Final Staff Assessment

CPV Sentinel Energy Project

Application For Certification (07-AFC-3)
Riverside County

CALIFORNIA
ENERGY
COMMISSION

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STAFF REPORT

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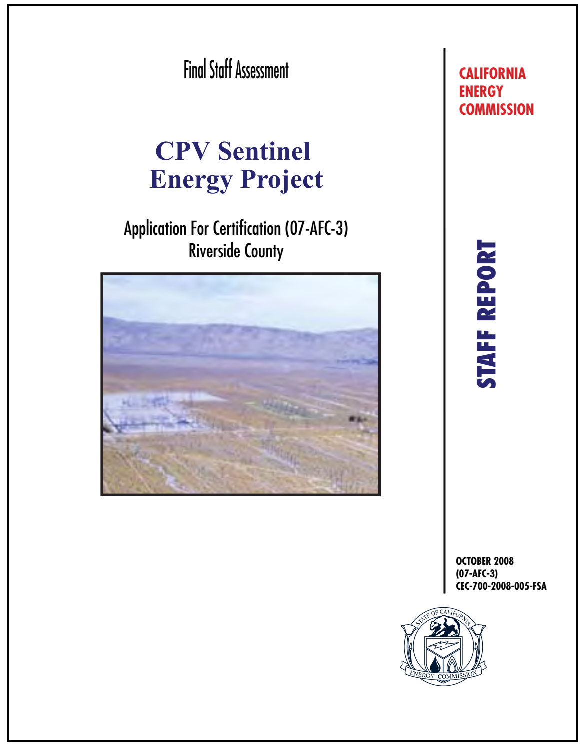

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CALIFORNIA ENERGY COMMISSION

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CPV SENTINEL ENERGY UPGRADE PROJECT
(07-AFC-3)
FINAL STAFF ASSESSMENT

EXECUTIVE SUMMARY

John Kessler

INTRODUCTION

This Final Staff Assessment (FSA) contains the California Energy Commission staff's independent evaluation of the CPV Sentinel Energy Project (CPV Sentinel) Application for Certification (07-AFC-3). The FSA examines engineering, environmental, public health and safety aspects of the CPV Sentinel project, based on the information provided by the applicant (CPV Sentinel, LLC) and other sources available at the time the FSA was prepared. The FSA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA). When issuing a license, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the EIR process.

The Energy Commission staff has the responsibility to complete an independent assessment of the project's engineering design and its potential effects on the environment, the public's health and safety, and whether the project conforms with all applicable 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 FSA 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 serves 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 CPV Sentinel project would be a nominally rated 850 megawatt, natural gas-fired generating facility using General Electric's LMS 100 combustion turbine generators. The other main project features will consist of a 37 acre power plant site, 14 acre construction laydown area, 3,250 feet of transmission lines, and 2.6 miles of natural gas pipeline. The power plant, transmission lines, and portions of the gas line and construction laydown area will be located within unincorporated Riverside County. Portions of the construction laydown area and portions of the proposed gas line route will be located within the city of Palm Springs. The site is situated approximately 8 miles northwest of the center of Palm Springs and 4.5 miles west of the center of Desert Hot Springs. **PROJECT DESCRIPTION Figures 1 and 2** show the regional and local settings for the proposed project, and **PROJECT DESCRIPTION Figures 3 and 4** show the general arrangement and a photo simulation of the proposed project.

The 37 acre proposed power plant site is currently vacant. The surrounding area is primarily characterized by industrial use with extensive development of wind energy and transmission infrastructure. Southern California Edison's (SCE) Devers substation is approximately 700 feet to the west of the proposed project site and the 135 megawatt natural gas-fired Indigo Energy Facility is approximately 1.8 miles to the southeast. The nearest current residence to the power plant site is approximately 330 feet to the east. CPV Sentinel has secured site control under an option to purchase this residence and the structure is currently vacant.

The proposed power plant site is zoned W 2 (Controlled Development Area) and designated as PF (Public Facilities) in the Riverside County General Plan. Electrical power-generating facilities are permitted uses within this zoning district and General Plan designation.

Electricity generated by the proposed project will be delivered to the Devers substation via a generation tie connecting the project station switchyard to the substation at the 230 kilovolt (kV) bus. It is currently anticipated that SCE will execute contracts with CPV Sentinel, LLC under which SCE will be responsible for final design, engineering, construction, operation, and maintenance of the generator tie to the Devers substation. SCE will seek a Certificate of Public Convenience and Necessity (CPCN) from the California Public Utilities Commission (CPUC). The project would require the construction of a 2,300 foot-long transmission line connecting the proposed project site to the existing Devers substation.

The applicant will be responsible for construction of a 3,200 foot-long road extending off Dillon Road to the project site, and associated intersection widening at Dillon Road and the site access road.

Fuel will be supplied by the extension of a 2.6-mile-long, 24 inch-diameter natural gas line extending from the Indigo Energy Facility to the CPV Sentinel site.

Potable water for the proposed project will be supplied by either on-site wells that would also be used for process water supply, or a 3,200 foot-long potable water supply line extension to the project site from a current Mission Springs Water District (MSWD) municipal line located along Dillon Road.

The proposed project will use a zero liquid discharge (ZLD) system, comprised of membrane-based wastewater treatment processes (microfiltration and reverse osmosis) coupled with a crystallizer system. This process will result in zero liquid wastewater discharge from the site, and instead, will generate a salt cake for disposal in a landfill.

PROPOSED WATER SUPPLY PLAN FOR PROCESS NEEDS

Under the proposed water supply plan, the project would pump groundwater via onsite or nearby wells within the Mission Creek Sub-basin. As defined in the applicant's Revised Water Supply Plan (AFC Supplement), groundwater used by the CPV Sentinel project would be replenished through the applicant's proposed Conservation Agreement and Implementation Agreement with the Desert Water Agency (DWA). The Desert Water Agency provides water service to the cities of Palm Springs, Desert Hot Springs, Cathedral City and part of the surrounding unincorporated area.

The primary elements of the project's proposed water supply plan for supplying process water are described in detail in two new agreements between the applicant and DWA:

- A Memorandum of Understanding Concerning Additional Conservation of Fresh Water within DWA ("Conservation Agreement").
- A Memorandum of Understanding for Implementation of Well Metering Agreement ("Implementation Agreement").

In the case of the fresh water Conservation Agreement, funding would be provided by CPV Sentinel, LLC to allow DWA to add new facilities to its existing reclaimed wastewater system. The Conservation Agreement's intent is to ensure that the CPV Sentinel project does not increase the net use of fresh water on a statewide basis and to comply with Energy Commission policy regarding use of fresh water for power plant cooling.

The Conservation Agreement's Memorandum of Understanding (MOU) is open ended and may or may not include the specific implementation measures identified in the AFC Supplement. However, for purposes of the Energy Commission's analysis, staff has reviewed the environmental impacts of the project defined by the applicant in the AFC Supplement. This included the following two proposals:

- CPV Sentinel, LLC would fund the installation of a recycled water line to serve the Palm Springs National Golf Course which currently uses fresh water from private groundwater wells for irrigation purposes. The new recycled water service is expected to conserve an annual average of 1,154 acre-feet/year of fresh water and would consist of approximately 900 feet of 12 inch pipeline extending from an existing DWA service main located along South Murray Canyon Drive in Palm Springs. The recycled water line would connect to an existing water feature at the golf course, which serves as a storage reservoir for the irrigation system at the golf course property. The new pipeline would be constructed within the existing street right-of-way and the golf course property. **PROJECT DESCRIPTION Figure 5** shows the location of the recycled water pipeline for supply to the Palm Springs National Golf Course.
- DWA has initiated a cooperative plan with the Building Industry Association to provide new homes built within DWA's Service Area with irrigation system controllers that use monitoring of evapotranspiration and the ambient temperature to limit outdoor water application to what is actually needed. According to the AFC Supplement, this existing program has demonstrated the effectiveness of irrigation controllers in conserving fresh water on the order of 0.1 – 0.14 acre-feet per

household annually. The CPV Sentinel applicant would fund installation of these irrigation controllers for a portion of existing customers to complement the DWA program of offering them to new homes. This would conserve freshwater supplies throughout DWA's Service Area.

In the case of the Implementation Agreement, no new facilities would be built. The Implementation Agreement is intended to ensure that the Mission Creek Sub-basin would be recharged with imported water in quantities greater than the actual CPV Sentinel pumping of groundwater for process needs including cooling. The Implementation Agreement is intended to ensure that there would be no diminishment of the physical supply of water in the Coachella Valley and the Mission Creek Sub-basin. This included the following proposal:

- Under the Implementation Agreement, the applicant would purchase water for importation equal to 108 percent of the CPV Sentinel project's groundwater production, and utilize DWA's entitlement as a State Water Project contractor to convey the imported water via the California Aqueduct. Since there is no conveyance system to deliver California Aqueduct water to DWA, DWA would exchange the imported water as conveyed in the California Aqueduct and delivered to Metropolitan Water District (MWD) for an equivalent amount of MWD's Colorado River water supply. The exchanged water that DWA would receive from MWD's Colorado River supply would then be used to recharge the existing spreading grounds in the Mission Creek Sub-basin. DWA would spread enough water to ensure that imported water equals at least 100 percent of the CPV Sentinel project's groundwater pumping. DWA would transfer ownership of a volume of this recharged water, equivalent to 100 percent of the project's pumping, to the CPV Sentinel applicant. Title to the additional 8 percent imported water would remain with DWA to cover incidental losses in the delivery, and to benefit all water users within DWA's Service Area.

The AFC Supplement states: "In all cases, DWA would purchase and CPV Sentinel would pay for waters already approved for transfer by DWR and reviewed pursuant to the California Environmental Quality Act (CEQA)." Staff has reviewed the CEQA documentation provided by the applicant for the North Kern water that the applicant has secured under its Implementation Program for the initial years of project operation, and believes it is complete.

PUBLIC AND AGENCY COORDINATION

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

LIBRARIES

On July 5, 2007, the Energy Commission sent the CPV Sentinel AFC to the Riverside County Library System (Desert Hot Springs Library), the Palm Springs Public Library, and to libraries in Eureka, Fresno, Los Angeles, Sacramento, San Diego, and San

Francisco. On February 29, 2008, the Energy Commission sent the applicant's AFC Supplement regarding its Revised Water Supply Plan to the same group of libraries.

INITIAL OUTREACH EFFORTS

The PAO's public outreach is an integral part of the Energy Commission's AFC review process. The PAO reviewed information provided by the applicant and also conducted their own outreach efforts to identify and locate local elected and certain appointed officials, as well as "sensitive receptors" (including schools, community, cultural and health facilities, daycare and senior-care centers, as well as environmental and ethnic organizations) within a six-mile radius of the proposed site for the project. The PAO notified--by letter and attached notice--all elected local (that is, county and city) officials, as well as the 96 sensitive receptors identified within six miles of the proposed site.

In addition, the PAO distributed--as an insert in 10,000 copies of the September 28, 2007 issue of the Palm Springs-published Desert Sun newspaper--a bilingual (English and Spanish) notice for the October 5th, 2007 Informational Hearing and Site Visit held locally for this project.

Energy Commission regulations require staff to notice, at a minimum, property owners within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines and water lines). This was done for the CPV Sentinel project for all workshop notices including the Data Response and Issue Resolution Workshops conducted on April 17th, June 12th and June 20th, 2008, the Preliminary Staff Assessment (PSA) Workshop on September 3, 2008, and the Notices of Availability for the PSA and this FSA.

ENVIRONMENTAL JUSTICE

The steps recommended by the U.S. EPA's guidance documents to assure compliance with the Executive Order 12898 regarding environmental justice are: (1) outreach and involvement; (2) a screening-level analysis to determine the existence of a minority or low-income population; and (3) if warranted, a detailed examination of the distribution of impacts on segments of the population. Though the Federal Executive Order and guidance are not binding on the Energy Commission, staff finds these recommendations helpful for implementing this environmental justice analysis. Staff has followed each of the above steps for the following 11 sections in the FSA: 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 (see the **ENVIRONMENTAL JUSTICE** chapter of this FSA).

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 EPA's NEPA

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 fifty percent 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 percent minority and low-income population has been identified within a one-mile radius of the CPV Sentinel site. Staff has concluded for all technical areas except Air Quality, that with the adoption of staff's recommended Conditions of Certification, that CPV Sentinel would not have a significant direct, indirect or cumulative adverse impact in the remaining 10 sections of the FSA evaluated for environmental justice. For Air Quality, staff is not able to draw its final conclusions until the applicant identifies its emission reduction credits for project air emissions.

OUTREACH

Staff's environmental justice outreach has been incorporated into its overall outreach activity facilitated by the Public Adviser's Office. This activity, outlined above, is summarized in the **INTRODUCTION** to the FSA.

STAFF'S ASSESSMENT

Each technical area section of the FSA contains a discussion of the project setting, impacts, and where appropriate, mitigation measures and proposed conditions of certification. The FSA 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 Air Quality which is currently undetermined, 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 CPV Sentinel project would comply with all applicable laws, ordinances, regulations, and standards (LORS). Staff's preliminary conclusions (with exception of Air Quality, which is undetermined) are that significant adverse direct, indirect or cumulative impacts are not likely to occur in any of the other technical areas. For a more detailed review of potential impacts, see staff's technical analyses in the FSA. The status of each technical area is summarized in the table below.

The discussion following the table provides a summary of the issue areas in the FSA that staff has identified as either being complex or undetermined as to whether the project would comply with LORS, or would have a potentially significant adverse impact which cannot be mitigated to a less than significant level.

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	**Undetermined**	**Undetermined**
Biological Resources	Yes	Yes
Cultural Resources	Yes	Yes
Efficiency	Yes	Yes
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes
Hazardous Materials	Yes	Yes
Land Use	Yes	Yes
Noise	Yes	Yes
Public Health	Yes	Yes
Reliability	Yes	Yes
Socioeconomic Resources	Yes	Yes
Soil & Water Resources	Yes	Yes
Traffic & Transportation	Yes	Yes
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	Yes	Yes
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

AIR QUALITY

A significant development occurred since the time that staff prepared the PSA affecting the applicant's plans for mitigating project air emissions. The applicant can no longer purchase emission reduction credits from the South Coast Air Quality Management District's Priority Reserve because of a recent ruling from the Superior Court of Los

Angeles County. In response to a lawsuit filed by the Natural Resources Defense Council and other groups, the court decided to prevent the District from making emission reduction credits in the Priority Reserve available to power plants without conducting more analysis under the California Environmental Quality Act (CEQA). Therefore, staff cannot complete its Air Quality analysis to determine whether the project would avoid significant adverse impacts and would conform to LORS with respect to Air Quality. Staff expects to prepare and file supplemental analysis and testimony for Air Quality at such time as the applicant identifies its proposed emission reduction credits

SOIL AND WATER RESOURCES

With the implementation of staff's recommended conditions of certification, staff concludes that the project would not cause any immitigable significant impacts and would conform to LORS.

The circumstances that led to the development of the applicant's proposed Water Supply Plan (WSP) are unique to this case. As a result, staff believes that although its recommendation is that the Energy Commission find the project with respect to Soil and Water Resources would not cause a significant adverse water resources impact and would conform to LORS, the complexities of this case deserve to be highlighted. Staff has looked carefully at both the potential for the project to cause significant adverse impacts combined with the adequacy of mitigation, and the project's conformance with LORS, including the Energy Commission's 2003 Integrated Energy Policy Report (IEPR) water conservation policy.

