or paleontologic resources.

CUMULATIVE IMPACTS AND MITIGATION

Staff believes that the potential for significant adverse cumulative impacts to the proposed project from geologic hazards, during the project's design life, is low, and that the project's contribution to cumulative impacts to potential geologic, mineralogic, and paleontologic resources is negligible. Because of the potential for moderate to high ground acceleration from earthquakes on the Helendale, San Andreas, or other nearby active faults, it may be prudent to base the structural design on the more stringent seismic guidelines in the newer California Building Code (CBC, 2007), which have not yet been adopted.

Based upon the literature and archives search, field surveys, and compliance documentation for the Victorville 2 project, the applicant proposes monitoring and mitigation measures for construction of the Victorville 2. Energy Commission staff agrees with the applicant that the project can be designed and constructed to minimize the effects of geologic hazards at the site, and that impacts to any vertebrate fossils encountered during construction would be mitigated to levels of insignificance.

The proposed conditions of certification allow the Energy Commission CPM and the applicant to adopt a compliance monitoring scheme ensuring compliance with applicable LORS for geologic hazards and geologic, mineralogic, and paleontologic resources.

FACILITY CLOSURE

Facility closure activities are not expected to impact geologic or mineralogic resources since no such resources are known to exist at either the project location or along its proposed linears. In addition, the decommissioning and closure of the project should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has so far not received any agency or public comments regarding geologic hazards, mineral resources, or paleontology.

CONCLUSIONS

The applicant will likely be able to comply with applicable LORS, provided that the proposed conditions of certification are followed. The design and construction of the project should have no adverse impacts upon geologic, mineralogic, and paleontologic resources. Staff proposes to ensure compliance with applicable LORS through adoption of the proposed conditions of certification, listed below.

PROPOSED CONDITIONS OF CERTIFICATION

General conditions of certification with respect to engineering geology are proposed under conditions of certification **GEN-1, GEN-5, and CIVIL-1** in the **FACILITY DESIGN** section. Proposed paleontological conditions of certification follow. It is staff's opinion that the likelihood of encountering paleontologic resources is high at the plant site, along buried pipelines connecting to the plant, and on the transmission line route from the project, at least to Milepost 8.5. The likelihood of encountering significant paleontological resources along the transmission line south of Milepost 8.5 is lower.

Staff will consider reducing monitoring intensity, at the recommendation of the project PRS, following examination of sufficient, representative deep excavations.

PAL-1 The project owner shall provide the Compliance Project Manager (CPM) with the resume and qualifications of its Paleontological Resource Specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain prior CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995. The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;
2. Ability to recognize and collect fossils in the field;
3. Local geological and biostratigraphic expertise;
4. Proficiency in identifying vertebrate and invertebrate fossils; and
5. At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontologic Resource Monitors (PRMs) shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of experience monitoring in California; or
- AS or AA in geology, paleontology, or biology and four years’ experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification:

1. At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.

2. At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project, stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor's beginning on-site duties.

3. Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction laydown areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale of 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the project or its linear facilities change, the project owner shall provide maps and drawings reflecting those changes to the PRS and CPM.

If construction of the project proceeds in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Before work commences on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked the following week, and until ground disturbance is completed.

<u>Verification:</u>

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

2. If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

3. If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within five days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner submits to the CPM for review and approval, a paleontological resources monitoring and mitigation plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities, and may be modified with CPM approval. This document shall be used as the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of Vertebrate Paleontology (SVP, 1995) and shall include, but not be limited, to the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to PRMMP procedures;

2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the conditions of certification;

3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;

4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;

5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling;

6. A discussion of procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;

7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meet the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed to receive data and fossil materials collected, requirements or specifications for materials delivered for curation, and how they will be met, and the name and phone number of the contact person at the institution; and

10. A copy of the paleontological conditions of certification.

<u>Verification:</u> At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall prepare and conduct weekly CPM-approved worker environmental awareness program (WEAP) training for the following workers: project managers, construction supervisors, foremen and general workers involved with or who operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved WEAP training. Worker WEAP training shall consist of an initial in-person PRS training during the project kick-off, for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. No ground disturbance shall occur prior to CPM approval of the WEAP, unless specifically approved by the CPM.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;

2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontologic sensitivity;

3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;

4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;

5. An informational brochure that identifies reporting procedures in the event of a discovery;

6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

<u>Verification:</u>

1. At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP, including the brochure, with the set of reporting procedures for workers to follow.

2. At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning to use a video for interim training.

3. If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

4. In the monthly compliance report (MCR), the project owner shall provide copies of the WEAP certification of completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring and will be included in the monthly compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keep a daily monitoring log of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.

3. The project owner shall ensure that the PRS notifies the CPM within 24 hours of the occurrence of any incidents that are out of compliance with respect to the paleontological conditions of certification. Such incidents would include, but are not limited to failure to notify the PRS prior to starting deep excavations or a failure to report a fossil discovery. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the conditions of certification.

4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM within 24 hours, or Monday morning in the case of a weekend event where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities to be placed in the monthly compliance reports. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities, and general locations of excavations, grading, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during project construction.

Verification: The project owner shall maintain in the compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after project completion and approval of the CPM-approved paleontological resource report (see **PAL-7**). The project owner shall be responsible for paying any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information, and submit it to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
Victorville 2 Hybrid Power Project (07-AFC-2)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on cultural, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials. Include this completed form in the monthly compliance report.

No.	Employee Name	Title/Company	Signature
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Cultural Trainer: ______________ Signature: _________________ Date: ___/___/___

PaleoTrainer: ________________ Signature: _________________ Date: ___/___/___

Biological Trainer: ____________ Signature: _________________ Date: ___/___/___

REFERENCES

California Code of Regulations, Title 24. 2007. (*California Building Standards Code* [CBSC]), Part 2, *California Building Code* (CBC).

CDC (California Department of Conservation), 2001. *Oil, Gas, and Geothermal Fields in California.*

CDMG (California Division of Mines and Geology), 2003. *Fault Investigation Reports for* Development *Sites Within Alquist-Priolo Earthquake Fault Zones in Southern California, 1974-2000.*

CDMG, 1999. *Mines and Mineral Producers Active in California (1997–1998).* Special Publication 103.

CDMG, 1998. *Gold Districts of California*, Sesquicentennial Edition, California Gold Discovery to Statehood. Bulletin 193.

CDMG, 1994. Fault *Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions, Scale: 1:750,000.*

CDMG, 1993. *Mineral Land Classification of Concrete Aggregate Resources in the Barstow*-Victorville *Area.* Open-File Report 92-06.

CDMG, 1990. *Industrial Minerals in California: Economic Importance, Present Availability, and Future Development*. Special Publication 105, reprinted from U.S. Geological Survey Bulletin 1958.

CDMG, 1986. *Geologic Map of the San Bernardino Quadrangle.* Scale 1:250,000.

CGS, 2007. *California* Historical *Earthquake Online Database*. *http://www.consrv.ca.gov/cgs/rghm/quakes/historical/*.

Cox, B.F., Hillhouse, J.W., and Owen, L.A., 2003. Pliocene and Pleistocene Evolution of the Mojave River, and Associated Tectonic Development of the Transverse Ranges and Mojave Desert, Based on Borehole Stratigraphy Studies and Mapping of Landforms and Sediments near Victorville, California. Geological Society of America. Special Paper 368. p. 1-42.

Dibblee, T.W. 1967. *Arial Geology of the Western Mojave Desert, California*. U.S. Geological Survey Professional Paper 522. 153 p.

FEMA (Federal Emergency Management Agency), 1996. *Flood Insurance Rate Map, San Bernardino County, California and Incorporated Areas, Flood Insurance Rate Map Nos.* 06071C5125 *F, 06071C5150 F, and 06071C5805 F*. Dated March 18, 1996.

Holroyd, P., 2007. Unpublished electronic mail communication. University of California Museum of Paleontology, 1 p.

ICBO (International Conference of Building Officials), 1998. *Map of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada.*

ICC (International Code Council), 2003. *International Building Code*.

Inland Energy, Inc., 2007. Application for Certification, Victorville 2 Hybrid Power Project. Volumes I and II. Submitted to the California Energy Commission, February, 2006.

Kleinfelder, 2006. *Preliminary Geotechnical Investigation Report, Victorville 2 Hybrid Power Project, City of Victorville, San Bernardino County, California.* Preliminary geotechnical report prepared for ENSR, in Camarillo, California, included in Inland Energy, Inc. (2007) as Appendix C.

McCleod, S.A. 2007. Unpublished paleontology resources report. Natural History Museum of Los Angeles County, Los Angeles, California, 3 pp.

Noble, L.F. 1954. *Geology of the Valyermo quadrangle and vicinity, California*. U.S. Geological Survey Geologic Quadrangle Map GQ-50. Scale 1-24,000.

Norris, R. M. and R. W. Webb. 1990. *Geology of California*. Second Edition. John Wiley and Sons. New York.

Scott, E. 2007. Unpublished paleontology literature and records review. San Bernardino County Museum, Redlands, California, 5 p.

SVP (Society for Vertebrate Paleontology), 1995. *Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontologic Resources: Standard* Procedures*.*

Victorville 2007a — City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vols. 1 and 2. 2/27/07. Received 2/28/07.

Victorville 2007c – City of Victorville (tn: 41644). Applicant’s Responses to CEC’s Data Request Set 1, #s 1 – 110. 7/23/07. Received 7/23/07.

POWER PLANT EFFICIENCY

Shahab Khoshmashrab and Steve Baker

SUMMARY OF CONCLUSIONS

The Victorville 2 Hybrid Power Project (Victorville 2), if constructed and operated as proposed, would generate 563 megawatts (MW) (maximum gross output) of electricity at an overall project fuel efficiency of 59% lower heating value (LHV). While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable and will produce up to 50 MW of electricity using renewable solar energy. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to this project. Staff therefore concludes that this project would present no significant adverse impacts on energy resources.

INTRODUCTION

One of the responsibilities of the California Energy Commission (Energy Commission) is to make findings on whether the energy use by a power plant, including the proposed Victorville 2 power plant, will result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that Victorville 2's energy consumption creates a significant adverse impact, it must further determine if feasible mitigation measures could eliminate or minimize that impact. In this analysis, staff addresses the inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- Examine whether the facility will likely present any adverse impacts upon energy resources;
- Examine whether these adverse impacts are significant; and if so,
- Examine whether feasible mitigation measures or alternatives could eliminate those adverse impacts or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the efficiency of this project.

SETTING

The city of Victorville, the applicant, proposes to build and operate Victorville 2, a 563 MW (maximum gross output) hybrid combined-cycle solar thermal power plant, to serve California's energy needs (Victorville 2007a, AFC §3.0). The project's combined-cycle equipment will consist of two General Electric (GE) Frame 7FA combustion gas turbine generators with an evaporative inlet air cooling system (Victorville 2007a, AFC

§§1.1, 2.1, 2.4.2), two multi-pressure heat recovery steam generators (HRSGs) with duct burners, and one three-pressure, reheat, condensing steam turbine (ST) generator capable of producing 267 MW (nominal maximum) and arranged in a two-on-one combined cycle train, totaling approximately 563 MW at nominal maximum gross output. The gas turbines and HRSGs will be equipped with dry low-NOx combustors and selective catalytic reduction to control air emissions (Victorville 2007a, AFC §§2.4.2, 2.4.3.1). The solar thermal equipment utilizes arrays of parabolic collectors that heat a working fluid used to generate steam. At full load solar operation, heat from the solar field can replace the equivalent of approximately 50 MW of duct firing.

Natural gas will be delivered to Victorville 2 via a new 12-inch gas line that will be connected to an existing Kern River-High Desert Power Project 24-inch natural gas pipeline (Victorville 2007a, AFC §§2.1, 2.4.5.1, 2.4.7.1).