With respect to the potential for significant impacts associated with the project's extraction of groundwater, staff believes the applicant's proposal to import new water into the Mission Creek Groundwater Sub-basin (MCGS) for recharge at 108% of the project's use would avoid contributing to the depletion of groundwater in a basin that is already in overdraft. In addition, to ensure that there are no temporary effects on other groundwater users in the basin, staff has proposed a number of conditions of certification that require recharge activities to occur on a schedule that results in no change in groundwater levels at residential wells and the 330-acre Willow Hole Conservation Area, which hosts several state and federally-protected plant and animal species.

The Energy Commission's 2003 IEPR policy on water use for power plant cooling, states that the Energy Commission will approve the use of fresh water for cooling purposes by power plants which it licenses only where alternative water supply sources and alternative cooling technologies are shown to be 'environmentally undesirable' or 'economically unsound'. In evaluating compliance with this policy, staff first assessed whether the proposed project will use fresh water. Based on guidance provided in the State Water Resources Control Board's policies and Title 22 of the California Code of Regulations, staff concluded that it will use fresh water. Next, staff determined that that reclaimed water from the Mission Spring Water District's Horton wastewater treatment plant is neither environmentally undesirable nor economically unsound. Staff also reviewed the option for dry cooling and concluded that at this time it appears economically unsound due to the lower cooling efficiency and loss of power generation.

Staff then looked to previous power plant siting case decisions of the Energy Commission to determine whether additional evaluation of the conformity of the project with the policy was appropriate. Based on the Commission's decisions in the recent Panoche Energy Center (06-AFC-5) and the Starwood-Midway Project (06-AFC-10) Projects, staff concluded that the Energy Commission has also considered the intent of the policy in determining a project's conformity with the policy. The Energy Commission's findings in both of these cases appeared to conclude that a project proposing to use a fresh water source that is of higher quality than the most degraded source reasonably available to the project, can comply with the policy where the project also includes measures that would accomplish conservation of water of a greater quantity and higher quality than the project would use. Water conservation quantities required in the Final Decisions for Panoche Energy Center and Starwood-Midway cases relative to the project's maximum annual water use were 109% and 100+% respectively.

The CPV Sentinel project as proposed would accomplish conservation of an even greater quantity of water than the project would use (approximately 150% of the project's maximum water use, and 300% of the project's average water use). However, staff remains concerned that water conserved under the WSP is not of a higher quality than the project's source of supply. Given this, staff notes that the WSP would result in conservation of fresh water far in excess of that conserved in the two previous siting cases discussed. Given that the Energy Commission has found that conservation of a higher quantity and quality of water can be used to support a finding of compliance with the policy, staff concluded that it is reasonable to find that conservation of a significantly greater quantity of water than used by the project can also support a finding of conformity with the policy.

Staff has attempted to arrive at a solution that would meet the spirit of the 2003 IEPR policy. Building from principles articulated in prior siting case decisions that the policy can be applied more broadly than its express terms, staff has determined that the proposed WSP associated with the CPV Sentinel project is a preferable option for water supply and for achieving conservation relative to the alternatives. However, staff's recommendation to the Energy Commission depends on the assumption that the recommended conditions of certification contained in the Final Staff Assessment would be adopted in the Final Decision. This would ensure that the applicant's proposed water conservation measures are fully implemented, and the water savings identified above are achieved.

Staff also recommends that the 2003 IEPR Policy be revisited during the next IEPR proceeding to enable the Commission to provide staff with additional direction on the application of the policy in future power plant siting cases. If the Energy Commission believes it is appropriate to allow use of fresh water for cooling when alternatives are viable, clarifications about the types of benefits that can support a finding of conformity of a project with the policy would be helpful to both staff and developers. The staff has been a strong proponent of the Commission's water conservation policy for power plant cooling since its adoption in the 2003 IEPR and wants to ensure it is appropriately following the Commission's policy guidance in this critical area in the future.

ALTERNATIVES SUMMARY

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

As determined by Energy Commission staff in the FSA, the CPV Sentinel project as proposed is not likely to cause potentially significant impacts except for conclusions in Air Quality that are currently undetermined. Located 700 feet from the Devers Substation to the west and surrounded by existing wind farms to the south, southeast, and east, staff has concluded the proposed site is suitable for the project. The alternative site staff evaluated to the north of the substation would require longer transmission infrastructure and acquirement of parcels from multiple landowners, with no further reduction of environmental impacts.

Staff does not believe that alternative technologies such as solar, wind, geothermal, biomass, and hydroelectric, present feasible alternatives to the proposed project under CEQA. While wind energy is an abundant resource in the project vicinity, it would not meet the objectives of the project to provide quick-start peaking capacity, energy and ancillary services that is needed to compliment renewable energy sources such as wind power. Based on the analysis of alternative sites and technologies, staff recommends the proposed site for the project. Staff concluded that there is not a need for an alternative water supply or cooling method since it would not be needed to lessen a significant adverse impact, and with the proposed water conservation measures, the project would conform to applicable LORS and policies (See **Soil and Water Resources**).

NOTEWORTHY PUBLIC BENEFITS

Important public benefits discussed under the fiscal and non-fiscal effects section are: capital expenditures, construction payroll, sales taxes, property taxes, and the value of regionally purchased construction and operation equipment and materials.

RECOMMENDATIONS AND SCHEDULE

For a more detailed review of potential impacts, see staff's technical analyses in the FSA.

Absent any non-compliance with LORS or significant indirect environmental impacts except for Air Quality which remains inconclusive, 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.

For all technical areas other than Air Quality, staff concludes that with the adoption of the recommended conditions of certification, the project will not cause a significant adverse environmental impact and would conform to all applicable LORS. At such time as the applicant identifies its emission reduction credits, staff expects to prepare and file a supplemental Air Quality analysis and testimony that can lead to a conclusion as to whether the project would also avoid a significant adverse impact and would conform to LORS in Air Quality. In the interim, staff is unable to recommend that the project be certified.

INTRODUCTION

Testimonry of John Kessler

PURPOSE OF THIS REPORT

This Final Staff Assessment (FSA) is the California Energy Commission staff's independent analysis of the proposed CPV Sentinel Energy Project (here after referred to as CPV Sentinel). This FSA is a staff document. It is neither a Committee document, nor a draft decision. The FSA describes the following:

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

The analyses contained in this FSA are based upon information from the: 1) Application for Certification (AFC), 2) responses to data requests, 3) supplementary information from local, state, and federal agencies, interested organizations and individuals, 4) existing documents and publications, 5) independent research, 6) comments at workshops, and 7) comments pertaining to the Preliminary Staff Assessment (PSA). The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification." The FSA presents final conclusions about potential environmental impacts and conformity with LORS, as well as proposed conditions that apply to the design, construction, operation and closure of the facility.

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

ORGANIZATION OF THE PRELIMINARY STAFF ASSESSMENT

The FSA 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 20 technical areas. Each technical area is addressed in a separate chapter. They include the following: 1) air quality; 2) public health; 3) worker safety and fire protection; 4) transmission line safety and nuisance; 5) hazardous materials management; 6) waste management; 7) land use; 8) traffic and transportation; 9) noise and vibration; 10) visual resources; 11) cultural resources; 13) socioeconomics; 14) biological resources; 15) soil and water resources; 16) geological and paleontological resources; 17) facility design; 18) power plant reliability; 19) power plant efficiency; and 20) 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 20 technical area assessments includes a discussion of:

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

ENERGY COMMISSION SITING PROCESS

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

The Energy Commission's siting regulations require staff to independently review the AFC and assess whether the list of environmental impacts contained is complete, and whether additional or more effective mitigation measures are necessary, feasible and available [Cal. Code Regs., tit. 20, §§1742 and 1742.5(a)].

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

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

The staff prepares a PSA that presents for the applicant, intervenors, organizations, agencies, other interested parties and members of the public, the staff's analysis, conclusions, and recommendations. Where it is appropriate, the PSA incorporates comments received from agencies, the public and parties to the siting case, and comments made at the workshops.

Staff will provide a comment period to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During the period after the publishing of the PSA, staff will conduct one or more workshops to discuss its findings, proposed mitigation, and proposed compliance-monitoring requirements. Based on the workshops and written comments, staff may refine its analysis, correct errors, and finalize conditions of certification to reflect areas where agreements have been reached with the parties, and publish a Final Staff Assessment (FSA).

The FSA 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 written public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision.

AGENCY COORDINATION

As noted above, the Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (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 as applicable 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.

OUTREACH

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

LIBRARIES

On July 5, 2007, the Energy Commission staff sent the CPV Sentinel AFC to the Riverside County Library System (Desert Hot Springs Library), the Palm Springs Public Library, and to libraries in Eureka, Fresno, Los Angeles, Sacramento, San Diego, and San Francisco.

INITIAL OUTREACH EFFORTS

The PAO's public outreach is an integral part of the Energy Commission's AFC review process. The PAO reviewed information provided by the applicant and also conducted its own outreach efforts to identify and locate local elected and certain appointed officials, as well as "sensitive receptors" (including schools, community, cultural and health facilities, daycare and senior-care centers, as well as environmental and ethnic organizations) within a six-mile radius of the proposed site for the project. The PAO notified--by letter and an attached notice--all elected local (that is, county and city) officials, as well as the 96 sensitive receptors identified within six miles of the proposed site.

In addition, the PAO distributed--as an insert in 10,000 copies of the September 28, 2007 issue of the Palm Springs-published Desert Sun newspaper--a bilingual (English and Spanish) notice for the October 5th, 2007 Informational Hearing and Site Visit held in Desert Hot Springs for this project.

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

ENVIRONMENTAL JUSTICE

Executive Order 12898, “Federal Actions to address Environmental Justice in Minority Populations and Low-Income Populations,” focuses federal attention on the environment and human health conditions of minority communities and calls on federal agencies to achieve environmental justice as part of this mission. The order requires the U.S. Environmental Protection Agency (USEPA) and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

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

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

PROJECT DESCRIPTION

Testimony of John Kessler

INTRODUCTION

CPV Sentinel, LLC (applicant) filed an Application for Certification (AFC) to the California Energy Commission (Energy Commission) on June 25, 2007, to construct and operate a simple cycle peaking power plant. The proposed CPV Sentinel Energy Project (CPV Sentinel) would be a nominally rated 850 megawatt (MW) electrical generating facility that would encompass 37 acres of land situated within unincorporated Riverside County, California, adjacent to the Palm Springs northern city limits. The proposed project consists of eight natural gas-fired General Electric (GE) LMS100 combustion turbine generators (CTGs), each with an exhaust stack 13.5 feet in diameter and 90 feet tall.

PROJECT PURPOSE AND OBJECTIVES

As described in the AFC, the applicant‘s objectives are to design, build, own, and operate the CPV Sentinel project in order to meet the need for additional electric generation capacity, energy, and ancillary services in Southern California. In particular, the applicant intends to provide for quick-start peaking capacity needs identified by Southern California Edison (SCE), the Energy Commission, the California Public Utilities Commission (CPUC), and the California ISO for the Los Angeles Basin Local Capacity Requirements Area. In February 2007, SCE executed a long-term contract for the capacity, energy, and ancillary services for five of the eight proposed CPV Sentinel units, to be delivered to SCE at Devers substation by August 1, 2010. In March 2008, SCE signed an additional long-term power purchase agreement for the remaining three CPV Sentinel units for an on-line date of May 1, 2012.

The CPV Sentinel AFC identifies several basic objectives for the development of the proposed power project. These objectives include:

- To construct and operate an 850-MW, natural gas-fired, simple cycle generating facility specifically designed to serve electricity demand in the Southern California region.
- To provide competitively priced electricity in the form of peaking capacity, energy, and ancillary services for sale to electric service providers. To help meet expected electrical demand growth in Southern California, particularly in the rapidly growing portions of western Riverside County and the Coachella Valley.
- To generate power at a location near the electric load, thereby increasing reliability of the regional electricity grid and reducing regional dependence on imported power.
- To site the project at a location zoned and planned for industrial use with ready access cooling water, natural gas, and electrical interconnection.
- To build new generation that will require minimal additional project-specific transmission system upgrades.

- To develop the project in a manner that allows CPV Sentinel, LLC to satisfy its obligations under its power purchase agreements with SCE.
- To develop a project that provides a reasonable rate of return on CPV Sentinel, LLC's investment.

Construction of the power plant would occur over an 18-month period. If approved, operation of the first five turbine units is planned to begin by March 2010, and the final three units are planned to begin operation in May 2012. Construction is expected to cost approximately $440 million.

PROJECT LOCATION

The proposed project site is located approximately 1.3 miles east of State Route (SR) 62 (also referred to as Twentynine Palms Highway), 1.7 miles north of Interstate 10 (I-10), and 1.3 miles west of Indian Avenue. Powerline Roads North and South run along the south side of the property. Access to the site would be available from Dillon Road north onto the proposed access road to the project site. Access to Dillon Road is from the Dillon Road exit off SR 62 and from the Indian Avenue exit off I-10. **Project Description Figure 1** shows the **r**egional setting, and **Project Description Figure 2** provides the local setting for the proposed project.

The power plant, transmission lines, and portions of the gas line and construction laydown area would be located within unincorporated Riverside County. Portions of the construction laydown area and portions of the proposed gas line route would be located within the city of Palm Springs. The site is situated approximately 8 miles northwest of the center of Palm Springs and 4.5 miles west of the center of Desert Hot Springs. The power plant site is located in portions of the southeastern quarter and portions of the southwestern quarter of Section 4, Township 3 south, and Range 4 east of the Desert Hot Springs 7.5 Minute Topographic Map. **Project Description Figure 3** shows the general arrangement and **Project Description Figure 4** provides a simulation of the proposed project.

PROJECT FEATURES

The primary proposed project features include the following:

- A power plant on a 37-acre property, including a ¾-acre stormwater retention basin and five on-site water supply wells;
- A 2.6-mile-long natural gas line extending from the existing Indigo Energy Facility;
- A 2,300-foot-long, 230-kV transmission line connecting to the existing Devers substation;
- A 3,200-foot-long road extending off Dillon Road to the project site and associated intersection widening at Dillon Road and the site access road;
- A 3,200-foot-long potable water supply line extending off Dillon Road to the project site;

- Eight natural gas-fired, GE Energy LMS100 CTGs, each with an exhaust stack 13.5 feet in diameter and 90 feet tall; and
- A 14-acre construction laydown area.

Project Setting: The 37-acre proposed power plant site is currently vacant. The surrounding area is primarily characterized by industrial use with extensive development of wind energy and transmission infrastructure. The Devers substation is approximately 700 feet to the west of the proposed project site, and the Indigo Energy Facility is approximately 1.8 miles to the southeast. The nearest current residence to the power plant site is approximately 330 feet to the east. CPV Sentinel has secured site control under an option to purchase this residence, and the structure is currently vacant.

Zoning/General Plan: The proposed power plant site is zoned W2 (Controlled Development Area) and designated as PF (Public Facilities) in the Riverside County General Plan. Electrical power-generating facilities are permitted uses within this zoning district and General Plan designation.

Transmission Lines: Electricity generated by the proposed project would be delivered to the existing SCE Devers substation via a 2,300-foot-long transmission line connecting the project switchyard to the Devers substation at the 230 kilovolt (kV) bus. CPV Sentinel, LLC, SCE and the California ISO entered into a Large Generator Interconnection Agreement (LGIA) effective June 6, 2008 for the purpose of interconnecting the project to the California ISO-controlled grid. It is currently anticipated that SCE will execute a separate tie-line agreement with CPV Sentinel, LLC under which SCE will be responsible for final design, engineering, construction, ownership, operation, and maintenance of the transmission line to the Devers substation. SCE will seek a Certificate of Public Convenience and Necessity (CPCN) from the CPUC for the line.

The new CPV Sentinel 230 kV switchyard is proposed as a single bus arrangement for nine switch bays. Each bay would have a single SF6 gas-insulated circuit breaker. Eight of the breakers would be connected by overhead conductors to the high voltage terminals of the respective Generator Step-up Transformer. The remaining switch bay and circuit breaker would be used for the new 230 kV overhead interconnection line to the Devers 500/230/115 kV Substation. The applicant would build, own and operate the CPV Sentinel switchyard.

The new CPV Sentinel 230 kV switchyard would be interconnected to the SCE Devers Substation 230 kV bus by building a new 2,300-foot long, 230 kV single circuit overhead transmission line with steel reinforced aluminum conductor on nine 85-foot to 115-foot high tubular steel poles. About 1,800 feet of the line would be outside of the CPV Sentinel plant or Devers substation boundaries and this portion of the line would follow the right of way of existing SCE 230 kV and 115 kV lines adjacent to Powerline Road.

To accommodate termination of the interconnecting line at the SCE Devers substation 230 kV bus, the existing Devers-Coachella 230 kV line and Devers-Vista #1 line outlets and their terminations would be relocated to adjacent switch bays with installation of five new 230 kV circuit breakers, and the new interconnection line from the CPV Sentinel switchyard would be terminated to the switch bay previously occupied by the Devers-Vista #1 230 kV line circuit breaker. SCE would build, own and operate the new 230 kV transmission tie line and interconnecting facilities between the CPV Sentinel switchyard and Devers substation (CPVS, AFC Sections 2 & 4).

Roads: The applicant would be responsible for construction of a 3,200-foot-long road extending off Dillon Road to the project site and associated intersection widening at Dillon Road and the site access road.

Gas Line: Fuel would be supplied to the project site via a 2.6-mile-long, 24-inch-diameter natural gas line extending from the Indigo Energy Facility to the CPV Sentinel site.

Potable Water Supply: Potable water for the proposed project will be supplied by either on-site wells that would also be used for process water supply, or a 3,200-foot-long potable water supply line extension to the project site from a current Mission Springs Water District's (MSWD) municipal line existing along Dillon Road.

Wastewater Discharge: The proposed project would use a zero liquid discharge (ZLD) system, comprised of membrane-based wastewater treatment processes (microfiltration and reverse osmosis) coupled with a crystallizer system. This process would result in zero liquid wastewater discharge from the site. Instead, the ZLD would generate a salt cake that would be transported to, and disposed in a landfill facility.

Process Water Supply Plan: Under the proposed process water supply system, the project would pump groundwater via on-site wells within the Mission Creek Sub-basin. As defined in the applicant's Revised Water Supply Plan (AFC Supplement), groundwater used by the CPV Sentinel project would be replenished through the applicant's proposed Conservation Agreement and Implementation Agreement with the Desert Water Agency (DWA).

The primary elements of the projects' proposed water supply plan are described in detail in two new agreements between the applicant and DWA:

- A Memorandum of Understanding Concerning Additional Conservation of Fresh Water within DWA ("Conservation Agreement").
- A Memorandum of Understanding for Implementation of Well Metering Agreement ("Implementation Agreement").

In the case of the fresh water Conservation Agreement, funding would be provided by CPV Sentinel, LLC to allow DWA to develop new facilities to the existing DWA reclaimed wastewater system. The Conservation Agreement's intent is to ensure that the CPV Sentinel project does not increase the net use of fresh water on a statewide basis and to comply with Energy Commission policy regarding use of fresh water for power plant cooling. The Conservation Agreement Memorandum of Understanding (MOU) is open ended and may or may not include the specific implementation measures identified in the AFC Supplement. However, for the purpose of the Energy

Commission’s analysis, staff has assessed the environmental impacts of the project as defined by the applicant in the AFC Supplement. This included the following two proposals:

- The CPV Sentinel, LLC would fund the installation of a recycled water line to serve the Palm Springs National Golf Course which currently uses fresh water from private groundwater wells for irrigation purposes. The new recycled water line would consist of approximately 900 feet of 12-inch pipeline extending from an existing DWA service main located along South Murray Canyon Drive in Palm Springs. The recycled water line would connect to an existing water feature at the golf course, which serves as a storage reservoir for the irrigation system at the golf course property. The new pipeline would be constructed within the existing street right-of-way and the golf course property. **PROJECT DESCRIPTION Figure 5** shows the location of the recycled water pipeline for supply to the Palm Springs National Golf Course.
- DWA has initiated a cooperative plan with the Building Industry Association to provide new homes built within DWA’s Service Area with irrigation system controllers that use evapotranspiration and the ambient temperature to limit outdoor water application to what is actually needed. According to the AFC Supplement, this existing program has demonstrated the effectiveness of irrigation controllers in conserving fresh water. The CPV Sentinel applicant would fund installation of these irrigation controllers for a portion of existing customers to complement the DWA program of offering them to new homes. This would conserve fresh water supplies throughout DWA’s Service Area.

In the case of the Implementation Agreement, no new facilities would be built. The Implementation Agreement is intended to ensure that the Mission Creek Sub-basin would be recharged with imported water in quantities greater than the actual CPV Sentinel pumping of groundwater for cooling. The Implementation Agreement is intended to ensure that there would be no diminishment of the physical supply of water in the Coachella Valley and the Mission Creek Sub-basin. This included the following proposal:

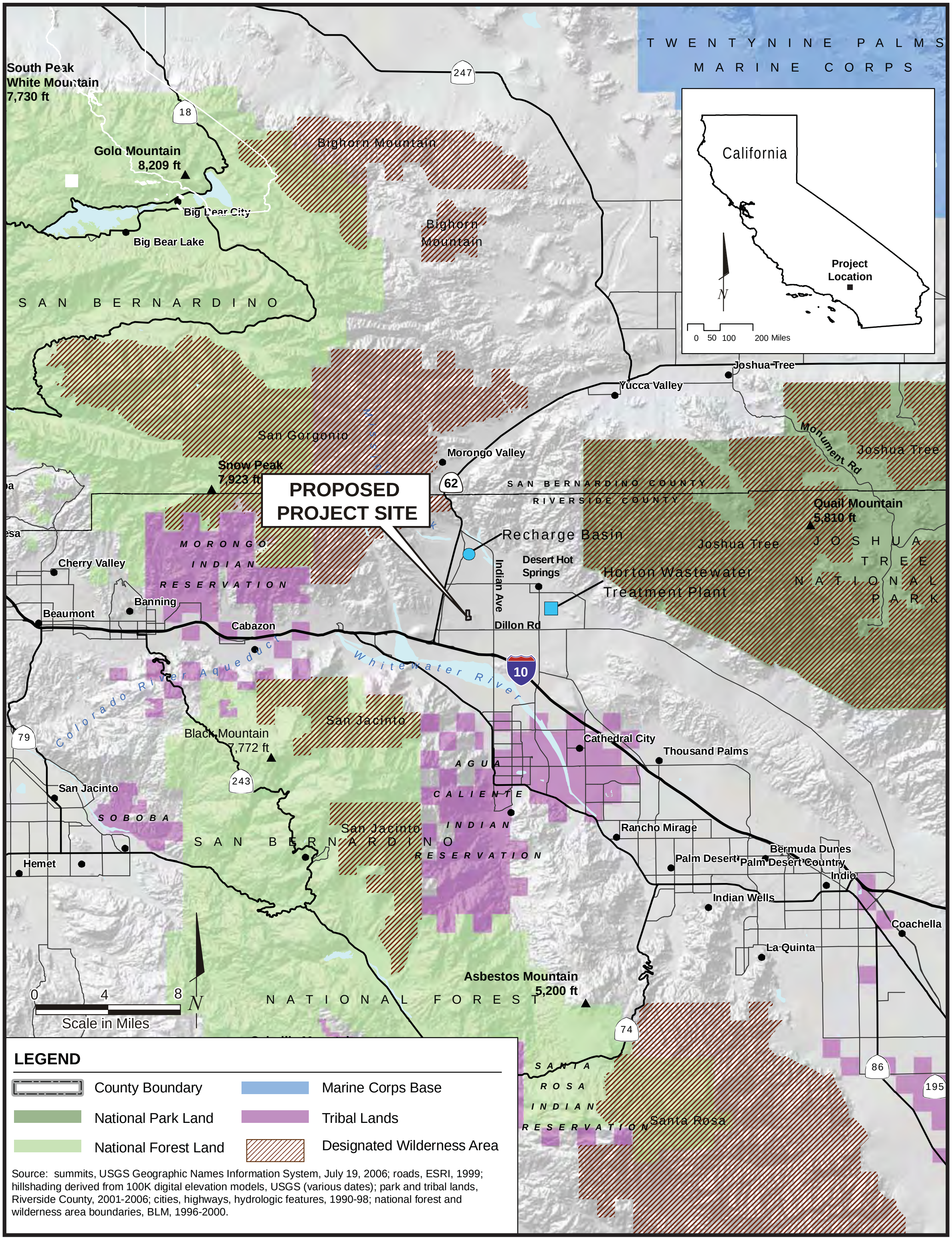
- Under the Implementation Agreement, the applicant would purchase water for importation equal to 108 percent of the CPV Sentinel project’s groundwater production, and utilize DWA’s entitlement as a State Water Project contractor to convey the imported water via the California Aqueduct. Since there is no conveyance system to deliver California Aqueduct water to DWA, DWA would exchange the imported water as conveyed in the California Aqueduct and delivered to Metropolitan Water District (MWD) for an equivalent amount of MWD’s Colorado River water supply. The exchanged water that DWA would receive from MWD’s Colorado River supply would then be used to recharge the existing spreading grounds in the Mission Creek Sub-basin. DWA would spread enough water to ensure that imported water equals at least 100 percent of the CPV Sentinel project’s groundwater pumping. DWA would transfer ownership of a volume of this recharged water, equivalent to 100 percent of the project’s pumping, to the CPV Sentinel applicant. Title to the additional 8 percent imported water would remain with DWA to cover incidental losses in the delivery and to benefit all water users within DWA’s

Service Area. The schedule for MWD to receive imported water as purchased by CPV Sentinel and for DWA to receive MWD's exchanged water would not normally coincide, as additional provisions of the agreement would consider the respective availability of Colorado River supply and capacity in the California Aqueduct to convey imported water.

The AFC Supplement states: "In all cases, DWA would purchase and CPV Sentinel would pay for waters already approved for transfer by the California Department of Water Resources and reviewed pursuant to the California Environmental Quality Act (CEQA). Thus, it is anticipated that the Energy Commission's review of the environmental impacts of any such transfer would be limited to the effects that delivery of the transferred water would have within the project area." Staff agrees with this assumption and has focused its evaluation of the proposed Implementation Agreement to environmental impacts within the project area.

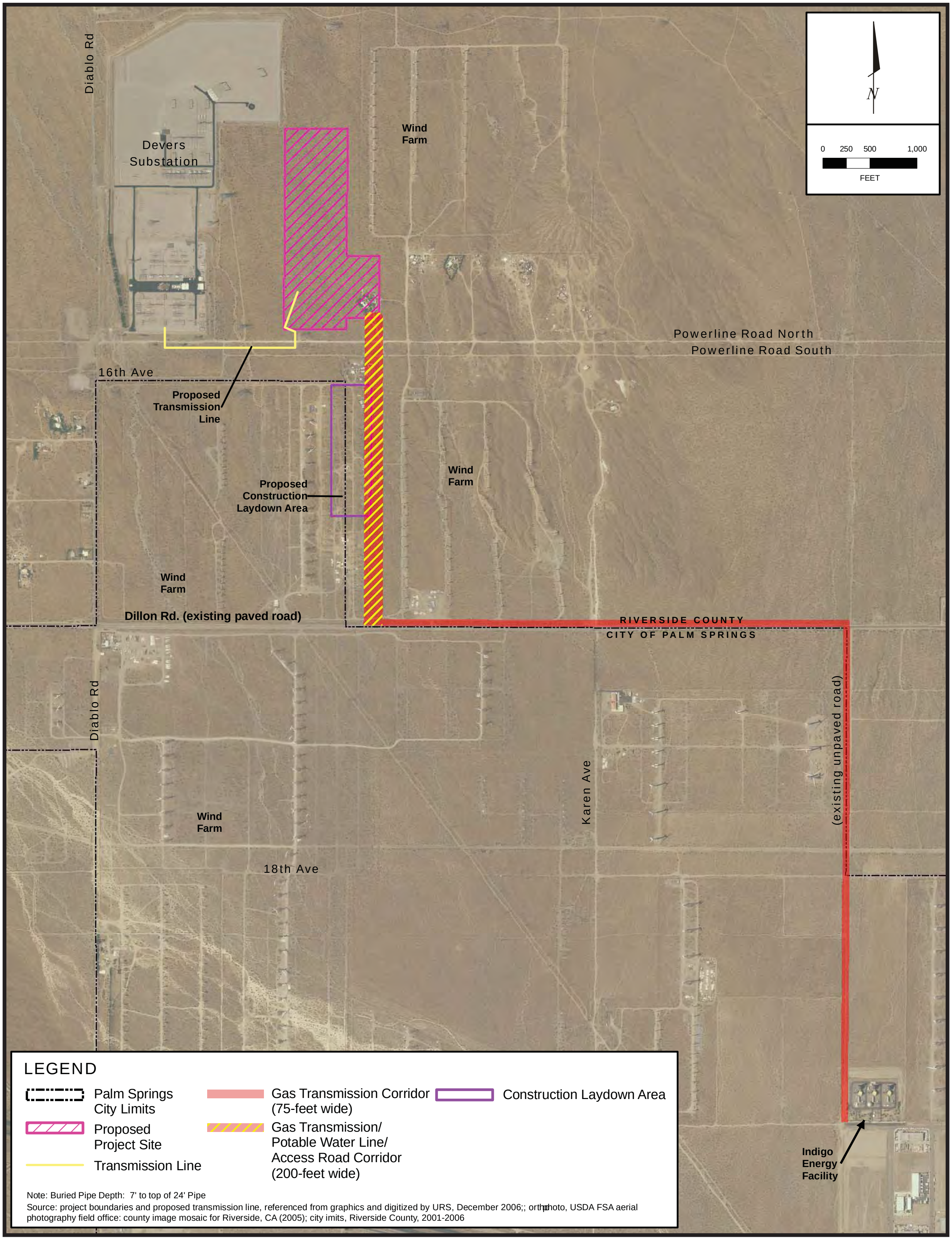
PROJECT DESCRIPTION - FIGURE 1

CPV Sentinel Energy Project - Regional Setting



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008
SOURCE: AFC Figure 1.1-1