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING THE SIGNIFICANCE OF ENERGY RESOURCES

CEQA guidelines state that the environmental analysis "…shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Title 14 CCR §15126.4[a][1]). Appendix F of the guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce the wasteful, inefficient, and unnecessary consumption of energy (Title 14, CCR §15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- Adverse effects on local and regional energy supplies and energy resources;
- A requirement for additional energy supply capacity;
- Noncompliance with existing energy standards; or
- The wasteful, inefficient, and unnecessary consumption of fuel or energy.

PROJECT ENERGY REQUIREMENTS AND ENERGY USE EFFICIENCY

Any power plant large enough to fall under Energy Commission siting jurisdiction (50 MW or greater) will, by definition, consume large amounts of energy. Under normal conditions, Victorville 2 will burn natural gas at a nominal rate of approximately 2,975 million British thermal units (MMBtu) per hour, LHV, during base load operation (Victorville 2007a, AFC §2.4.5.1, Figure 2-7a). The estimated fuel consumption, under the same conditions (with full load duct firing and the solar system turned off), is approximately 3,639 MMBtu per hour, LHV (Victorville 2007a, AFC §2.4.5.1, Figure 2-7b). This is a substantial rate of energy consumption that could potentially impact energy supplies. Under expected project conditions, electricity will be generated at a full load efficiency of approximately 59% LHV (Victorville 2007a, AFC, Figure 2-7c). This efficiency level compares very favorably with the average fuel efficiency of a typical base load power plant, and exceeds the efficiency level of a typical combined-cycle power plant (without solar energy input) by as much as five percentage points.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of natural gas to operate the project (Victorville 2007a, AFC §§1.1, 2.1, 2.4.5.1, 2.4.7.1). Natural gas for Victorville 2 will be supplied from the existing Kern River-High Desert Power Project lateral via a new pipeline connection. The Kern River system is capable of delivering the gas that Victorville 2 will require to operate. This natural gas supply is a reliable source of natural gas for this project. It therefore appears unlikely that the project would create a substantial natural gas demand increase.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel will be supplied to the project by Kern River via a new pipeline connection (Victorville 2007a, AFC §§2.4.5.1, 2.4.7.1). There appears to be little likelihood that Victorville 2 will require additional capacity since regional supplies are currently plentiful.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of Victorville 2 or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT, AND UNNECESSARY ENERGY CONSUMPTION

Victorville 2 could create significant adverse impacts on energy resources if alternatives reduced the project’s fuel use. The evaluation of alternatives to the project (that could reduce wasteful, inefficient, or unnecessary energy consumption) first requires the examination of the project’s energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by both the configuration of the power producing system and the selection of equipment used to generate its power.

Project Configuration

Victorville 2 will be a combined-cycle power plant. Electricity will be generated by 2 gas turbines and a reheat steam turbine operating on heat energy recovered from the gas turbines’ exhaust (Victorville 2007a, AFC §§1.1, 2.1, 2.4.2, 2.4.3). By recovering this heat, which would otherwise be lost up the exhaust stacks, the efficiency of any combined-cycle power plant is increased considerably from that of either gas turbines or a steam turbine operating alone. This configuration is well suited to the large, steady loads met by a base load plant that generates energy efficiently over long periods of time.

The applicant proposes to install evaporative inlet air coolers, HRSG duct burners (re-heaters), three-pressure HRSGs, a reheat steam turbine unit, a solar thermal field, and a circulating cooling water system (Victorville 2007a, AFC §§1.1, 2.1, 2.4.2, 2.4.3). Staff believes these features to be meaningful efficiency enhancements to Victorville 2. The two-train combustion turbine/HRSG configuration is also highly efficient during unit turndown since one gas turbine can be shut down, leaving the other fully loaded. This allows the efficient operation of one gas turbine instead of the operation of two gas turbines operating at an inefficient 50% of load.

Victorville 2 also includes HRSG duct burners, which will partially replace heat to the steam turbine cycle during high ambient temperatures when gas turbine capacity drops, and partially add power. Duct firing provides a number of additional operational benefits including load following and balancing and optimization of the steam cycle operation.

This project also utilizes parabolic solar thermal collector technology. In this technology, solar collectors track the sun and absorb its thermal energy. This heat is then transferred to a heat transfer fluid circulating through a boiler, where the heat is used to generate high-pressure steam for the steam turbine. This system could replace the equivalent of approximately 50 MW of duct firing. The solar technology would enhance the project's overall efficiency by reducing the consumption of natural gas (see below for further explanation).

Equipment Selection

The F-class of advanced gas turbines to be installed in Victorville 2 represents one of the most modern and efficient machines available. The applicant will install two GE Frame 7FA combustion gas turbine generators in a two-on-one combined-cycle power train nominally rated at 563 MW and 57.5% maximum full load efficiency[1] LHV under International Organization for Standardization (ISO) conditions (GTW, 2007). Victorville 2 will also employ GE's rapid start process that effectively reduces time required for startup and shutdown of the turbine generators, further improving the overall thermal efficiency of the project.

One possible alternative is the Siemens SCC6-5000F, nominally rated in a two-on-one train combined-cycle configuration at 589.7 MW and 57.2% efficiency LHV at ISO conditions (GTW, 2007).

Another alternative is the Alstom Power KA24, nominally rated in a two-on-two configuration at 560 MW with an efficiency rating of 57.3% LHV at ISO conditions (GTW 2007).

Any differences among the GE 7FA, SCC6-5000F, and Alstom KA24 in actual operating efficiency will be insignificant. Selecting among these machines is thus based on other factors such as generating capacity, cost, commercial availability, and the ability to meet air pollution limitations.

Efficiency of Alternatives to the Project

Victorville 2's objectives include the generation of base load electricity and ancillary services at all hours of the day to serve energy needs throughout California (E&LW, 2006a, AFC §§2.1, 2.4.2, 3.0, 5.0).

[1] Does not account for the efficiency enhancement offered by the solar system

Alternative Generating Technologies

Alternative generating technologies for Victorville 2 are considered in the AFC (Victorville 2007a, AFC §5.4). For purposes of this analysis, combined-cycle without solar thermal technology, other fossil fuels, nuclear, biomass, hydroelectric, wind, and geothermal technologies are all considered. Given the project objectives, location, air pollution control requirements, and the commercial availability of the above technologies, staff agrees with the applicant that only natural gas-burning technologies (whether coupled with solar technology or not) are feasible.

Natural Gas-Burning Technologies

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil fuel-fired power plant (Power, 1994). Under a competitive power market system, where operating costs are critical in determining the competitiveness and profitability of a power plant, the plant owner is strongly motivated to purchase fuel-efficient machinery.

Modern gas turbines represent the most fuel-efficient electric generating technology available today. Currently available large combustion turbine models can be grouped into three categories: conventional, advanced, and next generation. Advanced combustion turbines have advantages for Victorville 2. Their higher firing temperatures offer higher efficiencies than conventional turbines. They offer proven technology with numerous installations and extensive run times in commercial operations. Emission levels are also proven, and guaranteed emission levels have been reduced based upon the operational experience and design optimization of their manufacturers.

One possible alternative to an advanced F-class gas turbine is the next generation G-class machine, such as the Siemens-Westinghouse 501G gas turbine generator, which uses partial steam cooling to allow slightly higher temperatures, yielding slightly greater efficiency. In actual operation, one would expect to see the difference in efficiency diminish, since larger-capacity G-class turbines run at less than optimum (full) output more frequently than smaller-capacity F-class turbines. (Gas turbine efficiency drops rapidly at less than full load.). Given the minor efficiency improvement promised by the G-class turbine, and since this machine would have to operate at less than optimum base load efficiency in order to meet the project load capacity requirements, staff believes the applicant's decision to purchase F-class machines is reasonable.

Another possible alternative to the F-class advanced gas turbine is an H-class next generation machine with a claimed fuel efficiency of 60% LHV at ISO conditions. This high efficiency is achieved through a higher pressure ratio and firing temperature, made possible by cooling the initial turbine stages with steam instead of air. This first Frame 7H application is currently under construction at the Inland Empire Energy Center in Riverside County, California. Given the lack of commercial experience with this machine and the project load requirements, staff agrees with the applicant's decision to use F-class machines.

Capital cost is also important when selecting generating machinery. Recent progress in the development of gas turbines, incorporating technological advances made in the development of aircraft (jet) engines, combined with the cost advantages of assembly-line manufacturing, has produced machines that both offer the lowest available fuel cost and sell at the lowest per-kilowatt capital cost.

Solar Thermal Technology

The Mojave Desert, where the project site is located, is one of the country's best suited areas for solar energy facilities. A combined-cycle configuration without solar technology would fail to take advantage of this area's valuable solar energy resource.

With the duct burners turned on at full load and the solar system turned off, the project would generate approximately 563 MW of electricity (nominal maximum) at an overall efficiency of approximately 52.7% LHV (Victorville 2007a, AFC, Figure 2-7b). With the duct burners turned down and the solar system turned on at full load, the project can generate the same electrical capacity at an overall efficiency of approximately 59% LHV (Victorville 2007a, AFC, Figure 2-7c). As seen above, the solar system would enhance the project's overall efficiency by more than six percentage points. Therefore, adding solar thermal technology at Victorville 2 appreciably increases efficiency while reducing natural gas consumption.

Inlet Air Cooling

Other alternatives include gas turbine inlet air cooling methods. The two most common techniques are evaporative coolers or foggers, and chillers. Both increase power output by cooling gas turbine inlet air. A mechanical chiller offers greater power output than the evaporative cooler on hot, humid days; however, it consumes electric power to operate its refrigeration process, slightly reducing its overall net power output and overall efficiency. An absorption chiller uses less electricity but necessitates the use of a substantial amount of ammonia. An evaporative cooler or fogger boosts power output most efficiently on dry days; it uses less electricity than a mechanical chiller, possibly producing a slightly higher operating efficiency. Efficiency differences between these alternatives are relatively insignificant.

Given the climate at the project site and the relative lack of clear superiority of one system over another, staff agrees that the applicant's choice of an evaporative gas turbine inlet air cooling system will have no significant adverse energy impacts.

Staff concludes that the selected project configuration (hybrid combined-cycle solar thermal) and generating equipment (F-class gas turbines) represent the most efficient feasible combination for satisfying the project's objectives. The two-train CT/HRSG configuration also allows for high efficiency during unit turndown since one CT can be shut down, leaving one fully loaded, efficiently operating CT instead of having two CTs operate at an inefficient 50%. This offers an efficiency advantage over the larger machines during unit turndown. The solar technology proposed for this project would enhance the overall project's efficiency while reducing fuel consumption. There are no alternatives that would significantly reduce energy consumption while satisfying the project's objectives of producing base load electricity and ancillary services.

Staff, therefore, believes that Victorville 2 will not constitute a significant adverse impact on energy resources.

CUMULATIVE IMPACTS

The only nearby power plant that could potentially impact cumulative energy consumption, when aggregated with this project, is the High Desert Power Project. As discussed above, the natural gas supply system has enough capacity to supply both projects. Staff knows of no other projects that could produce cumulative energy impacts.

Staff believes that the construction and operation of the project would not create indirect impacts (in the form of additional fuel consumption), that would not have otherwise occurred without this project. Older, less efficient power plants consume more natural gas than new, more efficient plants such as Victorville 2. Natural gas is burned by the most competitive power plants on the spot market, and the most efficient plants run the most frequently. The high efficiency of the proposed Victorville 2 should allow it to compete favorably, run at high capacity, and replace less efficient power generating plants. The project would therefore not impact the cumulative amount of natural gas consumed for power generation.

NOTEWORTHY PUBLIC BENEFITS

The applicant expects to increase power supply reliability in the California electricity market by both meeting the state’s energy needs and contributing to regional electricity reserves. By doing so in a fuel-efficient manner, through installing the most modern F-class gas turbine generator available in a hybrid combined-cycle solar thermal configuration, Victorville 2 will benefit electric consumers of California.

CONCLUSIONS AND RECOMMENDATIONS

The project, if constructed and operated as proposed, would generate 563 MW (nominal gross output) of electric power at an overall project fuel efficiency of 59% LHV. While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

No cumulative impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

Victorville 2007a — City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vol. 1 and 2. 2/27/02. Received 2/28/2007.

GTW 2007 — Gas Turbine World 2007 performance specs. December 2006, pp. 29-35.