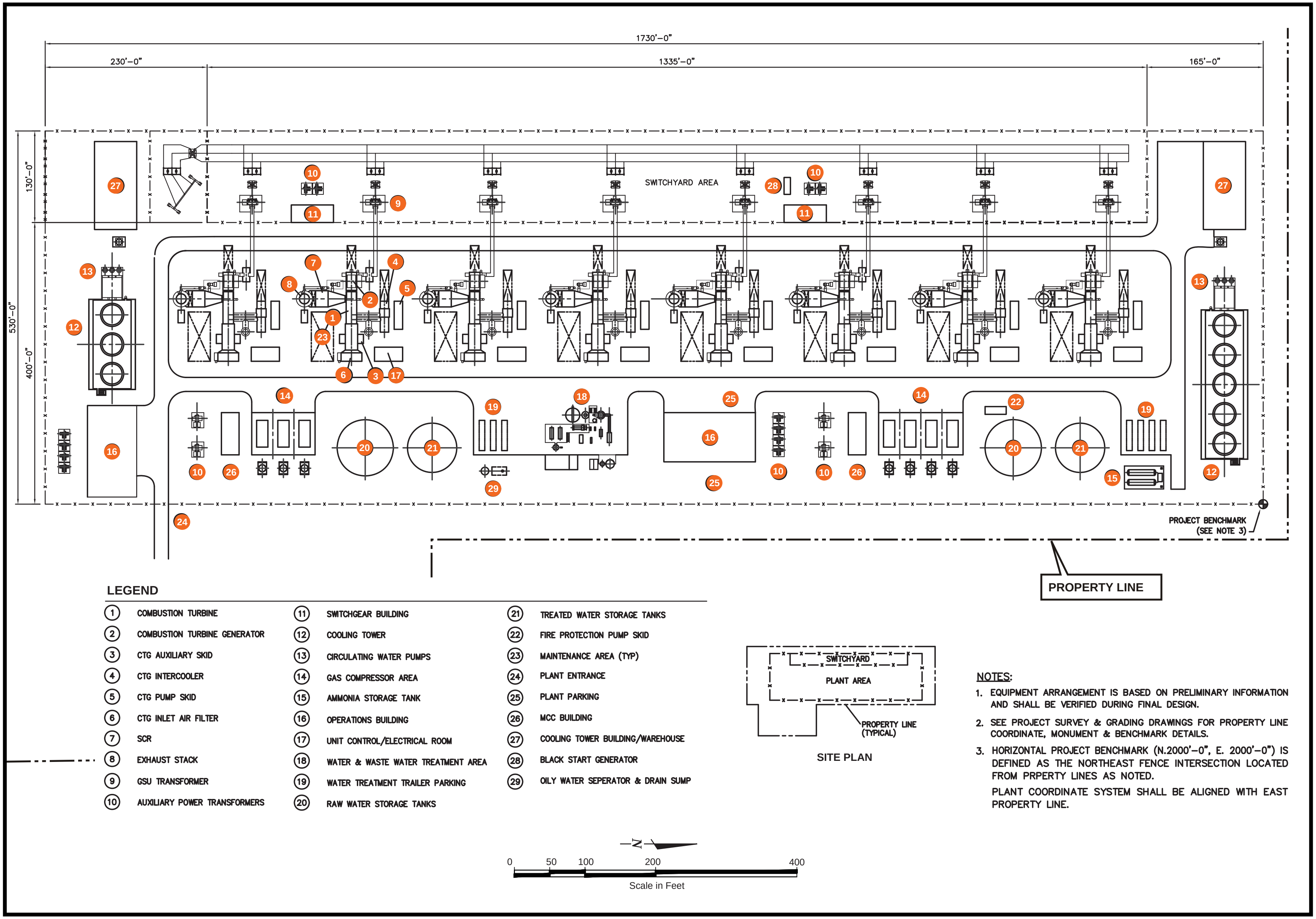
PROJECT DESCRIPTION - FIGURE 2
CPV Sentinel Energy Project - Local Setting



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008
SOURCE: AFC Figure 2.3-1

PROJECT DESCRIPTION - FIGURE 3

CPV Sentinel Energy Project - General Arrangement of Project



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: AFC Figure 2.4-1

PROJECT DESCRIPTION - FIGURE 4

CPV Sentinel Energy Project - Simulation of Proposed Project

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: AFC Figure 1.3-1

PROJECT DESCRIPTION - FIGURE 5

CPV Sentinel Energy Project - Proposed Recycle Water Pipeline to Serve Palm Springs National Golf Course

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: AFC Supplement - Figure 4

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Testimony of Joseph M. Loyer

SUMMARY OF CONCLUSIONS

At this time, the CPV Sentinel Energy Project applicant has not secured or identified sufficient emission reduction credits (ERCs), RECLAIM Trading Credits (RTCs) or other offsets allowed under South Coast Air Quality Management District (SCAQMD or District) Rules and Regulation to comply with New Source Review offset requirements or mitigate the potential air quality impacts from the project emissions of nitrogen oxides (NOx), sulfur dioxides (SO_2), volatile organic compounds (VOC), particulate matter less than 10 microns in diameter (PM10) and particulate matter less than 2.5 microns in diameter (PM2.5). Unmitigated, these pollutants have the potential to contribute to existing violations of the ambient air quality standards.

Therefore, staff cannot determine whether the CPV Sentinel project is likely to conform with applicable federal, state and District air quality laws, ordinances, regulations and standards; nor whether the mitigation proposed for the project is adequate to lessen any potentially significant impacts to a less than significant level.

Staff has analyzed the potential incremental greenhouse gas (GHG) emission impacts from the proposed project and concludes that they are not cumulatively considerable and thus do not represent a significant impact under California Environmental Quality Act (CEQA).

INTRODUCTION

This analysis evaluates the expected air quality impacts of the emissions of criteria air pollutants due to CPV Sentinel, LLC's (applicant) proposed construction and operation of the CPV Sentinel Energy Project (CPV Sentinel). Criteria air pollutants are defined as those air contaminants for which the state and/or federal government has established an ambient air quality standard to protect public health. The criteria pollutants analyzed are nitrogen dioxide (NO_2), sulfur dioxide ($SO_{2)}$, carbon monoxide (CO), ozone (O_3), and particulate matter (PM10 and PM2.5). In addition, volatile organic compounds (VOC) emissions are analyzed because they are precursors to both ozone (O_3) and particulate matter. Because NO_2 and SO_2 readily react in the atmosphere to form other oxides of nitrogen and sulfur respectively, the terms nitrogen oxides (NOx) and sulfur oxides (SOx) are also used when discussing these two pollutants.

In carrying out this analysis, Energy Commission staff evaluated the following three major points:

- Whether the CPV Sentinel project is likely to conform with applicable federal, state and South Coast Air Quality Management District (SCAQMD or District) air quality laws, ordinances, regulations and standards (Title 20, California Code of Regulations, section 1744 (b));

- Whether the CPV Sentinel project is likely to cause significant new violations of ambient air quality standards or contributions to existing violations of those standards (Title 20, California Code of Regulations, section 1742 (b)); and
- Whether the mitigation proposed for the CPV Sentinel project is adequate to lessen any potentially significant impacts to a less than significant level (Title 20, California Code of Regulations, section 1742 (b)).

LAWS, ORDINANCES, REGULATION, AND STANDARDS

The following federal, state, and local laws and policies pertain to the control of criteria pollutant emissions and mitigation of air quality impacts. Staff's analysis examines the project's compliance with these requirements.

AIR QUALITY Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
40 Code of Federal Regulations (CFR) 52	Nonattainment New Source Review (NSR) requires a permit and requires Best Available Control Technology (BACT) and Offsets. Permitting and enforcement delegated to SCAQMD. Prevention of Significant Deterioration (PSD) requires major sources to obtain permits for attainment pollutants. A major source for a simple-cycle combustion turbine is defined as any one pollutant exceeding 250 tons per year. Since the emissions from the CPV Sentinel project are not expected to exceed 250 tons per year, PSD does not apply.
40 CFR 60 Subpart KKKK	New Source Performance Standard for gas turbines: 15 parts per million (ppm) NOx at 15% O_2 and fuel sulfur limit of 0.060 lb SOx per million Btu heat input. BACT will be more restrictive. Enforcement delegated to SCAQMD.
40 CFR Part 70	Title V: Federal permit assuring compliance with all applicable Clean Air Act requirements. Title V permit application required within one year of start of operation. Permitting and enforcement delegated to SCAQMD.
40 CFR Part 72	Acid Rain Program. Requires permit and obtaining sulfur oxides credits. Permitting and enforcement delegated to SCAQMD.

State	
Health and Safety Code (HSC) Section 40910-40930	Permitting of source needs to be consistent with approved Clean Air Plan.
HSC Section 41700	Restricts emissions that would cause nuisance or injury.

Local – South Coast Air Quality Management District (SCAQMD)	
Regulation II: Permits	This regulation sets forth the regulatory framework of the application for issuance of construction and operation permits for new, altered and existing equipment.
Regulation IV: Prohibitions	This regulation sets forth the restrictions for visible emissions, odor nuisance, fugitive dust, various air emissions, fuel contaminants, start-up/shutdown exemptions and breakdown events.
Regulation VII: Emergencies	Establishes the procedures for reporting emergencies and emergency variances.
Regulation IX: Standards of Performance for New Stationary Sources	Regulation IX incorporates provisions of 40 CFR Part 60, Chapter I, and is applicable to all new, modified, or reconstructed sources of air pollution. Sections of this regulation apply to electric utility steam generators (Subpart Da) and stationary combustion turbines (Subpart KKKK). These subparts establish limits of PM10, SO_2, and NO_2 emissions from the facility as well as monitoring and test method requirements.
Regulation XI: Source Specific Standards	Specifies the performance standards for stationary engines larger than 50 brake horse power (bhp).
Regulation XIII: New Source Review	Establishes the pre-construction review requirements for new, modified or relocated facilities to ensure that these facilities do not interfere with progress in attainment of the national ambient air quality standards and that future economic growth in the SCAQMD is not unnecessarily restricted. However, this regulation does not apply to NOx or SOx emissions from certain sources, which are addressed by Regulation XX (RECLAIM).

Local – South Coast Air Quality Management District (SCAQMD)	
Regulation XVII: Prevention of Significant Deterioration	This regulation sets forth the pre-construction requirement for stationary sources to ensure that the air quality in clean air areas does not significantly deteriorate while maintaining a margin for future industrial growth.
Regulation XX: Regional Clean Air Incentives Market (RECLAIM)	RECLAIM is designed to allow facilities flexibility in achieving emission reduction requirements for NOx and SOx through controls, equipment modifications, reformulated products, operational changes, shutdowns, other reasonable mitigation measures or the purchase of excess emission reductions.
Regulation XXX: Title V Permits	The Title V federal program is the air pollution control permit system required by the federal Clean Air Act as amended in 1990. Regulation XXX defines the permit application and issuance as well as compliance requirements associated with the program. Any new or modified major source which qualifies as a Title V facility must obtain a Title V permit prior to construction, operation or modification of that source. Regulation XXX also integrates the Title V permit with the RECLAIM program such that a project cannot proceed without the other.
Regulation XXXI Acid Rain Permits	Title IV of the federal Clean Air Act provides for the issuance of acid rain permits for qualifying facilities. Regulation XXXI integrates the Title V program with the RECLAIM program. Regulation XXXI requires a subject facility to obtain emission allowances for SOx emissions as well as monitoring SOx, NOx, and carbon dioxide (CO_2) emissions from the facility.

SETTING

CLIMATE AND METEOROLOGY

The semi permanent high-pressure system centered off the west coast of the United States has a dominating influence on California's general climate. In the summer, this system results in low inversion layers with clear skies inland and typically early morning fog by the coast. In winter, this system promotes wind and rainstorms originating in the Gulf of Alaska and funneling these toward Northern California.

The large-scale wind flow patterns in the South Coast air basin are a diurnal cycle driven by the differences in temperature between the land and the ocean in addition to the channeling effect of the mountainous terrain surrounding the basin. The Tehachapi and Temblor mountains physically separate the air shed in the South Coast and San Joaquin Valley air basins. The San Bernardino, San Gabriel, and Santa Rosa mountain ranges generally make up the eastern boundary of the South Coast air basin. The Santa Monica and Santa Ana coastal mountain ranges make up the northern and southern boundaries respectively.

The proposed project would be located in Riverside County, eight miles northwest of the City of Palms Springs. The area surrounding the project site is primarily industrial use with major development of wind energy and related transmission infrastructure. This area is at the east end of the San Gorgonio Pass in the Salton Sea Air Basin. The differences in season in the Salton Sea Basin are marked by air temperature and not rainfall, which is sparse year-round. The winter temperatures average approximately 70 degrees F, while the summer temperatures average 109 degrees F. The diurnal temperature differences (the temperature difference between night and day) ranges from 30 to 35 degrees F, which is substantial. The annual precipitation totals approximately five inches, primarily in the winter months.

The wind patterns near the project site are based on meteorological data from 1988 through 1991 and are dominated by strong winds (greater than 21 knots) from the west and west north-west, with a nighttime drainage pattern yielding occasional mild air flow from the southeast at night. Calm conditions were not detected.

The mixing heights, a parameter that defines the height through which pollutants released to the atmosphere are mixed, was recorded at the Desert Rock Station in Nevada (1988-1991) and will be used for the modeling analysis in place of the Edwards Air Base monitoring, which was recorded only 50 percent of the time. Mixing heights at Desert Rock were an average of 1,013 feet (approximately 308 meters).

AMBIENT AIR QUALITY STANDARDS

The United States Environmental Protection Agency (U.S. EPA) and the California Air Resource Board (CARB) have both established allowable maximum ambient concentrations of criteria air pollutants based on public health impacts, called ambient air quality standards (AAQS). The state AAQS, established by CARB, are typically lower (more stringent) than the federal AAQS, established by the U.S. EPA. The state and federal air quality standards are listed in AIR QUALITY Table 2. As indicated, the averaging times for the various air quality standards (the duration over which all measurements taken are averaged) range from one hour to one year (annual). The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per unit volume of air, in milligrams (10^{-3} g, 0.001 g, or mg) or micrograms (10^{-6} g, 0.000001 g, or μg) of pollutant in a cubic meter (m^3) of air, averaged over the applicable time period.

AIR QUALITY Table 2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standard	Federal Standard
Ozone (O_3)	1 Hour	0.09 ppm (180 μg/m^3)	--
	8 Hour	0.07 ppm (140 μg/m^3)	0.075 ppm (147 μg/m^3)
Respirable Particulate Matter (PM10)	24 Hour	50 μg/m^3	150 μg/m^3
	Annual*	20 μg/m^3	50 μg/m^3
Fine Particulate Matter (PM2.5)	24 Hour	--	35 μg/m^3
	Annual*	12 μg/m^3	15 μg/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	0.18 ppm (338 μg/m^3)	--
	Annual*	--	0.030 ppm (56 μg/m^3)
Sulfur Dioxide (SO_2)	1 Hour	0.25 ppm (655 μg/m^3)	--
	3 Hour	--	0.5 ppm (1300 μg/m^3)
	24 Hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)
	Annual*	--	0.03 ppm (80 μg/m^3)
Lead	30 Day Average	1.5 μg/m^3	--
	Calendar Quarter	--	1.5 μg/m^3
Sulfates	24 Hour	25 μg/m^3	--
Hydrogen Sulfide (H_2S)	1 Hour	0.03 ppm (42 μg/m^3)	--
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 μg/m^3)	--
Visibility Reducing Particulates	8 hours	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.	--
* Annual Arithmetic Mean			

Source: CARB 2007b.

In general, an area is designated as attainment for a specific pollutant if the concentrations of that air contaminant do not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that standard is violated. Where not enough ambient data is available to support designation as either attainment or non-attainment, the area can be designated as unclassified. Unclassified areas are normally treated the same as attainment areas for regulatory purposes. An area can be designated as attainment for one air contaminant and non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same contaminant. The entire area within the boundaries of an air district is usually evaluated to determine the SCAQMD attainment status.

The ambient air quality standards shown in AIR QUALITY Table 2 define the maximum amount of a pollutant that can be present in outdoor air without harm to the public's health. These standards are set at levels to adequately protect the health of all members of the public, including those most sensitive to adverse air quality impacts such as the aged, people with existing illnesses, children, and infants, and include a margin of safety.

EXISTING AMBIENT AIR QUALITY

The project is located in the unincorporated area of Riverside County, approximately 8 miles northwest of the City of Palm Springs and is under the jurisdiction of the SCAQMD. AIR QUALITY Table 3 lists the attainment and non-attainment status of the district for each criteria pollutant for both the federal and state ambient air quality standards.

AIR QUALITY Table 3
Attainment / Non-Attainment Classification
South Coast Air Quality Management District (SCAQMD)

Pollutants	**Federal Classification**	**State Classification**
Ozone	**Non-Attainment**	**Non-Attainment**
PM10	**Non-Attainment**	**Non-Attainment**
PM2.5	**Non-Attainment**	**Non-Attainment**
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment

Source: CARB 2006a

Ambient air quality data has been collected extensively in the air basin. AIR QUALITY Table 4 lists a summary of maximum ambient measurements for the years 1999 through 2005 at the monitoring stations closest to the project site.

AIR QUALITY Table 4
Criteria Pollutant Summary
Maximum Short Term Ambient Concentrations (ppm or μg/m^3)

Pollutant	Averaging Period	Units	2001	2002	2003	2004	2005	2006	2007	Limiting AAQS
Ozone	1 hour	ppm	0.14[a]	0.14[a]	0.14[a]	0.13[a]	0.14[a]	0.13[a]	0.13[a]	0.09
Ozone	8 hour	ppm	0.11[a]	0.13[a]	0.11[a]	0.11[a]	0.12[a]	0.11[a]	0.10[a]	0.07
PM10[d]	24 hours	μg/m^3	149[b]	139[b]	124[b]	83[b]	106[b]	122[b]	211[b,1]	50
PM2.5[e]	24 hours	μg/m^3	44.7[a]	42.3[a]	26.8[b]	28.5[b]	44.4[b]	24.8[a]	20.5[a]	35
CO	1 hour	ppm	2[a]	2[a]	3[a]	2[a]	2[a]	2[a]	1.5[a]	20
CO	8 hour	ppm	1.5[b]	1.2[a]	1.3[a]	1.0[a]	0.8[a]	1.0[a]	0.8[a]	9.0
NO_2	1 hour	ppm	0.08[a]	0.10[a]	0.06[a]	0.07[a]	0.10[a]	0.09[a]	0.06[a]	0.18
SO_2	1 hour	ppm	0.02[c]	0.03[c]	0.02[c]	0.02[c]	0.01[c]	0.01[c]	0.01[c]	0.25
SO_2	24 hour	ppm	0.01[c]	0.01[c]	0.01[c]	0.02[c]	0.004[c]	0.004[c]	0.004[c]	0.04

Note: a) Coachella Valley 1: Palms Spring Fire Station Ambient Air Quality Monitoring Station
b) Coachella Valley 2: Indio-Jackson Street Ambient Air Quality Monitoring Station
c) Riverside-Rubidoux Ambient Air Quality Monitoring Station
d) Maximum PM10 concentration based on California monitoring methodology.
e) Maximum PM2.5 concentration based on national monitoring methodology.
1) This data may be excluded in accordance with EPA's National Event Policy.

Source: CARB 2007a

Comparison of the values in AIR QUALITY Table 4 to the most restrictive AAQS in AIR QUALITY Table 2 clearly shows that ozone, PM10, and PM2.5 continue to violate applicable standards while CO, NO_2 and SO_2 do not violate the standards.

Attainment Criteria Pollutants

Although both NO_2 and SO_2 are classified as in attainment with all state and federal AAQS, they remain of significant concern since they are precursors to PM10, and NO_2 is a precursor to ozone. Because NO_2 and SO_2 are precursors to non-attainment pollutants, the district will require full offset mitigation for both.

Nitrogen Dioxide (NO_2)

Most combustion activities and engines emit significant quantities of nitrogen oxides (NOx), a term used in reference to combined quantities of nitrogen oxide (NO) and NO_2. Most of the NOx emitted from combustion sources is NO. Although only NO_2 is a criteria pollutant, NO is readily oxidized in the atmosphere into NO_2. In urban areas, the ozone concentration level is typically high. That level will drop substantially at night as NO is oxidized into NO_2, and increase again in the daytime as sunlight disassociates NO_2 into NO and ozone. This reaction explains why urban ozone concentrations at ground level can be relatively low, while downwind rural areas (without sources of fresh NO emissions) are exposed to higher ozone concentrations as arriving NO_2 dissociates into NO and ozone in the presence of sunlight.

Sulfur Dioxide (SO_2)

Sulfur dioxide is typically emitted as a result of the combustion of fuels containing sulfur. In significant ambient quantities, SO_2 can lead to acid rain and sulfite particulate formation. Natural gas contains very little sulfur and consequently results in very little

SO_2 emissions when combusted. By contrast, fuels high in sulfur, such as lignite (a type of coal), emit large amounts of SO_2 when combusted. Sources of SO_2 emissions within the basin come from every economic sector and include a wide variety of gaseous, liquid and solid fuels.

Carbon Monoxide (CO)

CO is generated from most combustion engines and other combustion activities. CO is considered a local pollutant, as it will rapidly oxidize. It is thus found in high concentrations only near the source of emissions. Automobiles and other mobile sources are the principal source of CO emissions. High levels of CO emissions can also be generated from fireplaces and wood-burning stoves. Industrial sources, including power plants, typically constitute less than 10 percent of the ambient CO levels in the South Coast region (CARB 2006c).

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. Because the mobile sector (ships, cars, trucks, busses and other vehicles) is the main source of CO, ambient concentrations of CO are highly dependent on traffic patterns. Carbon monoxide concentrations in the state have declined significantly due to two state-wide programs: 1) the 1992 wintertime oxygenated gasoline program, and 2) Phases I and II of the reformulated gasoline program. New vehicles with oxygen sensors and fuel injection systems have also contributed to the decline in CO levels in the state. Today, all the counties in California are in compliance with the state CO AAQS.

Non-Attainment Criteria Pollutants

The following sections provide background for the non-attainment criteria pollutants: ozone, PM10, and PM2.5.

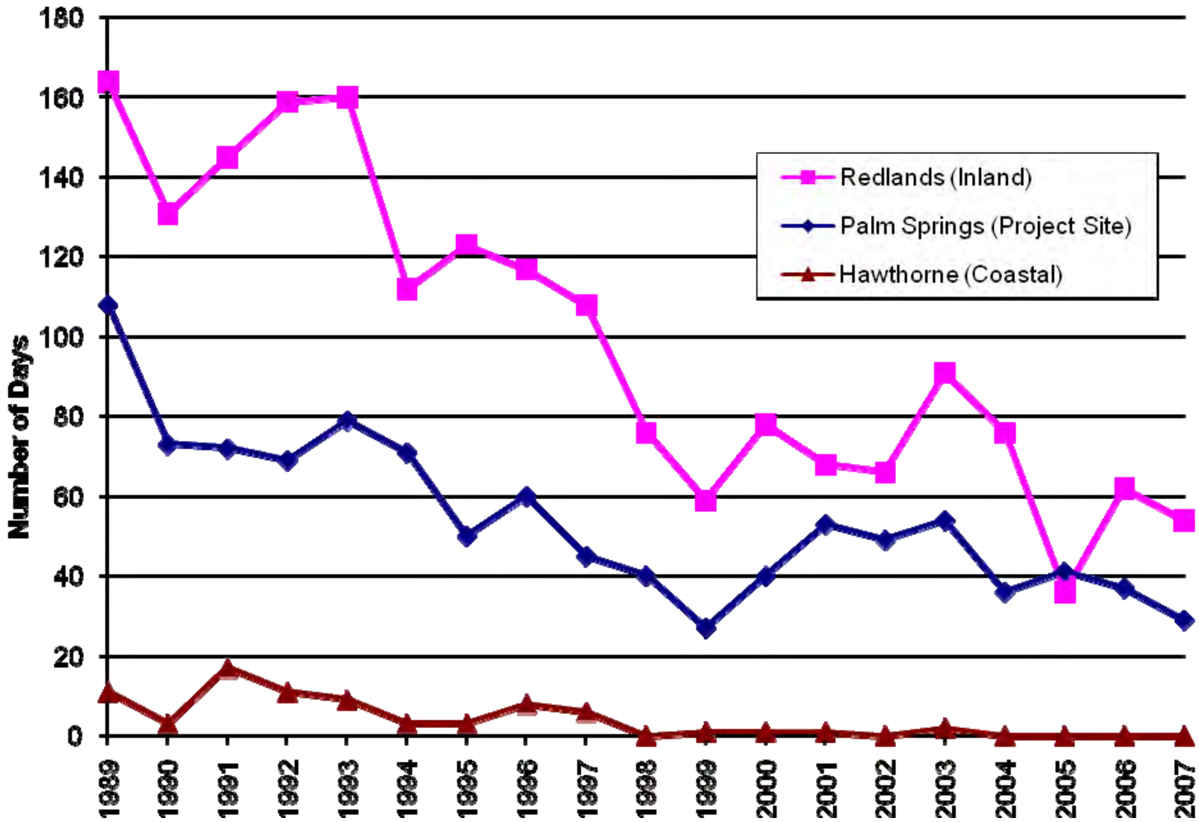
Ozone (O_3)

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between precursor air pollutants. The primary ozone precursors are NOx and VOC, both of which interact in the presence of sunlight to form ozone.

The SCAQMD is designated as serious-17 non-attainment for ozone (the second worst possible classification), meaning that the South Coast air basin ambient ozone design concentration is 0.280 ppm or above and it did not reach attainment before 2007. Efforts to achieve ozone attainment typically focus on controlling the ozone precursors NOx and VOC. SCAQMD-published state implementation plans (SIP) rely on the CARB to control mobile sources, the U.S. EPA to control emission sources under federal jurisdiction, and SCAQMD to control local industrial sources. Through these control measures, California and the SCAQMD are required to reach attainment of the federal ozone ambient air quality standard by 2010.

Exceedances of the national and state ozone ambient air quality standards occur in the region both up wind and downwind of the project site. AIR QUALITY Figure 1 shows the number of days each year on which exceedances of the state 1-hour ozone standard occurred for three representative monitoring sites. The three monitoring sites were chosen to represent three distinct parts of the air shed: coastal region, proposed project region, and inland region.

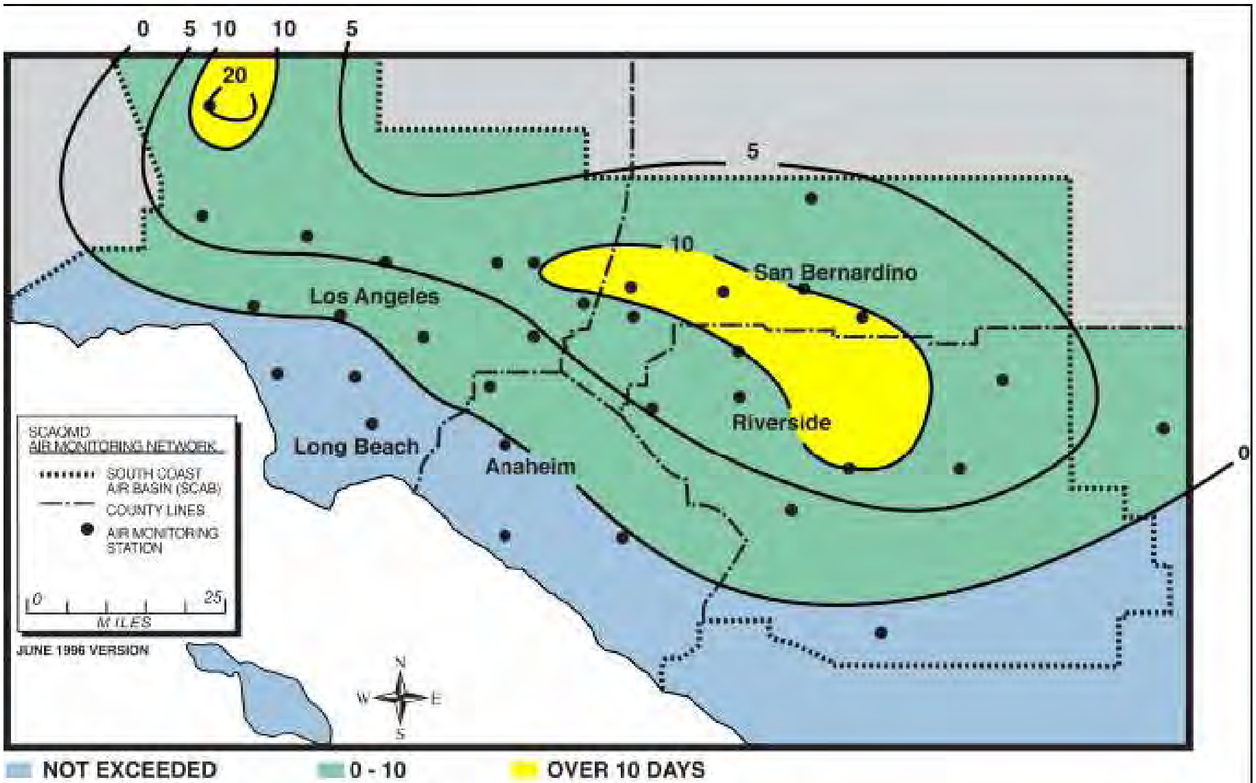
AIR QUALITY Figure 1
OZONE 1989-2007
Number of Days Exceeding the State 1-Hour AAQS



Source: CARB 2008b

The proposed project area (represented in AIR QUALITY Figure 1 by the Perris monitoring station) is in an area very near the inland regions of the SCAQMD. The data clearly shows the characteristic trend to higher ambient ozone concentrations farther away from the coast, due to prevailing onshore airflow. AIR QUALITY Figure 2 provides a graphical representation of this effect for a single year, showing how the onshore airflow pushes pollution inland and thus focuses regional violations away from the coast.

AIR QUALITY Figure 2
OZONE – 2006
Number of Days Exceeding 1-Hour Federal Standard
(1-hour average ozone > 0.12 ppm)



Source: SCAQMD 2006

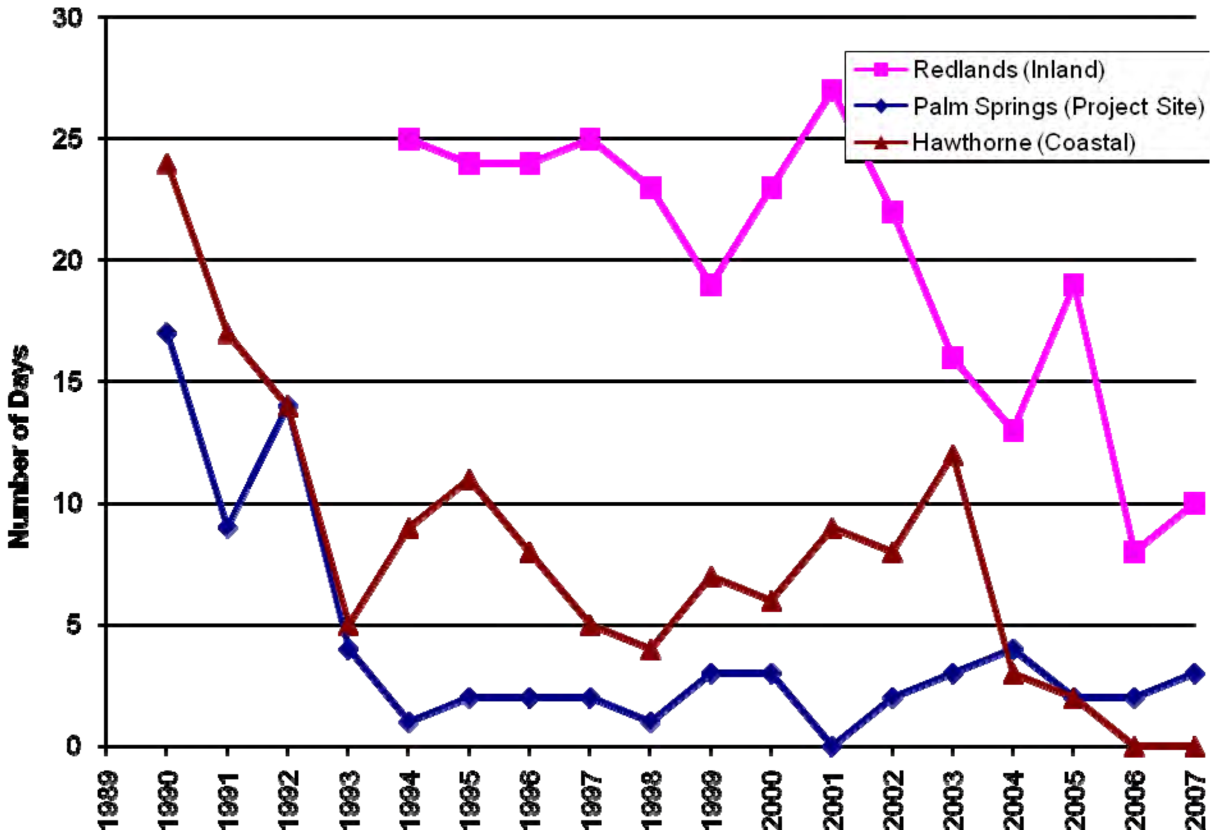
Though there are a significant number of exceedances of the ozone ambient air quality standards throughout the district, it is important to consider the improvements that have occurred in recent years. The SCAQMD leads the nation in air quality management methods and regulatory programs. These programs have significantly improved the air quality in spite of the growing population and industrial and commercial enterprises. AIR QUALITY Figure 1 clearly shows the improvements in ozone air quality levels over the past 16 years in the South Coast air basin, especially in the intermediate region near the proposed project site. As shown in AIR QUALITY Figure 1, in 2003 there was a slight increase over prior years in the number of exceedances recorded. Since 2003 however, the downward trend has returned, approaching the 2002 lower number of exceedances.