Power 1994 — “Operating and Maintaining IPP/Cogen Facilities” Power, September 1994, p. 14.

POWER PLANT RELIABILITY

Shahab Khoshmashrab and Steve Baker

SUMMARY OF CONCLUSIONS

The city of Victorville, the applicant, predicts an equivalent availability factor of 90-95 percent, which staff believes is achievable. Based on a review of the proposal, staff concludes that the Victorville 2 Hybrid Power Project (Victorville 2) will be built and will operate in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

INTRODUCTION

In this analysis, California Energy Commission (Energy Commission) staff addresses the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliable power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would not be likely to degrade the overall reliability of the electric system it serves (see the **SETTING** section, below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliable power generation. While the applicant has predicted an equivalent availability factor of 90-95% for the Victorville 2 (see below), staff uses typical industry norms as a benchmark, rather than the applicant's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, or standards (LORS) apply to the reliability of this project.

SETTING

In the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the state's control area operators, such as the California Independent System Operator (California ISO), which purchase, dispatch, and sell electricity throughout the state. How the California ISO and other control area operators ensure system reliability is an ongoing process; protocols are still being developed and put in place to provide sufficient reliability in the competitive market system. "Must-run" power purchase agreements and “participating generator” agreements are two mechanisms that ensure an adequate supply of reliable power.

The California ISO also requires that power plants selling ancillary services, as well as those holding reliability must-run contracts, fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the California ISO.

The California ISO’s mechanisms to ensure adequate power plant reliability have apparently been developed with the assumption that individual power plants competing to sell power into the system will exhibit reliability levels similar to those of power plants of past decades. However, there is reason to believe that, with free market competition, financial pressures on power plant owners to minimize their capital outlays and maintenance expenditures may ultimately reduce the reliability of many existing and newly constructed power plants (McGraw-Hill, 1994). It is possible that, if enough power plants exhibit reliability levels sufficiently lower than historical levels, the assumptions used by the California ISO to ensure system reliability could be invalid, causing serious repercussions. Until the state’s restructured competitive electricity market has undergone a shakeout period and the effects of varying power plant reliability are thoroughly understood and compensated for, staff recommends that power plant owners continue to build and operate their projects to the industry’s current level of reliability.

As part of its plan to provide needed reliability, the applicant proposes to operate the 563 megawatt (MW) (maximum gross output) Victorville 2, a hybrid combined cycle solar thermal power plant, with operating flexibility (that is, ability to start up, shut down, turn down, and provide peaking power) so that its operation can be readily adapted to changing conditions in the energy and ancillary services markets (Victorville 2007a, AFC §2.4.2). During periods when the solar collectors are in use (daytime when the sun is shining on the site), heat collected by the solar field would generate steam to augment the steam generated in the heat recovery steam generator. At full load solar operation, the heat from the solar field can replace the equivalent of approximately 50 MW of duct firing, which would maintain electrical output while reducing fuel consumption.

The project is expected to achieve an equivalent availability factor in the range of 90 to 95% (Victorville 2007a, AFC §2.4.2). The project’s capacity factor will depend on provisions in its bilateral power sales contracts, as well as market prices for electricity, ancillary services, and natural gas (Victorville 2007a, AFC §2.4.2).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to how the project is designed, sited, and operated in order to ensure its safe and reliable operation (Title 20, CCR §1752[c]).

Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if a project is at least as reliable as other power plants on that system.

The availability factor of a power plant is the percentage of time it is available to generate power; both planned and unplanned outages subtract from this availability. Measures of power plant reliability are based upon both the plant's actual ability to generate power when it is considered to be available, and upon starting failures and unplanned (or forced) outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when called upon to operate. Throughout its intended 30-year life, the Victorville 2 is expected to operate reliably. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability requires adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for a project and compares them to industry norms. If they compare favorably for this project, staff will then conclude that the Victorville 2 will be as reliable as other power plants on the electric system and will not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will be ensured by adopting appropriate quality assurance/quality control (QA/QC) programs during the design, procurement, construction, and operation of the plant and by providing for the adequate maintenance and repair of the equipment and systems discussed below.

Quality Control Program

The applicant describes a QA/QC program (Victorville 2007a, AFC Appendix D.1, §1.0; Appendix D.2, §1.0; Appendix D.2, §1.0; Appendix D.4, §1.0; Appendix D.5, §1.0) that is typical of the power industry. Equipment will be purchased from qualified suppliers based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs and quality history will be evaluated. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects that implementation of this program will result in standard reliability of design and construction. To ensure this implementation, staff has proposed appropriate conditions of certification in the section of this document entitled **FACILITY DESIGN**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility operating in base-load service for long periods of time must be capable of being maintained while operating. A typical approach to this is to provide redundant examples of those pieces of equipment that are most likely to require service or repair.

The applicant plans to provide an appropriate redundancy of function for the project (Victorville 2007a, AFC §§2.4.4.6, 2.4.4.7, 2.4.5.8). Because the project consists of two combustion turbine generators, operating in parallel as independent equipment trains, it is inherently reliable. A single equipment failure cannot disable more than one train, which allows the plant to continue to generate, but at reduced output. All plant ancillary systems are also designed with adequate redundancy to ensure their continued operation if equipment fails. Staff believes that this project's proposed equipment redundancy will be sufficient for its reliable operation.

Maintenance Program

Equipment manufacturers provide maintenance recommendations for their products, and the applicant is expected to base the project's maintenance program on those recommendations. The program would encompass both preventive and predictive maintenance techniques. Maintenance outages would probably be planned for periods of low electricity demand. Staff expects that the project will be adequately maintained to ensure an acceptable level of reliability.

FUEL AND WATER AVAILABILITY

The long-term availability of fuel and of water for cooling or process use is necessary to ensure the reliability of any power plant. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant could be curtailed, threatening both the power supply and the economic viability of the plant.

Fuel Availability

The Victorville 2 will burn natural gas delivered through an existing 24-inch natural gas pipeline that is connected to Southern California Gas Company's (SoCalGas's) natural gas transmission system and also supplies fuel to the High Desert Power Project. The Victorville 2 will have a new 12-inch gas line to connect with the existing line at a point adjacent to the southwest corner of the Victorville 2 project site (Victorville 2007a, AFC §§1.1, 2.1, 2.4.5.1, 2.4.7.1). All but approximately 450 feet of this gas line will be on the Victorville 2 project site. The High Desert Power Project consumes approximately 50% of the capacity of the existing 24-inch gas line; the Victorville 2 project would consume 37% of this capacity, leaving some extra capacity (Victorville 2007a, AFC §2.4.5.1). SoCalGas's natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas from the Southwest, the Rocky Mountains, and Canada. Staff agrees with the applicant's claim that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The Victorville 2 will use reclaimed water from the nearby Victor Valley Wastewater Reclamation Authority treatment plant via a new 1.5-mile pipeline for cooling tower makeup and other non-potable water use. Except for sanitary wastewater, which will be disposed of to an existing nearby sewer interceptor, the water will be recycled through a zero liquid discharge system (Victorville 2007a, AFC §§1.1, 1.2, 1.3.17, 2.1, 2.4.5.2, 2.4.7.2). The "will serve" letters accompanying the AFC confirm the availability of the necessary quantities of water for this project (Victorville 2007a, AFC Appendix N). Staff believes these sources represent a reliable supply of water for the project. For further discussion of water supply, see the **SOIL AND WATER RESOURCES** section of this document.

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, tsunamis (tidal waves), and seiches (waves in inland bodies of water) are not likely to present hazards for this project, but seismic shaking (earthquakes) and flooding could present credible threats to the project's reliable operation.

Seismic Shaking

The site lies within Seismic Zone 4 (Victorville 2007a, AFC §§1.3.6, 6.6.3.2; Appendix D); see the "Faulting and Seismicity" portion of the **GEOLOGY AND PALEONTOLOGY** section of this document. The project will be designed and constructed to the latest appropriate LORS (Victorville 2007a, AFC Appendix D). Compliance with current seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been continually upgraded. Because it will be built to the latest seismic design LORS, this project will likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see the section of this document entitled **FACILITY DESIGN**. In light of the general historical performance of California power plants and the electrical system in seismic events, staff has no special concerns with the power plant's functional reliability during seismic events.

Flooding

The project site is largely flat, with elevations ranging from approximately 2,780 to 2,820 feet above mean sea level. The western portion of the site is within a 500-year flood plain and the eastern portion of the site is undetermined with respect to flood zoning (Victorville 2007a, AFC §§1.2, 2.3.1, 2.4.6.7, 6.17.2.3, 6.17.3.3). San Bernardino County has experienced major flooding throughout its history and therefore finds it important to identify areas at high risk for severe flooding. The county participates in the National Flood Insurance Program, and therefore adheres to federally set requirements to reduce flood hazards. The county uses flood districts and zones to prevent construction of habitable structures in flood zones. At the eastern perimeter of the project site and even further to the east, the topography slopes down to the Mojave River. A ridgeline located in the middle of the project site also causes surface runoff to flow to the west and east of the site.

The Mojave River is the principal flood hazard for developed areas within the Victorville development planning area. Potential flood hazards at the project site are minimal because of flood control improvements on the river, including levees and the Forksite Dam, which is located approximately 18 miles upstream from the project.
Staff believes there are no special concerns with power plant functional reliability due to flooding. For further discussion, see **SOIL AND WATER RESOURCES,** and **GEOLOGY AND PALEONTOLOGY**.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as other related reliability data) are maintained by the North American Electric Reliability Corporation (NERC). NERC regularly polls North American utility companies on their project reliability through its Generating Availability Data System, and periodically summarizes and publishes those statistics on the Internet [http://www.nerc.com]. The NERC reported the following generating unit statistic for the years 1999 through 2003 (NERC, 2005):

For combined-cycle units (all MW sizes):

Availability Factor = 89.00 percent

The project’s gas turbines have been on the market for several years now and are expected to exhibit typically high availability. The applicant’s expectation of an annual availability factor of 90-95% (Victorville 2007a, AFC §2.4.2) appears reasonable when compared with NERC figures for similar plants throughout North America (see above). In fact, these machines can well be expected to outperform the fleet of various (mostly older and smaller) gas turbines that make up NERC statistics. Additionally, because the plant will consist of two parallel gas turbine generating trains, maintenance can be scheduled during times of the year when the full plant output is not required to meet market demand, which is typical of industry standard maintenance procedures. The solar technology employed in the Victorville 2 will be similar to that at the solar power plants at Kramer Junction, which have demonstrated availability factors in the 99% range in recent years (Victorville 2007a, AFC §2.4.3.4). The applicant’s estimate of plant availability, therefore, appears to be realistic. Stated procedures for assuring the design, procurement, and construction of a reliable power plant appear to be consistent with industry norms, and staff believes they are likely to ultimately produce an adequately reliable plant.

NOTEWORTHY PROJECT BENEFITS

This project would enhance power supply reliability in the California electricity market by meeting the state’s growing energy demand, contributing to electricity reserves in the region, and providing operating flexibility (that is, the ability to start up, shut down, turn down, and provide load following and spinning reserve). The fact that the project consists of two combustion turbine generators, configured as independent equipment trains, provides inherent reliability. A single equipment failure cannot disable more than one train, thereby allowing the plant to continue to generate, though at reduced output.

At full load solar operation, the heat from the solar system can replace the equivalent of approximately 50 MW of duct firing. The solar system would enhance the project’s ability to respond to the energy markets by providing peaking power during periods of peak electricity demand (e.g., hot summer afternoons), while reducing the natural gas consumption required to fire the duct burners at full load. During periods of peak demand, the sun will typically shine on the project site; solar energy should therefore be available when needed. If a malfunction prevented the use of the solar technology, natural gas could be burned in the duct burners to make up for that loss. This provides a reliable source of energy, which enhances both the project's overall reliability and availability.

CONCLUSION

The applicant predicts an equivalent availability factor of 90-95 percent, which staff believes is achievable. Based on a review of the proposal, staff concludes that the plant would be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

Victorville 2007a — City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vol. 1&2. 2/27/07. Received 2/28/2007.