Respirable Particulate Matter (PM10)

PM10 is generated both directly from a combustion process and generated downwind of a source when various emitted precursor pollutants chemically interact in the atmosphere to form solid precipitates. These solids are called secondary particulates, because they are not directly emitted, but are still generated as a consequence of facility emissions. Gaseous emissions of pollutants such as NOx, SO_2, and VOC from turbines, and ammonia (NH_3) from NOx control equipment can form particulate nitrates, sulfates, and organic solids.

San Bernardino County (not the entire South Coast air basin) has been designated a non-attainment zone for the federal 24-hour and annual PM10 ambient air quality standards. The South Coast air basin (including a portion of San Bernardino County within the basin) has been designated as a non-attainment zone for the state 24-hour and annual PM10 ambient air quality standards. AIR QUALITY Figure 3 below shows the number of days each year on which exceedances of the state 24-hour PM10 standard occurred for three representative monitoring regions: coastal, project site, and inland. The data shows some improvement over the period, but overall the PM10 situation remains a concern.

AIR QUALITY Figure 3
PM10 1989-2007
Number of Days Exceeding the State 24-Hour AAQS

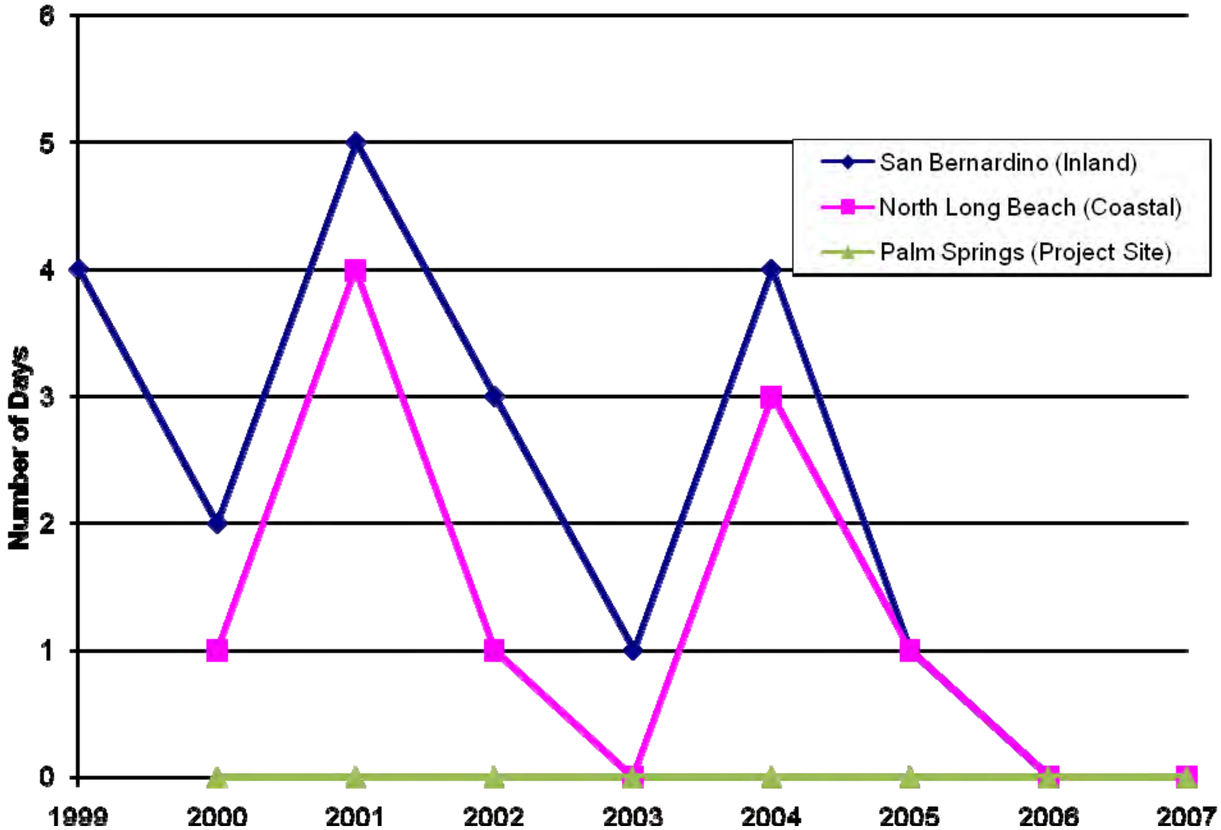


Source: CARB 2008a

Fine Particulate Matter (PM2.5)

PM2.5, a subset of PM10, consists of particles with an aerodynamic diameter less than or equal to 2.5 microns. Particles within the PM2.5 fraction penetrate more deeply into the lungs, and can be much more damaging by weight than larger particulates. PM2.5 is primarily a product of combustion and includes nitrates, sulfates, organic carbon (ultra fine dust) and elemental carbon (ultra fine soot). AIR QUALITY Figure 4 below shows the number of days each year on which exceedances of the old federal 24-hour PM2.5 standard of 65 ug/m^3 (there is no separate short-term state standard) occurred for three representative monitoring regions: coastal, project site, and inland. The federal 24-hour PM2.5 standard has recently been lowered to 35 ug/m^3. Staff is working through the ambient air quality measurement data from CARB to develop the "Number of Days Exceeding" necessary to correct this graph. That data will be available for the Final Staff Assessment.

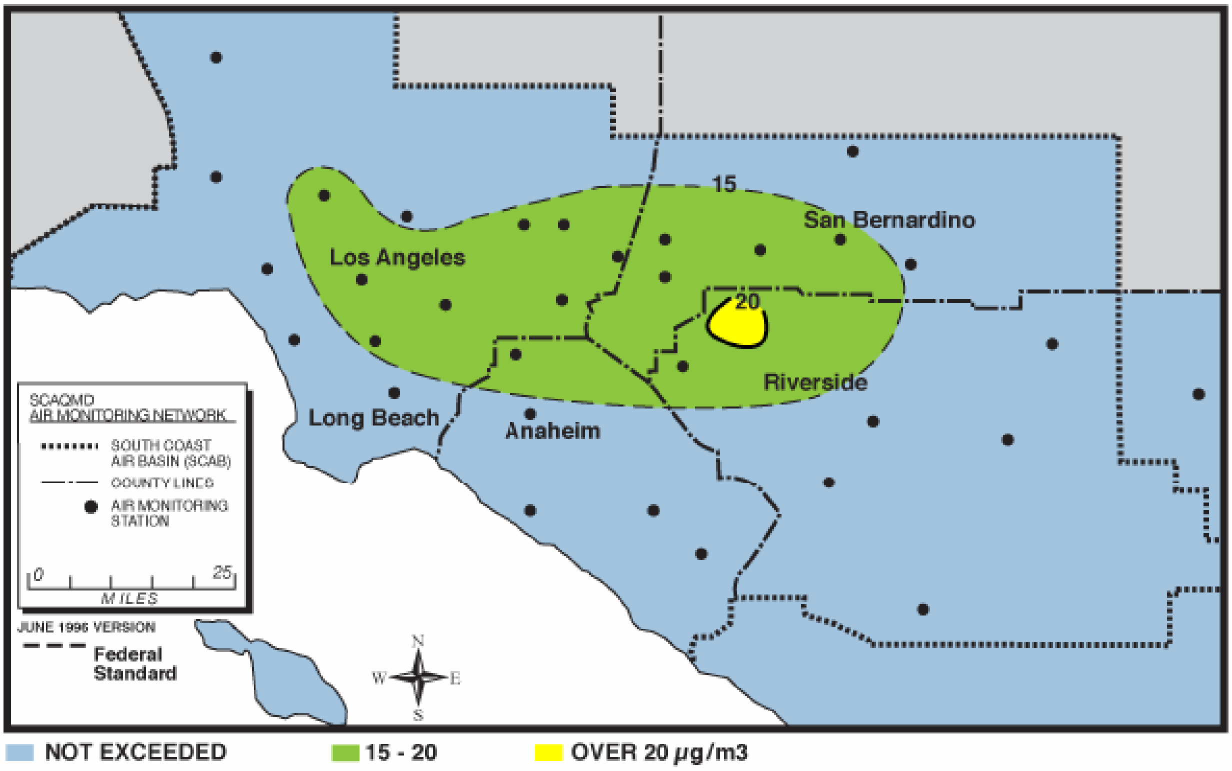
AIR QUALITY Figure 4
PM2.5 1999-2007
Number of Days Exceeding the Revoked Federal 24-Hour 65 ug/m^3 AAQS



Source: CARB 2008a

The highest concentrations of PM2.5 in the SCAQMD occur within the counties of San Bernardino and Riverside (similarly to PM10), but also extend west toward downtown Los Angeles. This effect is shown graphically in AIR QUALITY Figure 5 below.

AIR QUALITY Figure 5
PM2.5 – 2006
Annual Arithmetic Mean, µg/m³



Source: SCAQMD 2006

PM2.5 standards were first adopted by U.S. EPA in 1997, and were upheld by the United States Supreme Court in 2001 over a challenge from the American Trucking Association (ATA et al). Though SCAQMD is designated as non-attainment for all state and federal PM2.5 AAQS, the SCAQMD has not yet finished preparing a PM2.5 SIP. The SCAQMD has submitted a PM2.5 SIP, and once the plan is approved by USEPA, the SCAQMD will prepare revised NSR rules that will likely require offsetting of PM2.5 emissions. The SCAQMD is thus unlikely to address PM2.5 in their rules within the schedule of this proposed project. Staff, however, has a California Environmental Quality Act (CEQA) responsibility to address PM2.5 emissions since there are current ambient air quality standards in effect and the proposed project region is not in compliance with those standards.

Existing Ambient Air Quality Summary

Based on the above analysis of background ambient air quality, staff recommends the use of background ambient air concentrations in AIR QUALITY Table 5 for the purpose of modeling and evaluating potential ambient air quality impacts from the proposed project.

AIR QUALITY Table 5
Staff Recommended Background Concentrations (μg/m^3)

Pollutant	Averaging Time	Recommended Background	Limiting Standard	Percent of Standard
NO_2	1 hour	174.8[a]	338	52%
	Annual	24.5	56	44%
CO	1 hour	2,645[a]	23,000	11%
	8 hour	944.4[a]	10,000	9%
PM10	24 hour	211[b,1]	50	**422%**
	Annual	54.9	20	**274%**
PM2.5	24 hour	44.4[b]	35	**127%**
	Annual	10.8[2]	12	90%
SO_2	1 hour	62.9[c]	655	9%
	24 hour	39.4[c]	105	37%
	Annual	10.7[c]	80	13%

Note: a) Coachella Valley 1: Palms Spring Fire Station Ambient Air Quality Monitoring Station
b) Coachella Valley 2: Indio-Jackson Street Ambient Air Quality Monitoring Station
c) Riverside-Rubidoux Ambient Air Quality Monitoring Station
1) This data may be excluded by EPA and ARB in accordance with EPA's National Event Policy. In that case, staff recommends using a value of 122 ug/m^3, the next highest value.
2) Federal annual mean, there is insufficient data for the state annual mean.

Source: CARB 2007a

PROJECT DESCRIPTION AND PROPOSED EMISSIONS

The proposed CPV Sentinel project's major air emissions sources are:

- Eight General Electric (GE) LMS100 combustion turbine generators (CTG)
- Oxidation catalyst and selective catalytic reduction (SCR) equipment
- A five cell mechanical draft cooling tower
- A three cell mechanical draft cooling tower
- A 240 brake horsepower (bhp) diesel emergency fire pump engine
- A 2,206 bhp black start diesel engine
- Linear Construction Elements
  - o 2.6 mile long natural gas pipeline
  - o 2,300 foot long transmission line
  - o 3,200 foot long road extension
  - o 3,200 foot long potable water supply pipeline

The potential emissions from the facility are classified in three categories: construction, initial commissioning, and operation.

Construction Emissions

Facility construction is expected to take about 18 months. The power plant project construction consists of three major areas of activity: 1) the civil/structural construction

2) the mechanical construction, and 3) the electrical construction. The projected maximum daily and annual emissions, based on the highest monthly emissions over the entire construction period, are shown in AIR QUALITY Table 6.

AIR QUALITY Table 6
Estimated Maximum Construction Emissions

	NOx	SO_2	CO	VOC	PM10	PM2.5
Maximum Daily Emissions (lb/day)	110.4	0.1	63.6	18.6	13.6	7.6
Maximum Annual Emissions (tons/year)	14.7	0.02	8.6	2.6	2.4	1.2

Source: CPV 2007a

The largest percentage of these construction emissions will likely be emitted during the first phase of project site activity, mostly due to earth moving, grading activities, large equipment operations, underground utility installation, and as building erection occurs. These types of activities require the use of large earth moving equipment, which generate considerable direct combustion emissions, along with fugitive dust emissions. The mechanical construction phase includes the installation of the heavy equipment such as the gas turbines, compressors, pumps, and associated piping. Although not a large fugitive dust generation activity, the use of large cranes to install such equipment generates significantly more direct combustion emissions than other construction equipment. Lastly, the electrical construction phase involves installation of transformers, switching gear, instrumentation, and all wiring; and is a relatively small source of emissions in comparison to the earlier construction activities.

Initial Commissioning Emissions

New power generation facilities must go through an initial firing and commissioning phase before being deemed commercially available to generate power. During this period, emissions may exceed permitted levels due to numerous startups and shutdowns, periods of low load operation, and other testing required before emission control systems are fine-tuned for optimum performance.

The applicant anticipates six distinct commissioning phases (CPV 2007a), with a total of approximately 200 hours of operation per turbine without full emissions controls, and a further 300 hours per turbine of commissioning tuning under full emissions control. AIR QUALITY Table 7 presents the predicted maximum short term emissions of NOx, CO, and VOC. PM10 and SO_2 emissions are not included here since they are proportional to fuel use, and fuel use (and thus PM10 and SO_2 emissions) during commissioning is equal to or lower than during full load operations.