McGraw-Hill (McGraw-Hill Energy Information Services Group). 1994. Operational Experience in Competitive Electric Generation. Executive Report.

NERC (North American Electric Reliability Council). 2005. 1999–2003 Generating Availability Report.

TRANSMISSION SYSTEM ENGINEERING

Sudath Arachchige and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed Victorville 2 Hybrid Power Project's (Victorville 2) outlet lines and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards (LORS). The analysis of environmental impacts for project transmission lines and equipment, both from the power plant up to the point of interconnection with the existing transmission network as well as upgrades beyond the interconnection that are attributable to the project have been evaluated by staff and are included in the environmental sections of this staff assessment.

The following additional new transmission facilities may be required beyond the first point of interconnection:

- The construction of approximately 11 miles of 230kV transmission line with two sub-bundled 1590 Aluminum Conductor Steel- Reinforced (ACSR) conductors, in an existing right-of-way (ROW) from the Victor Substation to the existing Lugo Substation.
- The relocation of an existing 115kV line approximately 200 feet east of its existing location, within the same ROW. This relocation will require replacement of 3.5 miles of wooden poles with new steel poles and installation of 3.1 miles of new steel poles.
- Installation of a third Lugo-500/230kV transformer bank would be required to mitigate Transmission overloads triggered by the Victorville 2 project identified in a sensitivity study.
- The applicant could be responsible for upgrading Circuit Breakers (CB) in the SCE transmission system, in the event that generation projects in the queue ahead of Victorville 2 do not accomplish proposed upgrades prior to Victorville 2's commercial operation date.

A detailed special protection system (SPS) study is required in the facility study to determine if the existing High Desert SPS will need expansion to accommodate this project.

INTRODUCTION

STAFF ANALYSIS

This transmission system engineering (TSE) analysis examines whether this project's proposed interconnection conforms to all LORS required for safe and reliable electric power transmission. Additionally, under CEQA, the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (Title 14, California Code of Regulations §15378). The Energy Commission must therefore identify the system impacts and necessary new or modified transmission facilities downstream of the proposed interconnection that are required for interconnection and that represent the whole of the action.

Commission staff relies upon the responsible interconnecting authority for analysis of impacts on the transmission grid, as well as for the identification and approval of new or modified facilities required downstream from the proposed interconnection for mitigation purposes. The proposed project would connect to SCE's 230-kV transmission network and require both analysis by SCE and the approval of the California Independent System Operator (California ISO).

SCE'S ROLE

SCE is responsible for ensuring electric system reliability in its service territory for additions of proposed transmission modifications, and determines both the standards necessary to maintain reliability, and whether proposed modifications conform to those standards. SCE will provide both this analysis and reports in its system impact and facilities studies, and in both its approval for those facilities and for changes required for the addition of the proposed modifications.

CALIFORNIA ISO'S ROLE

The California ISO is responsible for ensuring electric system reliability for all participating transmission owners in California. Victorville 2 will be dispatched to the California ISO grid through SCE's 230kV Victor Substation. The CA ISO will therefore review the studies of the SCE system to ensure adequacy of the proposed transmission interconnection. The California ISO will further determine the reliability impacts of the proposed transmission modifications on SCE's transmission system, in accordance with all applicable reliability criteria. According to California ISO tariffs, the California ISO determines the need for transmission additions or upgrades downstream from the interconnection point in order to ensure the overall reliability of the transmission grid. The California ISO will therefore review the system impact study (SIS) performed by SCE and/or any other third party; provide its analysis, conclusions, and recommendations; and issue a preliminary approval (or concurrence) letter to SCE. Upon completion of the SCE facility study, the California ISO will review the study results, provide its conclusions and recommendations, and issue a final approval or disapproval letter for the proposed Victorville 2 interconnection. The California ISO may also provide both written and verbal testimony on its findings at Energy Commission hearings.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), Rules for Overhead Electric Line Construction, sets forth uniform requirements for the construction of overhead lines. Compliance with this order ensures both adequate service and the safety of both the public and the people who build, maintain, and operate overhead electric lines.
- CPUC General Order 128 (GO-128), Rules for Construction of Underground Electric Supply and Communications Systems, sets forth uniform requirements and minimum standards for underground supply systems to ensure adequate service and the safety of both the public and the people who build, maintain, and operate underground electric lines.

- The National Electric Safety Code, 1999, provides electrical, mechanical, civil, and structural requirements for overhead electric line construction and operation.
- The combined NERC/WECC (North American Electric Reliability Corporation/Western Electricity Coordinating Council) planning standards provide system performance standards for assessing the reliability of the interconnected transmission system. These standards require continuity of service as their first priority and the preservation of interconnected operation as their second. Some aspects of NERC/WECC standards are either more stringent or more specific than the either agency's standards alone. These standards provide transmission planning designed to withstand both forced and maintenance outage system contingencies while operating reliably within equipment and electric system thermal, voltage, and stability limits. These standards include reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of WECC standards, NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table, and on Section I.D, NERC and WECC Standards for Voltage Support and Reactive Power. These standards require that power flows and stability simulations verify defined performance levels. Performance levels are defined by specifying allowable variations in thermal loading, voltage and frequency, and loss of load that may occur during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (such as the loss of load from a single transmission element) to a catastrophic loss level designed to prevent system cascading and the subsequent blackout of islanded areas and millions of consumers during a major transmission disturbance (such as the loss of multiple 500-kV lines along a common right-of- way, and/or of multiple large generators). While the controlled loss of generation or system separation is permitted under certain specific circumstances, this sort of major uncontrolled loss is not permitted (WECC, 2002).
- NERC's reliability standards for North America's electric transmission system spell out the national policies, standards, principles, and guidelines that ensure the adequacy and security of the nation's transmission system. These reliability standards provide for system performance levels under both normal and contingency conditions. While these standards are similar to the combined NERC/WECC standards, certain aspects of the combined standards are either more stringent or more specific than the NERC performance standards alone. NERC's reliability standards apply to both interconnected system operations and to individual service areas (NERC, 2006).
- California ISO planning standards also provide the standards and guidelines that ensure the adequacy, security, and reliability of the state's member grid facilities. These standards also incorporate the combined NERC/WECC and NERC standards. These standards are also similar to the NERC/WECC or NERC standards for transmission system contingency performance. However, the California ISO standards also provide additional requirements that are not found in either the WECC/NERC or NERC standards. The California ISO standards apply to all participating transmission owners interconnecting to the California ISO- controlled grid. They also apply to non-member facilities that impact the California ISO grid through their interconnections with adjacent control grids (California ISO, 2002a).

- California ISO/FERC (Federal Energy Regulatory Commission) electricity tariffs contain guidelines for building all transmission additions/upgrades within the California ISO-controlled grid. The California ISO determines the need for a proposed project, as well as determining who is responsible for its cost. The agency is additionally responsible for providing an operational review of proposed facilities to be connected to the grid (California ISO, 2003a).

PROJECT DESCRIPTION

The applicant proposes to interconnect the 563 megawatt (MW) Victorville 2 project to SCE's 230kV Victor Substation near Victorville, California. The project's planned operational date is summer of 2009. SCE studied a net project output of 563 MW in the SIS and FS. The Victorville 2 project is a combined-cycle and solar array heat input generating plant consisting of two General Electric (GE) combustion turbine generating units (CTG), rated at 154.2 MW each, and one GE steam turbine generating unit (STG) rated at 268.3 MW. The generator auxiliary load would be 14 MW, resulting in a maximum net output of 563 MW at an 85% power factor. Each generating unit would be connected to the low side of its dedicated 18/230 kV generator step-up (GSU) transformer through 8,000-ampere gas-insulated (SF6) breakers. The high side of each generator step-up transformer would be connected to the project's switchyard via 1,200-ampere disconnect switches. The step-up transformers for the combustion turbine generating units would be rated at 18/230 kV and 118/157/196 megavolt ampere (MVA), while the transformer for the steam turbine generating unit would be rated 18/230 kV and 180/240/300 MVA. The 230-kV side of each step-up transformer would be connected by 1590 ACSR overhead conductors to a breaker and one-half 230 kV switchyard at the plant site.

The proposed 230-kV interconnection from the project switchyard to SCE's Victorville substation would consist two segments:

- The first segment is the construction of approximately 4.3 miles of 1590 ACSR, 230-kV transmission line in a new ROW between the project site and the south end of the High Desert Power Project (HDPP). The new transmission line would be attached to the existing HDPP transmission towers.
- The second segment places a second circuit, approximately 5.7 mile long, on the existing double-circuit HDPP transmission towers. This HDPP line was built as a double-circuit facility and has available space that would require very few additional transmission structures. New transmission towers are needed at three locations along the ROW where the existing line makes under-crossings of another utility's higher-voltage circuits.

The connection of the VV2 project would also require the installation of a new, approximately 11 mile 230kV transmission line between the Victor and Lugo substations. In order to accommodate the new line, an existing 115 kV line will be relocated approximately 200 feet to the east in the same ROW, and 3.5 miles of wooden poles along with new steel poles, 3.1 miles of new steel poles will also be installed (VV2, 2007b section 2.5 pages 2-38 to 2-44 and Figure 2-11).This transmission line is beyond the first point of interconnection and the CPUC is the lead agency for CEQA permitting. However, the construction of the new transmission line and relocation of the existing line are indirect or downstream project impacts, and a general level of environmental review is required for the Energy Commission's CEQA process.

SWITCHYARD AND INTERCONNECTION FACILITIES

The proposed overhead generator tie lines are rated to carry the full capacity of the Victorville project. The project's switchyard would use a breaker and one-half configuration with three bays and four positions. The switchyard consists of 230-kV circuit breakers, 230-kV disconnect switches, and other switching gear that will allow delivery of the project's output (through Victor 230 kV SCE substation) to the SCE grid. The switchyard will be interconnected to SCE's Victor Substation via a newly built, 10-mile-long, 230-kV single circuit. This single circuit is designed with 1590 ACSR conductors. The first 4.3 miles of this circuit would be built on newly constructed transmission towers and the remaining 5.7 miles will be built on the existing double-circuit HDPP transmission towers. The HDPP line was built as a double circuit facility and currently carries only one 230kV circuit. (VV2, 2007b section 2.5 pages 2-38 to 2-44 and Figure 2-11).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

For the interconnection of this proposed project to the grid, the interconnecting utility (SCE) and the control area operator (California ISO) are responsible for ensuring grid reliability. These two entities determine the transmission system impacts of the proposed project and any mitigation measures needed to ensure system conformance with utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. System impact and facilities studies are used to determine the impacts of the proposed project on the transmission grid. Staff relies on the studies and any review conducted by the responsible agency (California ISO) to determine the effect of the project on the transmission grid and to identify any necessary downstream facilities or indirect project impacts required to bring the transmission network into compliance with applicable reliability standards. System impact and facilities studies analyze the grid both with and without the proposed project, under conditions specified in the planning standards and reliability criteria. The standards and criteria define the assumptions used in the study and establish the thresholds through which grid reliability is determined. The studies analyze the impact of the project for the proposed first year of operation, and are based on a forecast of loads, generation, and transmission. Load forecasts are developed by the interconnected utility. Generation and transmission forecasts are established by an interconnection queue. The studies focus on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads, or cascading outages), and short circuit duties. If the studies show that the interconnection of the project causes the grid to be out of compliance with reliability standards, then the study will identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards.

When a project connects to the California ISO-controlled grid, both the studies and mitigation alternatives must be reviewed and approved by the California ISO. If either the California ISO or interconnecting utility determines that the only feasible mitigation includes transmission modifications or additions requiring CEQA review, the Energy Commission must analyze those modifications or additions according to CEQA requirements.

SCOPE OF SYSTEM IMPACT STUDY

The system impact study was performed by SCE at the request of Inland Energy, Inc., to identify the transmission system impacts of Victorville 2 on SCE's 115/230/500-kV system. The study included power flow, sensitivity, and short circuit studies, and transient and post-transient analyses (VV2, 2007a, system impact study). The study modeled the proposed project for a net output of 563 MW. The base cases included all California ISO-approved major SCE transmission projects, the transmission system for the Los Angeles Department of Water and Power, and major path flow limits of Southern California Import Transmission, East-Of-River, and West of River. Because preliminary studies identified severe overloads and other potential operational issues, this study assumed that a Victor-Lugo 230-kV transmission line was in service. The detailed study assumptions are described in the study. The power flow studies were conducted with and without Victorville 2 connected to SCE's grid at the Victor Substation, using 2009 heavy summer and 2010 light spring base cases. The power flow study assessed the project's impact on thermal loading of the transmission lines and equipment. Transient and post-transient studies were conducted for Victorville using the 2009 heavy summer base case to determine whether the project would create instability in the system following certain selected outages. Short circuit studies were conducted to determine if Victorville 2 would overstress existing substation facilities.

Power Flow Study Results

The system impact study identified pre-project overload criteria violations under the 2009 heavy summer and 2010 light spring conditions. Pre-project overloads are caused by either existing system conditions or by projects with higher positions in the California ISO's generator interconnection queue. The mitigation identified for the pre-project overloads was not included in the pre-project study cases, but was included in the Victorville 2 cases. The post-project cases indicate that SCE facilities are not adequate to accommodate the project's interconnection to the 230-kV Victor Substation in 2009 and 2010. However, once the pre-project overloads are mitigated, the studies did not identify any post-project overloads.

Following are the study results and mitigation measures based on the power flow study:

- Overload: Victorville 2 will aggravate pre-project overloads on the Lugo 500/230-kV transformers nos. 1 and 2 under the 2009 heavy summer and 2010 light spring system conditions for normal, N-1, and N-2 contingencies.

Mitigation: Modifications to the existing High Desert Power Project SPS would mitigate both the pre-project overloads and system instability by tripping generation under contingency conditions; SCE system operating procedures would allow for the curtailment of generation in the Victor area when the SPS system is inoperative.

- Overload: The project will aggravate pre-project overloads on the El Dorado 230/115-kV transformer under the 2009 heavy summer and 2010 light spring system conditions for normal, N-1, and N-2 contingencies.

Mitigation: SPS would mitigate the pre-project overloads by tripping generation under contingency conditions and SCE system operating procedure would allow for curtailment of generation when the SPS is inoperative.

- Overload: The project will aggravate pre-project overloads on the Inyo 115-kV phase shifter under the 2010 light spring system condition for normal, N-1, and N-2 contingencies.

Mitigation: The Bishop Remedial Action Scheme would mitigate the pre-project overloads by tripping local generation under contingency conditions and SCE system operating procedure would allow for curtailment of generation in the Bishop area to minimize flows to the Inyo phase-shifter transformer.

- Overload: The project will aggravate pre-project overloads on El Dorado Mountain Pass 115kV line under the 2009 Heavy Summer and 2010 Light Spring system conditions for normal, N-1 and N-2 contingencies.

Mitigation: SPS would mitigate the pre-project and post-project overloads by tripping generation under outage conditions and SCE system operating procedure would allow for curtailment of generation when the SPS is inoperative.

The system impact study identified no post-project overload criteria violations under the 2009 heavy summer and 2010 light spring conditions. All the system upgrades of the prior queue projects have been considered and included during the post-project condition. A detailed SPS study will be required in the facility study to determine if the existing High Desert SPS needs to be expanded to include Victorville 2 under the outages of Victor-Lugo 230-kV nos. 1 through 3.

Power Flow Sensitivity Study Results

- The sensitivity study indicated that Victorville 2 would trigger base case and N-1 overloads on the Lugo 500/23- kV AA transformer bank and Victor-Lugo 230-kV lines No. 1 and 2 without utilizing the existing RAS of the SCE system.
- The SIS identified overloads on Victor-Lugo 230-kV lines No. 1 and 2 under base case and N-1 contingencies with addition of the project, with and without any prior queue projects. A third Victor-Lugo 230-kV line and a third Lugo 500/230-kV transformer bank have to be in service before the project can interconnect to the California ISO grid.
- A detailed SPS study is required to determine whether or not the existing High Desert SPS needs to be expanded to include Victorville 2, under the outages of Victor-Lugo 230-kV no. 1 through 3.

Transient and Post-Transient Power Flow Study Results

NERC/WECC planning standards require that the system maintain post-transient voltage stability when either critical path transfers or area loads increase by 5% for category ”B” contingencies, and 2.5% for category ”C” contingencies. Post-transient studies conducted for similar or larger generators in the area concluded that voltage remains stable under both N-1 and N-2 contingencies. The transient and post-transient studies also indicate that the simultaneous outage of Kramer-Lugo 230-kV lines nos. 1 and 2 caused voltage violation throughout the north-of-Lugo area. However, these violations would disappear if a third Kramer-Lugo 230-kV line, needed for the reliable interconnection of prior queue projects, were in service. If the prior projects withdraw from the queue, the existing Kramer SPS will have to be revised in order to maintain system stability and post-transient voltage levels.

Short Circuit Study Results

Short circuit studies were performed to determine the degree to which the addition of Victorville 2 increases fault duties at SCE’s substations; adjacent utility substations; and the other 115-kV, 230-kV, and 500-kV busses within the study area. The busses at which faults were simulated, the maximum three-phase and single-line-to-ground fault currents at these busses both with and without the project, and information on the breaker duties at each location are summarized in the tables (3 Phase to Ground and Single Line to Ground) of the System Impact Study Report (VV2, 2006b, SIS tables on p. 17). The SIS indicates that the project did not trigger any circuit breaker upgrades, but did identify breaker replacement or upgrades due to generation projects ahead in the queue. The study identified 68 SCE circuit breakers which would require replacement, and 13 circuit breakers which needed to be upgraded due to interconnection of other projects.

COMPLIANCE WITH LORS

The study indicates that the project interconnection would comply with NERC/WECC planning standards and California ISO reliability criteria. The applicant will design, build, and operate the proposed 230-kV overhead transmission lines. The proposed modifications to the Victor 230 kV substation will be performed by SCE within the substation’s fenced yard.

Staff concludes that, assuming the proposed conditions of certification are met, the project would likely meet the requirements and standards of all applicable LORS.

CONCLUSIONS AND RECOMMENDATIONS

The proposed Victorville 2 Hybrid Power Project’s (Victorville 2) outlet lines and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards (LORS). The analysis of environmental impacts for project transmission lines and equipment, both from the power plant up to the point of interconnection with the existing transmission network as well as upgrades beyond the interconnection that are attributable to the project have been evaluated by staff and are included in the environmental sections of this staff assessment.

The following additional new transmission facilities may be required beyond the first point of interconnection:

- The construction of approximately 11 miles of 230kV transmission line with two sub-bundled 1590 Aluminum Conductor Steel- Reinforced (ACSR) conductors, in an existing right-of-way (ROW) from the Victor Substation to the existing Lugo Substation.
- The relocation of an existing 115kV line approximately 200 feet east of its existing location, within the same ROW. This relocation will require replacement of 3.5 miles of wooden poles with new steel poles and installation of 3.1 miles of new steel poles.
- Installation of a third Lugo-500/230kV transformer bank would be required to mitigate Transmission overloads triggered by the Victorville 2 project identified in a sensitivity study.
- The applicant could be responsible for upgrading Circuit Breakers (CB) in the SCE transmission system, in the event that generation projects in the queue ahead of Victorville 2 do not accomplish proposed upgrades prior to Victorville 2's commercial operation date.

A detailed special protection system (SPS) study is required in the facility study to determine if the existing High Desert SPS will need expansion to accommodate this project.

RECOMMENDATIONS

If the Energy Commission approves this project, staff recommends that the following conditions of certification be met to ensure both system reliability and conformance with LORS.

CONDITIONS OF CERTIFICATION FOR TSE

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

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

Transmission System Engineering Table 1
Major Equipment List

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

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

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

The project owner shall submit to the CBO for review and approval, the names, qualifications, and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

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

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

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

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

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

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

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

1. Receipt or delay of major electrical equipment;

2. Testing or energization of major electrical equipment; and

3. The number of electrical drawings approved, submitted for approval, and still to be submitted.

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

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

1. The VV2 will be interconnected to the SCE grid via a 230-kV, 1590-ACSR, approximately 10 mile single circuit tie line. The proposed VV2 switchyard would use a breaker and a half configuration with three bays and four positions.

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

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

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

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

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

7. The project owner shall provide to the CPM:

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

   b. Executed project owner and California ISO Facility Interconnection Agreement.

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

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

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

3. Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-5** 1) through 6) above.

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

TSE-6 The project owner shall inform the CPM and CBO of any impending changes, which may not conform to the requirements TSE- 5 1) through 6) and have not received CPM and CBO approval and request approval to implement such changes. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CBO and the CPM.

<u>Verification:</u> At least 60 days prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes which may not conform to requirements of TSE- 5 and request approval to implement such changes.

TSE-7 The project owner shall provide the following Notice to the California Independent System Operator (California ISO) prior to synchronizing the facility with the California transmission system:

1. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and

2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO Outage Coordination Department.

<u>Verification:</u> The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. A report of the conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

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

<u>Verification:</u> Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

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

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

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

REFERENCES

California ISO (California Independent System Operator). 1998a. Cal-ISO Tariff Scheduling Protocol. Posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

California ISO (California Independent System Operator). 1998b. Cal-ISO Dispatch Protocol. Posted April 1998.

California ISO (California Independent System Operator). 2002a. Cal-ISO Grid Planning Standards. February 2002.

VV2 (Victorville 2 Hybrid Power Project). 2006a. Inland Energy Inc., Victorville 2 Hybrid Power Generating Station (System Impact Study) submitted to the California Energy Commission.

VV2 (Victorville 2 Hybrid Power Project). 2007b. Inland Energy Inc., Victorville 2 Hybrid Power Generating Station Application for Certification. Submitted to the California Energy Commission.

NERC/WECC (North American Reliability Council/Western Electricity Coordinating Council). 2002. NERC/WECC Planning Standards. August 2002.

DEFINITION OF TERMS

AAC	All aluminum conductor
ACSR	Aluminum conductor steel-reinforced
ACSS	Aluminum conductor steel-supported
Ampacity	Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.
Ampere	The unit of current flowing in a conductor.
Bundled	Two wires, 18 inches apart.
Bus	Conductors that serve as a common connection for two or more circuits.
Conductor	The part of the transmission line (the wire) that carries the current.
Congestion Management	A scheduling protocol, which provides that dispatched generation and transmission loading (imports) will not violate criteria.
Emergency Overload	See "Single Contingency." This is also called an L-1.
Kcmil or KCM	Thousand circular mil. A unit of the conductor's cross sectional area When divided by 1,273, the area in square inches is obtained.
Kilovolt (kV)	A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.
Loop	An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection, and returns it back to the interrupted circuit, thus forming a loop or cul de sac.
Megavar	One megavolt ampere reactive.
Megavars	Mega-volt-Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.
Megavolt	A unit of apparent power. It equals the product of the line

Ampere (MVA)	voltage in kilovolts, current in amperes, and the square root of 3, divided by 1,000.
Megawatt (MW)	A unit of power equivalent to 1,341 horsepower.
Normal Operation/ Normal Overload	The condition arrived at when all customers receive the power they are entitled to, without interruption and at steady voltage, and with no element of the transmission system loaded beyond its continuous rating.
N-1 Condition	See "single contingency."
Outlet	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.
Power Flow Analysis	A forward-looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers, and other equipment and system voltage levels.
Reactive Power	Generally associated with the reactive nature of motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.
Remedial Action Scheme (RAS)	An automatic control provision, which, for instance, will trip a selected generating unit upon a circuit overload.
SF6 (Sulfur Hexafluoride)	An insulating medium.
Single Contingency	Also known as "emergency" or "N-1 condition," the occurrence when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.
Solid Dielectric Cable	Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.
Switchyard	An integral part of a power plant and used as an outlet for one or more electric generators.
Thermal Rating	See "ampacity."
TSE	Transmission system engineering.