AIR QUALITY Table 7
Estimated Maximum Initial Commissioning Emissions

	NOx	CO	VOC
Maximum Hourly Emissions (lb/hour)	168	305	15

Source: CPV 2007a

Operation Emission Controls

NOx Controls

Each combustion turbine generator (CTG) exhaust will be treated by an ammonia injected selective catalytic reactor (SCR) system before release to the atmosphere. SCR refers to a process that chemically reduces NOx to elemental nitrogen and water vapor by injecting ammonia into the flue gas stream in the presence of a catalyst and excess oxygen. The process is termed selective because the ammonia preferentially reacts with NOx rather than oxygen. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or noble metals are also used. Regardless of the type of catalyst used, efficient conversion of NOx to nitrogen and water vapor requires uniform mixing of ammonia into the exhaust gas stream and a catalyst surface large enough to ensure sufficient time for the reaction to take place.

VOC and CO Controls

VOC and CO will be controlled at the CTG combustor and by an oxidation catalyst. An oxidation catalyst system chemically reacts organic compounds and CO with excess oxygen to form nontoxic carbon dioxide and water. Unlike the SCR system for reducing NOx, an oxidation catalyst does not require any additional chemicals.

PM10 and SO_2 Controls

The exclusive use of natural gas, an inherently clean fuel that contains very little noncombustible solid residue, will limit the formation of SO_2 and PM10. Natural gas does contain small amounts of a sulfur-based scenting compound known as mercaptan which results in sulfur dioxide emissions when combusted. However, in comparison to other fuels used in modern thermal power plants, such as fuel oil or coal, the amount of sulfur dioxide produced from the combustion of natural gas is very low. Like SO_2, the emission level of PM10 from natural gas combustion is also very low compared to the combustion of fuel oil or coal. It is assumed in these calculations that the natural gas has a maximum short term sulfur content of 0.75 gr/100scf (grains per 100 cubic feet at standard temperature and pressure), based on Southern California Gas Company rules for pipeline quality natural gas, and an annual average sulfur content of 0.25 gr/100scf, based on a monthly gas sampling requirement at the CPV Sentinel project.

The majority of the emissions from cooling towers are pure water vapor; however, a small amount of liquid water can escape and is known as "drift". Cooling tower drift consists of a mist of very small water droplets, which can generate particulate matter that originates from the dissolved solids in the circulating water once the water evaporates. To limit these particulate emissions, cooling towers use drift eliminators to capture these water droplets, and cooling tower operators are required to monitor the total dissolved solids (TDS) in the cooling tower recirculation water to ensure that it does not exceed a SCAQMD specified value. The applicant intends to use drift eliminators on the cooling towers designed to limit drift to 0.0005 percent of the circulating water volume per unit time.

Proposed Operation Emissions

Per the applicant's request, all emissions calculations and limitations are based on an assumed availability of 3,200 hours per year, plus 350 startups and shutdowns for 3 CTG Units and 2,628 hours per year, plus 300 startups and 300 shutdowns for 5 CTG Units (CPV 2007a). The CTGs will burn only pipeline natural gas; there are no provisions for an alternative or back-up fuel.

The proposed maximum criteria air pollutant emissions are based entirely on vendor data for the GE LMS100 turbine and the data presented in the SCAQMD Preliminary Determination of Compliance (SCAQMD 2007a). AIR QUALITY Table 8 lists the maximum 1-hour emissions from each piece of equipment on the proposed project site.

AIR QUALITY Table 8
Equipment Maximum Short-Term Emissions Rates
(pounds per hour [lb/hr], except as noted)

Process Description	NOx	SO_2	CO	VOC	PM10
CTG Startup (25 minute startup, **lb/1-hr event**)	24.9	0.17	15.89	4.30	2.50
CTG Full Load	7.92	0.61	11.58	2.21	6.00
CTG Shutdown (10 minute shutdown, **lb/1-hr event**)	6.0	0.02	35.0	3.0	1.03
Fire Pump Engine	2.537	0.0022	0.312	0.053	0.074
Black Start Engine	18.173	0.0238	3.839	1.069	0.029
Cooling Towers (all 8 cells)	0	0	0	0	0.79

Source: CPV 2007a, FDOC Reference

Based on these emissions rates, the maximum possible 1-hour emissions from the entire facility are shown in AIR QUALITY Table 9. The estimated emissions for the CTGs depend on the operational assumptions. For example, the NOx and VOC emissions from the CTGs are a maximum when all eight CTGs startup and operate at full load. Contrast that with the maximum for CO emissions from the CTGs, which occurs when all eight CTGs are operating at full load and then shutdown. Finally, the PM10 and SOx emissions from the CTGs are at a maximum when the CTGs are at full load.

AIR QUALITY Table 9
Facility Maximum 1-hour Emissions
(pounds per hour [lb/hr])

Process Description	NOx	SO_2	CO	VOC	PM10
8 CTGs	236.2[a]	4.9[c]	356.7[b]	44.72[a]	48[c]
Fire Pump Engine[d]	2.537	0.0022	0.312	0.053	0.074
Black Start Engine[d]	18.173	0.0238	3.839	1.069	0.029
Cooling Towers (all 8 cells)	--	--	--	--	0.784
Total Maximum 1-hour Emissions	256.91	4.9	360.9	45.8	48.9

[a] Assumes all 8 CTGs startup and operate for the balance of 1 hour.
[b] Assumes all 8 CTGs operate at full load and shutdown for the balance of 1 hour.
[c] Assumes all 8 CTGs operate at full load for the duration of 1 hour.
[d] The Fire Water Pump and Black Start Engine are assumed to test for the entire hour.

Source: CPV 2007a

In general, higher emissions of NOx, VOC and CO will occur during the startup and shutdown of a large CTG than during operation because the turbine combustors are designed for maximum efficiency during full load, steady state operation. During startup, combustion temperatures and pressures change rapidly, resulting in less efficient combustion and higher emissions. Also, flue gas emission controls (the catalysts discussed above), operate most efficiently when a turbine operates at or near full load temperatures.

The maximum daily emission rates for NOx, CO, and VOC were conservatively estimated for each power train based on 22 hours and 49 minutes of operation, two 25 minute startups, and two 10.3 minute shutdowns per turbine. The maximum daily emission rates for PM10 and SO_2 were based instead on 24 hours of full load operation, since PM10 and SO_2 emissions are proportional to fuel use. The total project maximum daily emissions are then conservatively estimated as the sum of the emissions from all eight power trains, the cooling tower, and a single hour of black start engine and emergency fire pump operation for required testing purposes. These estimates are presented in AIR QUALITY Table 10 below.

AIR QUALITY Table 10
Project Maximum Daily Emissions
(pounds per day [lb/day])

Process Description	NOx	SO_2	CO	VOC	PM10
8 CTGs	1,941.30[a]	118.08[b]	2,928.71[a]	520.46[a]	1,152[b]
Fire Pump Engine [c]	2.537	0.0022	0.312	0.053	0.074
Black Start Engine [c]	18.173	0.0238	3.839	1.069	0.029
Cooling Towers [d]	--	--	--	--	18.82
Total Maximum Daily Emissions	1,962.01	118.11	2,932.86	521.59	1,170.99

[a] Assumes each of 8 CTGs has 2 startups, 2 shutdowns and full load operation for the duration of 24 hours.
[b] Assumes all 8 CTGs operate at full load for 24 hours.
[c] Assumes the Fire Water Pump and Black Start Engine are tested for one hours each.
[d] Assumes all 8 cells of the cooling towers operate at full load for 24 hours.

Source: CPV 2007a

The expected maximum annual emissions for the total facility are summarized in AIR QUALITY Table 11. The calculations assume 3,200 hours per year, plus 350 startups and shutdowns for 3 CTG Units and 2,628 hours per year, plus 300 startups and 300 shutdowns for 5 CTG Units. The facility annual emissions further assume 3,200 hours of 3-cell cooling tower operation and 2,628 hours per year of the 5-cell cooling tower. The emergency fire pump testing is expected to occur for one hour each week and the diesel generator testing is expected to occur one hour each month. In addition, the calculations for annual SO_2 emissions assume annual average fuel sulfur content of 0.25 gr/100 scf.

AIR QUALITY Table 11
Project Maximum Annual Emissions
(pounds per year [lb/yr] and tons per year [tpy])

Process Description	**NOx**	**SO_2**	**CO**	**VOC**	**PM10**
8 CTG (tpy)[a]	143.76	8.35	217.40	38.42	83.52
Firewater Pump (lb/yr)[b]	131.92	0.114	16.22	2.76	3.84
Black Start Engine (lb/yr)[c]	218.08	0.28	46.07	12.83	0.348
Cooling Towers (lb/yr)[d]	--	--	--	--	2,237
Total Maximum Annual Emissions (tpy)	143.94	8.35	217.43	38.43	84.64

[a] Assumes CTG Units 1-5: 2,628 hours of full load operation, 300 startups and 300 shutdowns.
CTG Units 5-8: 3,200 hours of full load operation, 350 startups and 350 shutdowns.
[b] Assumes the Fire Water Pump has 52 1-hour tests.
[c] Assumes the Black Start Engine has 12 1-hour tests.
[d] Assumes the 5 cell cooling tower operates at full load for 2,628 hours per year and the 3 cell cooling tower operates at full load for 3,200 hours per year.

Source: CPV 2007a

Ammonia Emissions

To control NOx emissions from the combustion turbines, ammonia is injected into the flue gas stream as part of the SCR system. In the presence of the catalyst, the ammonia and NOx react to form harmless elemental nitrogen and water vapor. However, not all of the ammonia reacts with the flue gases to reduce NOx; a portion of the ammonia passes through the SCR and is emitted unaltered from the stacks. These ammonia emissions are known as ammonia slip. It should be noted that a maximum permitted ammonia slip rate only occurs after significant degradation of the SCR catalyst, usually five years or more after commencing operations. At that point, the SCR catalysts are removed and replaced with new catalysts. During the majority of the operational life of the SCR system, actual ammonia slip will be at 10 to 50 percent of the permitted limit. The applicant proposes an ammonia emission limit of five ppm at 15 percent oxygen averaged over one hour.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses potential impacts from the construction and operation of the proposed project, and also analyzes the cumulative effects of this project with past, present, and reasonably foreseeable projects that are sources of similar emissions. Construction impacts result from the emissions occurring during the construction of the project. The operation impacts result from the emissions over the proposed lifetime of the project. The cumulative impacts analysis includes projections regarding the conditions contributing to cumulative impacts as reflected in the district's adopted attainment plan, a summary of expected environmental impacts from related projects in the region, and an analysis of those impacts from a cumulative standpoint.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff has used two main significance criteria in evaluating this project. First, all project emissions of nonattainment criteria pollutants and their precursors (NOx, VOC, CO, PM10, PM2.5, and SO_2) are considered significant and must be mitigated. Second, any

AAQS violation or any contribution to any AAQS violation caused by any project emissions are considered significant and must be mitigated. For construction emissions, the mitigation is limited to controlling construction equipment tailpipe emissions and fugitive dust emissions to the maximum extent feasible. For operating emissions, the mitigation includes both the best available control technology (BACT) and the use of emission reduction credits (ERC) or other valid emission reductions to offset emissions of nonattainment criteria pollutants and their precursors.

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

DIRECT/INDIRECT IMPACTS AND MITIGATION

While the emissions are the actual mass of pollutants emitted from the project, the impacts are the concentration of pollutants from the project that reach ground level. When emissions are expelled at a high temperature and velocity through the relatively tall stack, the pollutants will be significantly diluted by the time they reach ground level. The emissions from the proposed project are analyzed through the use of air dispersion models to determine the probable impacts at ground level.

Air dispersion models provide a means of predicting the location and ground level magnitude of the impacts of a new emissions source. These models consist of a complex series of mathematical equations, which are repeatedly evaluated by a computer for many different sets of ambient conditions and input parameters. The model results are often described as a maximum theoretical concentration of pollutant in the air to which people could be exposed, or units of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$).

In general, the input parameters for the modeling include stack information (exhaust flow rate, temperature, and stack dimensions), specific turbine emission data, and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For this project, the meteorological data used as inputs to the model included hourly wind speeds and directions measured at the Wintec Wind Energy facility, and background criteria pollutant measurements from a number of SCAQMD maintained ambient monitoring stations in the vicinity of the project site (CPV 2007a).

The applicant used the U.S. EPA approved American Meteorological Society/Environment Protection Agency Regulatory Model Improvement Committee Model (AERMOD), as both a screening and refined model to estimate the direct impacts of the project's NOx, PM10, CO, and SO_2 emissions resulting from project construction and operation. A description of the modeling analysis and its results are provided in the Application for Certification (AFC) (CPV 2007a). AERMOD is a generally accepted model for this type of project, and the meteorological input data is sufficient. Staff added the applicant's modeled impacts to the available highest ambient background concentrations recorded during the previous three years from nearby monitoring stations. The results were then compared 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 contribute to an existing violation.

Construction Impacts and Mitigation

Construction Impact Analysis

The construction air quality impact analyses prepared by the applicant considered both fugitive dust generated from the construction activity and combustion emissions produced by construction equipment. As a conservative assumption, this includes the following major sources (CPV 2007a):

- Dust entrained during site preparation and finish grading;
- Dust entrained during onsite travel on paved and unpaved surfaces;
- Dust entrained during aggregate and soil loading and unloading operations;
- Dust caused by wind erosion of areas disturbed during construction;
- Exhaust from diesel construction equipment used for site preparation, grading, excavation, and construction;
- Exhaust from water trucks used for onsite paved and unpaved road fugitive dust control;
- Exhaust from diesel powered welding machines, electric generator, air compressors, and water pumps;
- Exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction site;
- Exhaust from diesel trucks used to deliver concrete, fuel, and construction supplies to the site; and
- Exhaust from automobiles used by workers to commute to the construction site.

The maximum 24-hour impacts were assessed using the emission rates for the month of maximum activity and annual impacts were assessed using the average emissions for the entire construction period. The results of this modeling effort (shown in AIR QUALITY Table 12 below) were added to the assumed maximum background values, and compared to the most restrictive AAQS.

AIR QUALITY Table 12
Maximum Construction Impacts (µg/m³)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	1 hour	145.5	174.8	320.3	338	95%
	Annual	7.69	24.5	32.19	56	57%
CO	1 hour	95.3	2,645	2,740.3	23,000	12%
	8 hour	23.1	944.4	967.5	10,000	10%
PM10	24 hour	3.41	211	214.41	50	**429%**
	Annual	1.03	54.9	55.93	20	**280%**
PM2.5	24 hour	1.17	44.4	45.57	35	**130%**
	Annual	0.56	10.8	11.36	12	95%
SO_2	1 hour	0.21	62.9	63.11	655	10%
	24 hour	0.02	39.4	39.42	105	38%
	Annual	0.01	10.7	10.71	80	13%
Includes emissions due to site grading, laydown, building, and pipeline excavation activities.						

Source: CPV 2007a

As AIR QUALITY Table 12 shows, the project's construction emissions will not cause a new violation of the NO_2, CO and SO_2 ambient air quality standards, and thus staff does not find these impacts to be significant. Staff believes that the particulate emissions from the construction of the project create a potentially significant impact because they will contribute to existing violations of the annual and 24-hour average PM10 and the 24-hour federal PM2.5 AAQS. Those emissions can and should be mitigated to a level of insignificance.

Construction Mitigation

Applicant's Proposed Mitigation

The applicant proposes a number of mitigation and emissions control measures for use during the construction of the project. The applicant specifically proposes the following measures to control exhaust emissions from heavy diesel construction equipment (CPV 2007a):

- Operational measures, such as limiting time spent with the engine idling by shutting down equipment when not in use;
- Regular preventive maintenance to prevent emission increases due to engine problems;
- Use of low sulfur and low aromatic fuel meeting California standards for motor vehicle diesel fuel; and
- Use of low-emitting gas and diesel engines meeting state and federal emissions standards (Tier I and II) for construction equipment, including, but not limited to catalytic converter systems and particulate filter systems.