Tap	A transmission configuration creating an interconnection through a sort single circuit to a small or medium sized load or a generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.
Undercrossing	A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.
Underbuild	A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

ALTERNATIVES

Felicia Miller and John Kessler

SUMMARY OF CONCLUSIONS

In the analysis of the Victorville 2 Hybrid Power Project (Victorville 2), three alternative project sites were examined, as well as several alternative energy producing technologies which do not burn fossil fuels. Lacking a significant environmental impact associated with the proposed project, the alternative sites and generation technologies would not result in an environmentally superior 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). None of the alternative sites are considered to be superior to the applicant's proposed site. While all three alternative sites are in land use areas zoned industrial, the alternative sites have greater disadvantages than advantages when compared to the proposed project. Alternative Site A is less desirable because it is closer to aircraft approach and takeoff activities of Southern California Logistics Airport (SCLA) where the project could be considered a distraction to air traffic. Alternative Site B is less desirable because it is in closer proximity to residential development. Alternative Site C is not located within either the city of Victorville or the planning area addressed under the SCLA Specific Plan, and therefore would not meet the project objective to locate Victorville 2 within the boundaries of city of Victorville.

Alternative technologies (i.e., geothermal, wind, biomass, and hydroelectric) were examined as possible alternatives to the project. Geothermal and hydroelectric alternatives were determined not to be a viable option, as there are no adequate geothermal or hydrological resources located near the city of Victorville. Wind power is not considered a feasible alternative as the area around city of Victorville is not identified as a productive area for development of commercial wind power. Feedstock for biomass power would likely have to be transported over long distances from agricultural residues in the Central Valley of the state, and lacking sufficient feedstock in the greater Victorville area, biomass is not a practical alternative. While an all solar energy project would utilize an available renewable natural resource within a region of California where its potential for power production is among the highest in the state, an all solar energy project would not fully meet the objectives of the project to provide a reliable source of power generation that would supply electrical energy night and day. Since an objective of the project is to provide 563 MW of electricity with minimal impacts to the environment and provide the public with an efficient, reliable source of electrical power, staff concludes the alternative technologies examined are not feasible.

Staff also believes that the "No Project Alternative" is not superior to the proposed project. The No Project scenario would likely delay development of reliable electrical resources required for the region and could impact electrical supply reliability throughout California.

Therefore, staff does not recommended alternative generation technologies or alternative sites over the technology and site proposed by the city of Victorville.

INTRODUCTION

The purpose of staff's alternatives analyses is to describe a range of reasonable project alternatives that could feasibly attain the objectives of the proposed Victorville 2 project, and avoid or substantially lessen one or more of the significant effects of the project. If the Energy Commission determines that the proposed project will result in significant adverse impacts that cannot be mitigated, it cannot license the project unless it finds that alternatives are infeasible and that the benefits of the project outweigh the impacts. However, the Energy Commission does not have the authority to require alternative configurations, require alternative technology designs, or to require the Applicant to move the proposed project to another location. If the Applicant moves its proposed project to one of the alternative sites, Energy Commission staff will analyze any new proposed site at the same level of detail as the original proposed site.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

ENERGY COMMISSION SITING REGULATIONS

Energy Commission siting regulations require the examination of the "feasibility of available site and facility alternatives to the Applicant's proposal which substantially lessen the significant adverse impacts of the proposal on the environment" (Title 20, California Code of Regulations, §1765).

CEQA *Guidelines* Section 15126.6(a) (Title 14, California Code of Regulation) requires an evaluation of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." In addition, the analysis must address the "no project" alternative (Title 14, California Code of Regulation, §15126.6(e)).

The range of alternatives is governed by the "rule of reason," which requires consideration only of those alternatives necessary to permit informed decision-making and public participation. CEQA *Guidelines* state that an environmental document does not have to consider an alternative of which the effect cannot be reasonably ascertained and of which the implementation is remote and speculative (Title 14, California Code of Regulation, §15126.6(f)(3)).

SCOPE AND METHODOLOGY OF THE ALTERNATIVES ANALYSIS

In order to provide a reasonable range of feasible alternatives that could substantially reduce or avoid any potentially significant adverse impacts of the proposed project, staff must first determine the appropriate scope of analysis. It is necessary to identify and determine the potentially significant impacts of the proposed project and then focus on alternatives that are capable of reducing or avoiding significant impacts.

To prepare this alternative analysis, the staff used the following methodology:

- Describe the basic objectives of the project;
- Identify the potential significant environmental impacts of the project;
- Identify and evaluate alternative sites for the project to determine whether these sites could reduce or eliminate project impacts;
- Identify and evaluate technology alternatives to the project that could mitigate project impacts; and
- Evaluate the "No Project" alternative to determine whether this alternative would be superior to the project as proposed.

Alternatives to the proposed project include two general types: (1) other sites where the proposed project (a natural gas burning turbine) could be utilized, and (2) different power generation technologies (not requiring natural gas as fuel). These alternatives are discussed and evaluated below.

PROJECT OBJECTIVES

After studying the Applicant's Application for Certification (AFC), Energy Commission staff has determined city of Victorville's project objectives to be:

- Provide an efficient, reliable, and environmentally sound power generating facility to meet future electrical power needs of the rapidly growing city of Victorville and surrounding area, as well as provide additional generating capacity for the state and region as a whole;
- Locate the facility within the boundaries of the city of Victorville and under city ownership and control, so that the city can increase its level of assurance that the future electrical power needs of residential, commercial and industrial users in the city can be met, while at the same time supplying power to the regional grid;
- Use solar technology to generate a portion of the facility's power output and thereby support the State of California's goal of increasing the percentage of renewable energy in the state's electricity mix;
- Integrate the solar component of the project and its combined-cycle component in a way that maximizes the synergies between the two technologies to increase project efficiency; and
- Site the facility within the SCLA Specific Plan Area, a location zoned and planned for industrial use in an already established industrial area and with ready access both to adequate supplies of non-potable water to meet the facility's process water needs and to a natural gas pipeline that can supply the project without requiring significant modifications to the regional gas supply system. (Victorville 2007a)

SUMMARY DESCRIPTION OF PROPOSED PROJECT

The proposed Victorville 2 project would have a net electrical output of 563 megawatts (MW), with construction planned to begin in summer of 2008 and commercial operation planned by summer of 2010. Primary equipment for the generating facility would include two 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 268 MW, and 250 acres of parabolic solar-thermal collectors with associated heat transfer equipment. The solar-thermal collectors would contribute up to 50 MW of the STG's 268 MW output, and with plant auxiliary loads of about 13 MW, Victorville 2's net output would be 563 MW. Victorville 2 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.

The project is located in the city of Victorville, immediately north of the SCLA which is the former site of the George Air Force Base. The site is situated approximately 3.5 miles east of U.S. Highway 395 and approximately 0.5 mile west of the Mojave River. Access to the site is from Helendale Road, which is currently unpaved, but will be improved by the city of Victorville prior to the start of the project construction. Construction of the proposed project would require three areas that total 388 acres.

The current condition of the site consists primarily of undisturbed land and is surrounded by vacant, undisturbed land. The site is largely flat, with elevations ranging from approximately 2,780 to 2,820 feet above mean sea level, although the topography located at the eastern perimeter of the site slopes down towards the Mojave River.

Including the land required for the solar collectors, the footprint of the power plant would require grading of approximately 338 acres to achieve a project footprint for the Power Block and Solar Field of 275 acres, and construction laydown would require two separate temporary areas of 20 and 30 acres each.

The city of Victorville's General Plan, adopted in August 2005, outlines Victorville's long-range plans for development within its incorporated boundaries and sphere of influence and has designated the project area as Industrial (I) within the SCLA Specific Plan Area. This designation is compatible with the development of a power facility. (Victorville 2007a)

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS

Staff's assessments of environmental impacts associated with the proposed Victorville 2 Project are presented in detail in the individual sections of this Preliminary Staff Assessment (PSA). No significant impacts are identified, assuming that all recommended mitigation is incorporated. The issues of most concern for the Victorville 2 project are summarized below and in detail in the appropriate technical section in the PSA.

- **Air Quality:** Staff recognizes that the construction of the Victorville 2 project has the potential to degrade the area's existing air quality by increasing emissions of particulate matter less than 10 microns in size (PM10), particularly during construction associated with fugitive dust. The project owner intends to ensure that the impacts from operation of the project for nitrogen oxides (NOx), carbon monoxide (CO), sulfur oxides (SOx) and precursor organic compounds (POC) and any other air quality issues are fully mitigated. In addition, PM10 emissions would be subject to mitigation measures, and the Applicant would be required to reduce overall air emissions in the surrounding area. These mitigation measures would reduce impacts to air quality to a less than significant level. A thorough discussion of air quality impacts and mitigation measures is presented in the **AIR QUALITY** section.

- **Biological Resources:** Staff recognizes that the construction of the Victorville 2 project may cause permanent, temporary, and possible cumulative impacts to state and federally listed animal species (i.e., Desert tortoise, Mojave ground squirrel). Impacts to these species could be mitigated to less than significant levels by the purchase of offsite compensatory credits in San Bernardino County and through the implementation of avoidance mitigation measures presented in the **BIOLOGICAL RESOURCES** section.

SCREENING CRITERIA USED TO SELECT ALTERNATIVE SITES

The purpose of this section is to evaluate alternative project sites. The evaluation criteria for each site are the following: 1) Will the alternative fulfill the project objectives and siting criteria? 2) Will it reduce the potential significant impacts identified for the proposed project? 3) Will it cause other significant environmental impacts?

In considering site alternatives, staff defined a geographic area within which alternative sites were evaluated. Since alternatives must consider the underlying objectives of the proposed project, staff confined the geographic area for location alternatives to the area within close proximity to the existing High Desert Power Plant which would locate the site within the city of Victorville and the SCLA Specific Plan Area. These location alternatives are consistent with the Applicant’s project objectives and siting criteria. Potential impacts that would affect all alternative sites are air emissions and loss of habitat for biological resources. Land use compatibility was also evaluated for each alternative site. In addition, for each alternative site, the advantages and disadvantages of each site are compared to the proposed project site.

Using well-defined criteria, the applicant considered potential alternatives sites. Staff evaluated and considered these criteria, found them sound, and used them as a rationale for alternative site consideration. The criteria are as follows:

- Within the boundaries of the city of Victorville, located within the SCLA, an area of the city that is the focal point of ongoing and planned industrial development,
- Within the city of Victorville in order to maximize benefits in terms of factors such as: tax base, jobs; local purchase of materials, supplies, and services; and control of electrical generation,
- Approximately 275 acres in size and largely flat land, so that the site can accommodate a solar array field capable of generating approximately 50 MW as a fully integrated portion of an overall 563MW generating facility,
- In an area with a high level of insulation allowing for a high renewable energy contribution per acre, and thus reducing the amount of acreage needed and associated impacts,

- Largely undeveloped to minimize the need to relocate residents or disrupt other current land uses,
- Near existing high-voltage transmission lines/ROWs serving the Los Angeles basin (a major part of the project's expected service load) in order to minimize the land use and other impacts and costs associated with connecting the project to the electrical grid,
- Near a natural gas supply pipeline with adequate capacity to supply the facility in order to minimize the need for upgrades to the natural gas supply system,
- Near a source that provides ready access to non-potable water of adequate quantity and quality that can be used to meet power plant cooling and process water needs, and
- Near a water pipeline that can provide a reliable backup cooling source in case of outages in the primary cooling water supply system. (Victorville 2007a)

ALTERNATIVE SITES ANALYZED

Using the criteria listed above, three alternative site locations were identified and analyzed. All three sites are in the general vicinity of the High Desert Power Plant, as the applicant determined the sites had a close proximity to available transmission capacity, natural gas supply source and reclaimed water source to serve as the primary source of cooling and other industrial water. The following three alternative sites were examined:

Alternative Site A: located near and to the southwest of the proposed site, adjacent to and south of Colusa Road, near the end of the SCLA's north-south runway.

Alternative Site B: located approximately two miles west of the proposed site and slightly to the north; it is the only alternative site not located within the city of Victorville.

Alternative Site C: located immediately south of Air Expressway in Victorville, approximately five miles south and slightly west of the proposed site. (Victorville 2007a)

ALTERNATIVE SITE A

This alternative site is located near and to the southwest of the proposed site, adjacent to the south of Colusa Road. It is located near the end of the SCLA's north-south runway and on a direct line with aircraft approach and take-off patterns using that runway.

Advantages: The alternative site is similar to the proposed site; flat and undeveloped, large enough to accommodate the proposed combined cycle and solar facilities and within reasonable proximity to access natural gas, primary and backup cooling water supply sources and transmission system interconnection locations. The site is located within the SCLA planning area, and land use is compatible with existing industrial development.

Disadvantages: Although the site is able to meet the FAA requirements in terms of height restrictions and accident protection zones, a major disadvantage to this site is that it was less attractive because of the perceived potential issue of distracting pilots. As a result, this site was determined less desirable for the proposed project. Alternative Site A would not avoid or substantially lessen the environmental effects of the proposed project, and thus is not being further considered.

ALTERNATIVE SITE B

This alternative site is located approximately two miles northwest of the proposed project site, outside the city of Victorville, in an unincorporated part of San Bernardino County. Colusa Road is the northern boundary of the alternative site.

Advantages: The alternative site is similar to the proposed site; flat and undeveloped, large enough to accommodate the proposed combined cycle and solar facilities and within reasonable proximity to access natural gas, primary and backup cooling water supply sources and transmission system interconnection locations.

Disadvantages: The alternative site has the disadvantage of not being within the city of Victorville. Location within the city boundaries would provide the city with an increment of property tax revenue that could be generated by the project. In addition, this site is not located within the city’s designated redevelopment area, and would not support the ongoing redevelopment process outlines in the city’s General Plan. This site would require longer lines to supply cooling/process water, sanitary wastewater disposal and fuel gas supply pipelines, as well as longer transmission lines, which would increase project costs and potential impacts. For these reasons, and that Alternative Site B would not avoid or substantially lessen the environmental effects of the proposed project, this site is not being further considered.

ALTERNATIVE SITE C

This alternative site is located south of the SCLA site; approximately five miles south and slightly west of the proposed site, with Air Expressway Boulevard bordering the north side of the site.

Advantages: The alternative site is similar to the proposed site; flat and undeveloped, large enough to accommodate the proposed combined cycle and solar facilities and within reasonable proximity to access natural gas, primary and backup cooling water supply sources and transmission system interconnection locations.

Disadvantages: The alternative site would require several additional miles of gas pipeline, as well as primary and backup water supply lines, resulting in increased costs and potential impacts. In addition, the site is located closer to non-industrial land uses and existing and potential planned development. This site is considered less suitable, and would not avoid or substantially lessen the environmental effects of the proposed project. Therefore, Alternative Site C is not being further considered.

GENERATION TECHNOLOGY ALTERNATIVES

Staff considered various alternative generation technologies and evaluated which of these would meet the project’s objectives. Technologies examined were those which do not burn fossil fuels: wind, biomass, geothermal, and hydropower.

WIND GENERATION

Modern wind turbines can represent viable alternatives to large bulk power fossil power plants as well as small-scale distributed systems. The range of capacity for an individual wind turbine today ranges from 400 watts up to 3.6 MW.

Although air emissions are significantly reduced or eliminated for wind facilities, they can have significant visual effects and wind turbines also cause bird mortality (especially for raptors) resulting from collision with rotating blades.

Wind resources would require large land areas in order to generate 563 MW of electricity. Depending on the size of the wind turbines, wind generation “farms” generally require large tracts of land, and would likely require several thousand acres to support a wind farm of similar capacity. Comparatively, the proposed project would be contained within approximately 275 acres. Even if adequate land were available, wind generation technology is not a feasible alternative as the area around Victorville is not considered a productive resource area for development of commercial wind energy (Hewlett 2002). In addition, a north-south landing strip located at the SCLA is to the immediate south of the project site and wind turbines at this location may present a hazard to aircraft. Wind energy would also disturb significantly more acres of habitat for desert tortoise and Mojave ground squirrel, and would not fully meet the objectives of the project to provide a reliable source of power generation for supplying electrical energy night and day. With these considerations, wind energy generation is neither feasible nor environmentally preferable in this location.

BIOMASS GENERATION

Biomass generation typically uses a feedstock consisting of waste vegetation such as wood chips (the preferred source) or agricultural waste. The feedstock is most commonly burned to generate steam in a boiler, and the steam is harnessed in a steam turbine-generator to produce electricity. Biomass facilities typically generate substantially greater quantities of air pollutant emissions due to the quality of fuel and can require substantially more water for cooling compared to natural gas burning facilities. In addition, biomass plants in California are typically sized to generate less than 50 MW, substantially less than the capacity of the 563 MW Victorville 2 project. Numerous biomass units would be required to meet the project goal of generating 563 MW. Land and project infrastructure impacts would be significantly more damaging to the environment than the proposed project. Air emissions from the numerous generating units would be greater than the proposed project and operating within air quality requirements may not be achievable. In addition, feedstock for biomass power would likely have to be transported over long distances from agricultural residues in the Central Valley of the state (Hewlett 2002), and lacking sufficient feedstock in the greater Victorville area, biomass is not a practical alternative.

GEOTHERMAL

Geothermal technologies use steam or high-temperature water obtained from naturally occurring geothermal reservoirs to drive steam turbine-generators. Geothermal technology is limited to areas where geologic conditions provide underground steam fields or reservoirs that are either self-sustainable or can be maintained over time with water reinjection. There are no viable geothermal resources in the location of the proposed project in the city of Victorville (Hewlett 2002).

HYDROPOWER

Hydropower facilities require large quantities of water diverted from streams and rivers that must be sustained during dry seasons by either the presence of adequate natural flows or by impounding water in a reservoir during wet seasons for use during dry seasons. The energy potential of using water to generate power is also a function of having sufficient topography to allow water to drop in elevation and pressurize before flowing through a turbine. Neither the water resources nor the topographic conditions are present in the project region.

SOLAR ENERGY

Power plants using all solar technology, whether solar-thermal or photovoltaic, require large areas of land for siting equipment. Based on the proposed project's solar efficiency of requiring about 250 acres for producing 50 MW, and in order to create a source of power generation equivalent to the proposed project capacity of 563 MW, approximately 2,800 acres of land would have to be disturbed for an all solar alternative project. If a larger area could be acquired and dedicated for a solar project, one of its most significant benefits would include eliminating air emissions during project operations. Among the negative effects would be the greater loss of habitat for desert tortoise and other species of concern. While an all solar energy project would utilize an available renewable natural resource within a region of California where its potential for power production is among the highest in the state (Hewlett 2002), an all solar energy project would not fully meet the objectives of the project to provide a reliable source of power generation that would supply electrical energy night and day.

THE "NO PROJECT" ALTERNATIVE

CEQA *Guidelines* and Energy Commission regulations require consideration of the "No Project" alternative. This alternative assumes that the project is not constructed, and the impacts of that scenario are compared to those of the proposed project.

The "No Project" Alternative would not provide an efficient and reliable power generating facility to meet future electrical power needs of the rapidly growing city of Victorville and surrounding area, as well as provide additional generating capacity contributing towards development of renewable energy for the state and region as a whole. Also, the "No Project" alternative would eliminate the expected economic benefits the proposed project would bring to the city of Victorville, including increased property taxes, employment, sales taxes, and sales of services, manufactured goods, and equipment.

While no unmitigatable significant impacts have been identified for this project, the "No Project" Alternative would eliminate all impacts to the environment that would result from the construction and operation of the plant at the proposed site.

CONCLUSIONS AND RECOMMENDATION

In the analysis of the Victorville 2 project, three alternative project sites were examined, as well as several alternative energy producing technologies which do not burn fossil fuels. Lacking a significant environmental impact associated with the proposed project, the alternative sites and generation technologies would not be environmentally superior.

Three alternative sites were analyzed 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). None of the alternative sites are considered to be superior to the applicant's proposed site. While all three alternative sites are in land use areas zoned industrial, the alternative sites have greater disadvantages than advantages when compared to the proposed project. Alternative Site A is less desirable because it is closer to aircraft approach and takeoff activities of SCLA, where the project could be considered a distraction to air traffic. Alternative Site B is less desirable because it is in closer proximity to residential development. Alternative Site C is not located within either the city of Victorville or the planning area addressed under the Southern California Logistics Airport (SCLA) Specific Plan, and therefore would not meet the project objective to locate Victorville 2 within the boundaries of city of Victorville.

Alternative technologies (i.e., geothermal, wind, biomass, and hydroelectric) were examined as possible alternatives to the project. Geothermal and hydroelectric alternatives were determined not to be a viable option, as there are no adequate geothermal or hydrological resources located near the city of Victorville. Wind power is not considered a feasible alternative, as the area around city of Victorville is not identified as a productive area for development of commercial wind power. Feedstock for biomass power would likely have to be transported over long distances from agricultural residues in the Central Valley of the state, and lacking sufficient feedstock in the greater Victorville area, biomass is not a practical alternative. While an all solar energy project would utilize an available renewable natural resource within a region of California where its potential for power production is among the highest in the state, an all solar energy project would not fully meet the objectives of the project to provide a reliable source of power generation that would supply electrical energy night and day. Since an objective of the project is to provide 563 MW of electricity with minimal impacts to the environment and provide the public with an efficient, reliable source of electrical power, staff concludes the alternative technologies examined are not feasible.

Staff also believes that the "No Project Alternative" is not superior to the proposed project. The No Project scenario would likely delay development of reliable electrical resources required for the region and could impact electrical supply reliability throughout California.

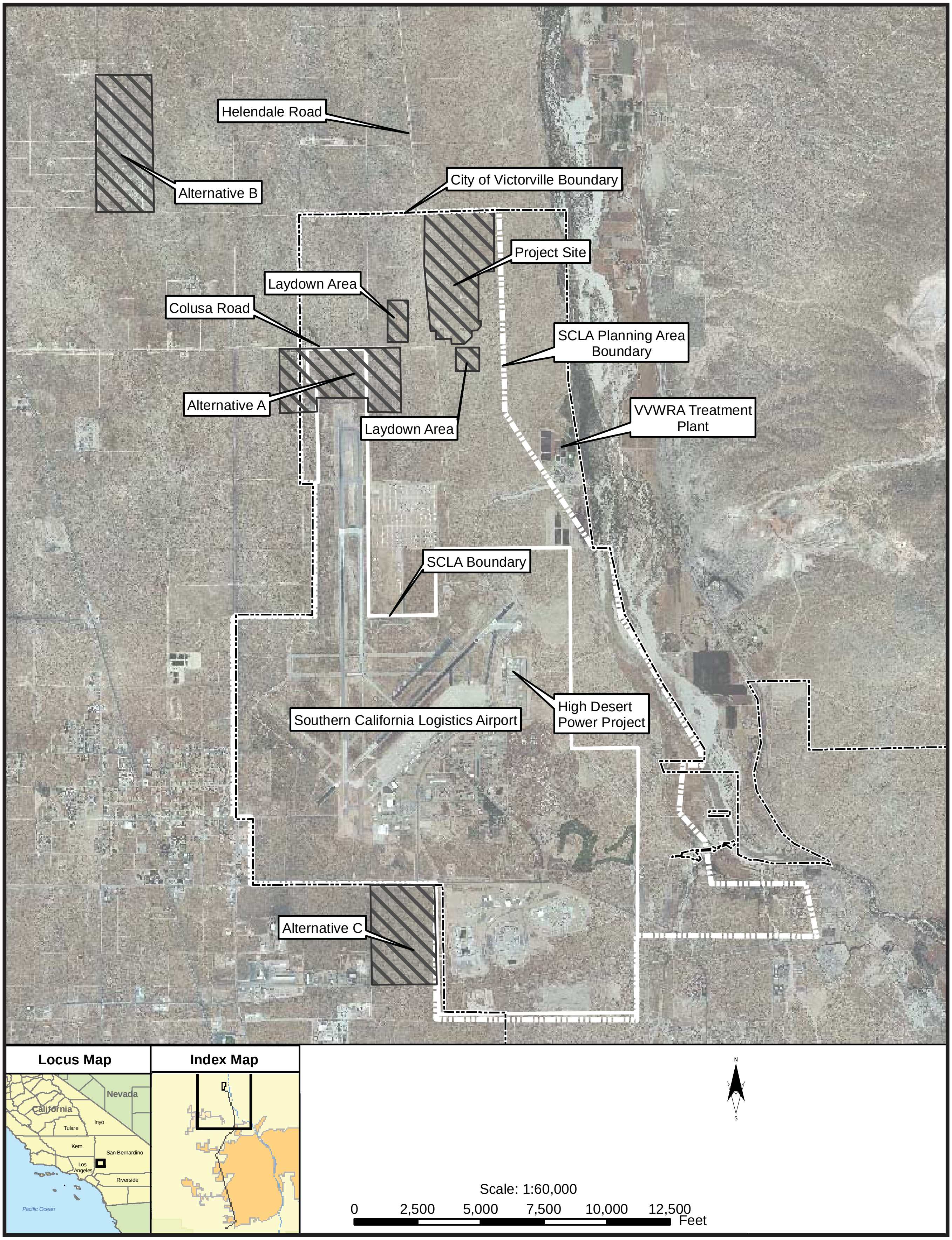
Therefore, staff does not recommended alternative generation technologies or alternative sites over the technology and site proposed by the city of Victorville.

REFERENCES

Hewlett 2002 - Hewlett Foundation and the Energy Foundation, Renewable Energy Atlas of the West, A Guide to the Region's Resource Potential. 2002. http://energyatlas.org

Victorville 2007a – City of Victorville (tn: 39421). Application for Certification of the Victorville 2 Hybrid Power Project. Vol. 1&2. 2/27/07. Received 2/28/07.

ALTERNATIVES - FIGURE 1
Victorville 2 Hybrid Power Project - Alternative Sites Considered



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, NOVEMBER 2007
SOURCE: AFC Figure 5-1

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Steve Munro

INTRODUCTION

The project's General Compliance Conditions of Certification, including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of elements that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions of certification;
- establish requirements for facility closure plans; and
- specify conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure to an insignificant level. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

DEFINITIONS

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

PRE-CONSTRUCTION SITE MOBILIZATION

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

CONSTRUCTION GROUND DISTURBANCE

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

CONSTRUCTION GRADING, BORING, AND TRENCHING

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

CONSTRUCTION

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. Construction does **not** include the following:

1. the installation of environmental monitoring equipment;
2. a soil or geological investigation;
3. a topographical survey;
4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and
5. any work to provide access to the site for any of the purposes specified in “Construction” 1, 2, 3, or 4 above.

START OF COMMERCIAL OPERATION

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

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The CPM will oversee the compliance monitoring and shall be responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision;
2. resolving complaints;
3. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;
4. documenting and tracking compliance filings; and
5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission when handling disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management.

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

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

ENERGY COMMISSION RECORD

The Energy Commission shall maintain as a public record, in either the Compliance file or Dockets file, for the life of the project:

1. all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;

2. all monthly and annual compliance reports filed by the project owner;

3. all complaints of noncompliance filed with the Energy Commission; and

4. all petitions for project or condition of certification changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

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

COMPLIANCE CONDITIONS OF CERTIFICATION

Unrestricted Access (COMPLIANCE-1)

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

Compliance Record (COMPLIANCE-2)

The project owner shall maintain project files onsite or at an alternative site approved by the CPM, for the life of the project unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all “as-built” drawings, all documents submitted as verification for conditions, and all other project-related documents.

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

Compliance Verification Submittals (COMPLIANCE-3)

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission’s procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by the CPM without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

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

2. providing appropriate letters from delegate agencies verifying compliance;

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

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

Verification lead times (e.g., 90, 60 and 30-days) associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

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

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

All submittals shall be addressed as follows:

> **Steve Munro**
> **Compliance Project Manager**
> **California Energy Commission**
> **1516 Ninth Street (MS-2000)**
> **Sacramento, CA 95814**

If the project owner desires Energy Commission staff action by a specific date, it shall so request in its submittal cover letter and include a detailed explanation of the effects on the project if this date is not met.

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

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner's **first** compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be in the same format as the compliance matrix described below.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times (e.g., 30, 60, 90 days) for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

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

If the project owner anticipates starting project construction as soon as the project is certified, it may be necessary for the project owner to file compliance submittals prior to project certification. This is important if the required lead-time for a required compliance event extends beyond the date anticipated for start of construction. It is also important that the project owner understand that the submittal of compliance documents prior to project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change based upon the Commission Decision.

Compliance Reporting

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

Compliance Matrix (COMPLIANCE-5)

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all conditions of certification in a spreadsheet format. The compliance matrix must identify:

1. the technical area;
2. the condition number;
3. a brief description of the verification action or submittal required by the condition;
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. the expected or actual submittal date;
6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable; and
7. the compliance status of each condition, e.g., “not started,” “in progress” or “completed” (include the date).

Satisfied conditions do not need to be included in the compliance matrix after they have been identified as satisfied in at least one monthly or annual compliance report.

Monthly Compliance Report (COMPLIANCE-6)

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

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

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

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

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

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

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

6. a cumulative listing of any approved changes to conditions of certification;

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

8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;

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

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

Annual Compliance Report (COMPLIANCE-7)

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by the CPM. Each Annual Compliance Report shall identify the reporting period and shall contain the following:

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

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

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

4. a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;

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

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

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

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

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

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

Confidential Information (COMPLIANCE-8)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501 et. seq.

Annual Energy Facility Compliance Fee (COMPLIANCE-9)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner is required to pay an annual compliance fee, which is adjusted annually. The amount of the fee for FY2007-2008 was $17,676. The initial payment is due on the date the Energy Commission adopts the final decision. You will be notified of the amount due. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

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

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

http://www.energy.ca.gov/sitingcases/power_plants_contacts.html

Any changes to the telephone number shall be submitted immediately to the CPM, who will update the web page.

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

FACILITY CLOSURE

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

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

CLOSURE DEFINITIONS

Planned Closure

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

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

Unplanned Permanent Closure

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

COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

Planned Closure (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM) prior to commencement of closure activities. The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;

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

3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and

4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

Prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

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

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

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

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

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less that 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

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

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

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, which have jurisdiction for health and safety matters, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM’s determination (or other period of time agreed to by the CPM).

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

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, which have jurisdiction for health and safety matters, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

Post Certification Changes to the Energy Commission Decision: Amendments, Ownership Changes, Insignificant Project Changes and Verification Changes (COMPLIANCE-14)

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. **It is the responsibility of the project owner to contact the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769.** Implementation of a project modification without first securing Energy Commission, or Energy Commission staff approval, may result in enforcement action that could result in civil penalties in accordance with section 25534 of the Public Resources Code.

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

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

Amendment

The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769, when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed modification results in deletion or change of a condition of certification, creates a significant impact, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations or standards, the petition will be processed as a formal amendment to the final decision, which requires public notice and review of the Energy Commission staff analysis, and approval by the full Commission. This process takes approximately two to three months to complete, and possibly longer for complex project modifications.

Change of Ownership

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769 (b). This process takes approximately one month to complete, and requires public notice and approval by the full Commission.

Insignificant Project Change

Modifications that do not result in deletions or changes to conditions of certification, and that are compliant with laws, ordinances, regulations and standards may be authorized by the CPM as an insignificant project change pursuant to section 1769(a) (2). This process usually takes less than one month to complete, and it requires a 14-day public review of the Notice of Insignificant Project Change that includes staff’s intention to approve the modification unless substantive objections are filed.

Verification Change

A verification may be modified by the CPM without requesting an amendment to the decision if the change does not conflict with the conditions of certification and provides an effective alternate means of verification. This process usually takes less than five working days to complete.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

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

ENFORCEMENT

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

Moreover, to ensure compliance with the terms and conditions of certification and applicable LORS, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

NONCOMPLIANCE COMPLAINT PROCEDURES

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

The Energy Commission has established a toll free compliance telephone number of **1-800-858-0784** for the public to contact the Energy Commission about power plant construction or operation-related questions, complaints or concerns.

Informal Dispute Resolution Procedure

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

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

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

Request for Informal Investigation

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

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

Request for Informal Meeting

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

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

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

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

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

Formal Dispute Resolution Procedure-Complaints and Investigations

If either the project owner, Energy Commission staff, or the party requesting an investigation is not satisfied with the results of the informal dispute resolution process, such party may file a complaint with the Energy Commission's Dockets Unit. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, Section 1237.

KEY EVENTS LIST

PROJECT: ______________________________

DOCKET #: ______________________________

COMPLIANCE PROJECT MANAGER: ______________________________

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

Compliance Table 1
Summary of Compliance Conditions of Certification

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

CONDITION NUMBER	**SUBJECT**	**DESCRIPTION**
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.
COMPLIANCE-8	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner shall submit a closure plan to the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-12	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-14	Post-certification changes to the Decision	The project owner must petition the Energy Commission to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.

ATTACHMENT A
COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME:
AFC Number:

COMPLAINT LOG NUMBER ____________
Complainant's name and address:

Phone number: ____________________

Date and time complaint received:
Indicate if by telephone or in writing (attach copy if written):
Date of first occurrence:

Description of complaint (including dates, frequency, and duration):

Findings of investigation by plant personnel:

Indicate if complaint relates to violation of a CEC requirement:
Date complainant contacted to discuss findings: ___________________

Description of corrective measures taken or other complaint resolution:

Indicate if complainant agrees with proposed resolution:
If not, explain:

Other relevant information:

If corrective action necessary, date completed: _________________
Date first letter sent to complainant: ____________(copy attached)
Date final letter sent to complainant: ____________(copy attached)

This information is certified to be correct.
Plant Manager's Signature: _____________________________ Date:

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

PREPARATION TEAM

VICTORVILLE 2 HYBRID POWER PROJECT PREPARATION TEAM

Executive Summary ....John Kessler

Introduction ....John Kessler

Project Description ....John Kessler

Air Quality...Tuan Ngo

Biological Resources..N. Misa Ward

Cultural Resources.................... Michael J. Lerch, Julie A. Minor and Beverly E. Bastian

Hazardous Materials ....Alvin J. Greenberg, Ph.D. and Rick Tyler

Land Use...Shaelyn Strattan and David Flores

Noise and Vibration...Steve Baker

Public Health ....Obed Odoemelam, Ph.D.

Socioeconomics .... Joseph Diamond, Ph.D.

Soil and Water Resources……….Ellen Townsend-Hough, Linda Bond and John Kessler

Traffic and Transportation ....James Adams and William Walters

Transmission Line Safety and Nuisance ....Obed Odoemelam, Ph.D.

Visual Resources ....David Flores, William Walters and Bill Kanemoto

Waste Management ....Cheryl Closson

Worker Safety and Fire Protection ....Alvin J. Greenberg, Ph.D. and Rick Tyler

Facility Design..Steve Baker

Geology and Paleontology ....Dal Hunter, Ph.D., C.E.G.

Power Plant Efficiency......................................Shahab Khoshmashrab and Steve Baker

Power Plant Reliability......................................Shahab Khoshmashrab and Steve Baker

Transmission System Engineering.........................Sudath Arachchige and Mark Hesters

Alternatives ....Felicia Miller and John Kessler

General Conditions..Steve Munro

Project Assistant ....April Esau

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE VICTORVILLE 2 ***HYBRID POWER PROJECT***	**Docket No. 07-AFC-1** **PROOF OF SERVICE** ***(Revised 9/5/07)***

INSTRUCTIONS: All parties shall 1) send an original signed document plus 12 copies OR 2) mail one original signed copy AND e-mail the document to the web address below, AND 3) all parties shall also send a printed OR electronic copy of the documents that shall include a proof of service declaration to each of the individuals on the proof of service:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 07-AFC-1
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

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DECLARATION OF SERVICE

I, April Esau, declare that on November 21, 2007, I deposited copies of the attached Preliminary Staff Assessment for the Victorville 2 Hybrid Power Project (07-AFC-1) in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

Original signed in Dockets
April Esau