The applicant further proposes the following measures to control fugitive dust emissions during construction of the project:

- Use either water application or chemical dust suppressant application to control dust emissions from on-site unpaved road travel and unpaved parking areas;
- Use vacuum sweeping and/or water flushing of paved road surface to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard;
- Limit traffic speeds on unpaved site areas to 5 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to roadways;
- Replant vegetation in disturbed areas as quickly as possible;
- Use wheel washers or wash tires of all trucks exiting the construction site; and
- Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water or chemical dust suppressant.

Staff Proposed Mitigation

Staff agrees with the applicant’s proposed mitigation measures. However, because of the predicted significant contribution to both the short- and long-term PM10 and PM2.5 problems, staff believes some additional construction mitigation measures are necessary. These additional measures are detailed below.

Staff has determined that the use of oxidizing soot filters is a viable emissions control technology for all heavy diesel powered construction equipment that does not use an ARB certified low emission diesel engine and ultra-low sulfur content diesel fuel. In addition, staff proposes that prior to the commencement of construction, the applicant provide an Air Quality Construction Mitigation Plan (AQCMP) that specifically identifies the mitigation measures that the applicant will employ to limit air quality impacts during construction. Staff includes proposed staff Conditions of Certification **AQ-SC1** through **AQ-SC5** below to implement these requirements. These conditions are consistent with both the applicant’s proposed mitigation above, and conditions of certification adopted in previous licensing cases similar to the CPV Sentinel project. With the compliance of these conditions, it is staff’s opinion that the potential for significant air quality impact from the construction of the project is very low. Staff recommends that the implementation of all construction mitigation measures be managed by a single person of responsibility as required in AQ-SC1 to ensure adequate implementation of all mitigation measures.

Operation Impacts and Mitigation

While the construction and commissioning impacts are both relatively short lived, the operation impacts from the project will continue throughout the life of the facility. The operation impacts are thus subject to a more refined level of analysis. The following sections discuss the air quality impacts of project operation during normal full load conditions, including startup and shutdown events, the commissioning phase operations, and fumigation meteorological conditions.

Operation and Startup Impact Analysis

The applicant provided a refined modeling analysis (CPV 2007a), using the AERMOD model to quantify the potential impacts of the project during both full load operation and startup conditions. The worst case (maximum) results of this modeling analysis are shown in AIR QUALITY Table 13.

AIR QUALITY Table 13
Refined Modeling Maximum Impacts (µg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	1 hour	161.3[a]	174.8	336.1	338	99%
	Annual	0.75[c]	24.5	25.25	56	45%
CO	1 hour	169.2[a]	2,645	2,814.2	23,000	12%
	8 hour	47.2[a]	944.4	991.6	10,000	10%
PM10	24 hour	16.7[b]	211	227.7	50	**455%**
	Annual	0.63[c]	54.9	55.53	20	**278%**
PM2.5	24 hour	16.7[b]	44.4	61.1	35	**174%**
	Annual	0.63[c]	10.8	11.43	12	95%
SO_2	1 hour	44.3[b]	62.9	107.2	655	16%
	24 hour	1.06[b]	39.4	40.46	105	39%
	Annual	0.04[c]	10.7	10.74	80	13%

[a] modeled 1-hour average impacts during startup event
[b] modeled 1-hour average impacts during full load operation
[c] Modeled annual operational assumptions for all emitting devices (see AIR QUALITY Table 11).

Source: CPV 2007a

Startup impacts (NOx and CO) are much larger than full load impacts not only because the emissions are greater, but also because the flue gas stream is at a lower velocity and temperature. This reduced emissions velocity means the pollutants will settle faster and thus have less time to dilute before reaching the ground. Note that the values presented are very conservative, based on worst case startup emission estimates from the turbine manufacturer. Typical startup events are likely to generate significantly fewer emissions and impacts. This analysis is additionally conservative in regards to the assumed background measurements. The assumption is that the highest background measurements, from the last four years, coincide (in both location and timing) with the maximum project emission impacts. Because such a high background level is unlikely to occur at the same time and location as the maximum impacts from the project, these modeled conditions are considered worst case, conservative, and not likely to occur.

AIR QUALITY Table 13 shows that during worst case startup and full load operations, the facility will potentially contribute to the existing PM10 violations. These violations could exceeding 400 percent of the ambient air quality standard. The air dispersion modeling predicted the location of the highest PM10/PM2.5 ambient air quality impacts

520 meters (or just over ½ a mile) to the south of the project site. Staff uses the federal and state ambient air quality standards, which are health based standards, as the indication of a possible ambient air quality impacts. Since the project PM10/PM2.5 emission impacts will contribute to an existing exceedance of the PM10 and PM2.5 state and federal ambient air quality standards, staff presumes that these impacts may thus also contribute to existing human health impacts (generally in the form of respiratory impacts). Thus, staff considers the project PM10/PM2.5 emission impacts to be significant if left unmitigated.

Since the project's impacts alone do not cause a violation of any NO_2 , CO, or SO_2 ambient air quality standards under such conservative assumptions, staff concluded that the project impacts for those pollutants are insignificant. Although the direct NO_2 impacts from the CPV Sentinel project do not cause a violation of the NO_2 ambient air quality standard, all NO_2 emissions from the facility will need to be regionally mitigated with RECLAIM Trading Credits (RTCs) to maintain district wide progress toward attainment with the ozone ambient air quality standards because NO_2 is a precursor emission to ozone formation (see Conditions of Certification **AQ-2** and **AQ-16**). Similarly, the direct SO_2 impacts from the CPV Sentinel project, which do not cause a violation of the SO_2 ambient air quality standards, will also need to be regionally mitigated with ERCs or PRCs to maintain district wide progress toward attainment with the PM10 ambient air quality standards because SO_2 is a precursor pollutant to secondary PM10/PM2.5 formation. Please see the "Operations Mitigation" section below for a detailed discussion of the proposed mitigation.

Fumigation Modeling Impact Analysis

Surface air is usually stable during the early morning hours before sunrise. During such meteorological conditions, emissions from elevated stacks rise through this stable layer and are dispersed and diluted. When the sun first rises, the air at ground level is heated, resulting in turbulent vertical mixing (both rising and sinking) of air within a few hundred feet of the ground. Emissions from a stack that enter this turbulent layer of air will also be vertically mixed, bringing some of those emissions down to ground level before significant dispersion occurs and possibly causing abnormally high short term impacts. As the sun continues to heat the ground, this vertical mixing layer becomes thicker over time, and the emissions plume becomes better dispersed. The early morning air pollution event, called fumigation, usually lasts approximately 30 to 60 minutes.

The applicant used the U.S. EPA approved SCREEN3 model (version 96043) for the calculation of fumigation impacts, without a shoreline assumption, since the proposed facility is a significant distance from the nearest shoreline. AIR QUALITY Table 14 shows the highest modeled fumigation impacts in comparison with the one-hour NO_2, SO_2 and CO standards. Since fumigation impacts will not typically occur for more than a one-hour period, only the impacts on the one-hour standards are shown. The results of the modeling analysis show that fumigation impacts will not violate any of the one-hour standards. Therefore, staff finds the potential ambient air quality impacts from fumigation to be less than significant.

AIR QUALITY Table 14
CTG Fumigation Modeling Maximum 1 hour Impacts (µg/m^3)

Pollutant	Modeled Impact from 1 Unit	Modeled Impact from 8 Units	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	0.7955	6.364	174.8	181.16	338	54%
CO	1.16	9.291	2645	2654.3	23,000	12%
SO_2	0.061	0.49	62.9	63.39	655	10%

Commissioning Modeling Impact Analysis

The initial commissioning of a power plant refers to the time frame between completion of construction and the consistent production of electricity for sale on the market. Normal operating emission limits usually do not apply during initial commissioning procedures. The CPV Sentinel project will go through several tests during initial commissioning. During the first set of tests, post-combustion controls will not be operational (i.e., the SCR and oxidation catalyst).

These tests start with a Full-Speed, No-Load test. This test runs the turbine at approximately 20 percent of its maximum heat input rate. Components tested include the ignition system, synchronization with the electric generator and the turbine-overspeed safety system. Part Load testing runs the turbines to approximately 60 percent of the maximum heat input rating. During this test, the turbine will be tuned. Full Load testing runs the turbines to their maximum heat input rate. This testing entails further tuning of the turbine. Full Load with partial SCR testing runs the turbines at 100 percent of their maximum heat input rate and operates the SCR ammonia injection grid for the first time at less than maximum injection rate. Finally, Full Load with full SCR testing runs the turbines at their maximum heat input rate and operates the SCR ammonia inject grid at its full capacity. It is during this test that the SCR system will be completely tuned and operating at design levels (i.e., NOx control at 2.0 ppm).

There is little experience to draw from regarding the initial commissioning of the GE LMS100 turbines. The applicant is estimating that it will need approximately 394 hours of actual turbine operation per turbine train for commissioning purposes. The applicant plans on commissioning all five turbine trains at approximately the same time. The applicant estimates that the maximum NOx emission rate (175 lbs/hr for one turbine) is most likely to occur during the water injection commissioning phase when the water injection will be 50 percent effective and the turbine train will be at 50 percent load. The maximum CO emission rate (255 lbs/hr) will most likely occur when the water injection is 100 percent effective and the turbine train is at 100 percent load (SCR and oxidation catalyst are not yet commissioned).

The applicant used the U.S. EPA approved AERMOD model for the calculation of commissioning impacts. AIR QUALITY Table 15 shows the highest modeled impacts in comparison with the one-hour NO_2 and CO standards and the 8-hour CO standard. The modeling reflects the NOx and CO emission rates presented and shows that there is no reasonable expectation that the emissions from initial commissioning will cause or contribute to an exceedance of the limiting ambient air quality standards.

AIR QUALITY Table 15
CTG Commissioning Modeling
Maximum 1 hour Impacts (µg/m^3)

Pollutant	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	109.8	174.8	284.6	338	84%
CO 1-HOUR	205.5	2645	2851	23,000	12%
CO 8-HOUR	166.0	944.4	1110.4	10,000	11%

Source: CPV 2007a

Secondary Pollutant Impacts

The project's gaseous emissions of NOx, SO_2, VOC and ammonia can contribute to the formation of secondary pollutants: ozone and PM10/PM2.5. There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are input into the model to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NOx and VOC emissions to ozone formation, the emissions of NOx and VOC from the CPV Sentinel project do have the potential (if left unmitigated) to contribute to higher ozone levels in the region. These impacts would be significant because they would contribute to ongoing violations of the state and federal ozone ambient air quality standards.

Secondary PM10 formation, which is assumed to be 100 percent PM2.5, is the process of conversion from gaseous reactants to particulate products. The process of gas-to-particulate conversion, which occurs downwind from the point of emission, is complex and depends on many factors, including local humidity and the presence of air pollutants. The basic process assumes that the SOx and NOx emissions are converted into sulfuric acid and nitric acid first, and then react with ambient ammonia to form sulfate and nitrate. The sulfuric acid reacts with ammonia much faster than nitric acid and converts completely to particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase will tend to fall out, however the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air. There are two conditions that are of interest described as "ammonia rich" and "ammonia poor." In the case of "ammonia rich," there is more than enough ammonia to react with all the sulfuric acid and to establish a balance of nitric acid-ammonium nitrate. Further ammonia emissions in this case will not necessarily lead to increases in ambient PM2.5 concentrations. In the case of an "ammonia poor" environment, there is insufficient ammonia to establish a balance and thus additional ammonia will tend to increase PM2.5 concentrations.

An extensive study of the area near Rubidoux in Riverside County and other studies of ambient air quality in the South Coast Basin indicates that the entire Basin is likely to be ammonia rich. The ammonia sources are primarily driven by ammonia emissions from livestock, soil (natural emissions and agricultural additives), motor vehicles and domestic emissions. These sources exist at various intensities across the basin giving rise to the transportation of ammonia (as ammonium, NH_4, which is more stable than ammonia, NH_3) throughout the basin. Since the ambient air concentrations is likely ammonia rich, further ammonia emissions from the CPV Sentinel project might not lead to further formation of ammonium nitrate or sulfate. While there may be some conversion from the ammonia emitted from the project, the conversion rate might also well be zero. Furthermore, there is currently no regulatory model that can predict the conversion rate. Therefore, staff is not able to reasonably estimate what impacts, if any, there will be from the project ammonia emission.

Additionally, the actual ammonia emissions from the CPV Sentinel project will be approximately 10 to 50 percent of the ammonia limit being imposed (5 ppm at 15 percent O_2 averaged over one hour). The point at which the project begins to emit at greater than 50 percent of the limit is typically the indicator to the operator that the SCR requires a major overhaul. Once this major overhaul is completed the SCR performance is typically returned to near new levels (approximately 1 ppm or better). It is in the best interest of the project owner to perform these overhauls as required so that the cost of ammonia stays low for the project. Thus for the vast majority of the project life, the ammonia emission will be below 2 ppm. An emission of any type of pollutant at this level has a very low potential to cause a significant impact.

Staff finds that it is not reasonably possible to estimate the impacts from the CPV Sentinel project emissions of ammonia, but that these emissions are small and well controlled so that it is reasonable to assume that they are not likely to cause or contribute to an exceedance of the PM10 or PM2.5 ambient air quality standards or that at least it is reasonably speculative. Thus, staff concludes that the CPV Sentinel project ammonia emissions do not have the potential to cause a significant impact on the ambient air quality.

The emissions of NOx and SOx from the CPV Sentinel project do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region. These impacts would be significant because they would contribute to ongoing violations of the state and federal PM2.5 ambient air quality standards. The mitigation of the project NOx and SOx emissions is discussed in the Operations Mitigation section below.

Visibility Impacts

A visibility analysis of a project's gaseous emissions is required under the Federal Prevention of Significant Deterioration (PSD) permitting program, if the project triggers the PSD thresholds and under District Rule 1303, if the specific wilderness areas are within a prescribed distance from the facility. The analysis provided by the applicant showed that at the nearest Class 1 areas are San Jacinto Wilderness Area, Joshua Tree National Park and San Gorgonio Wilderness Area. The predicted contrast values for these three Class 1 areas are below the significance criterion for actual plume backgrounds and the project is thus considered to not have a significant impact on visibility for these areas.

Operations Mitigation

Applicant's Proposed Mitigation

The CPV Sentinel project's air pollutant emissions impacts will be reduced by using emission control equipment on the project and by providing emission offsets. To reduce NOx emissions, the applicant proposes to use water injection into the combustors in the CTGs and an SCR system with an ammonia injection grid.

Cooling Towers

To reduce the PM10 emissions from the cooling towers, the applicant has committed to using wet, mechanical draft cooling towers with a drift eliminator rated at 0.0005 percent. The SCAQMD rules and regulations do not cover cooling towers in their permits to construct or operate. Thus staff proposes that the cooling tower compliance be monitored through Conditions of Certification **AQ-SC11** and **AQ-SC12**.

Combustion Turbine

To reduce CO emissions, the applicant proposes to use a combination of good combustion and maintenance practices, along with an oxidizing catalyst. The use of a clean-burning fuel (natural gas) and the efficient combustion process of the CTGs will limit VOC and PM10 emissions. The use of natural gas as the only fuel will limit SO_2 emissions.

Water Injection

Over the last 20 years, combustion turbine manufacturers have focused their attention on limiting the NOx formed during combustion. One method has been steam or water injected into the combustor cans to reduce combustion temperatures and the formation of thermal NOx, which is the primary source of NOx emissions from a CTG. This method has been employed for many years and is well understood and has been proposed for the GE LMS100 turbines for this project.

Flue Gas Controls

To further reduce the emissions from the combustion turbines before they are exhausted into the atmosphere, flue gas controls, primarily catalyst systems, will be installed for the GE LMS100s. The applicant is proposing two catalyst systems, an SCR system to reduce NOx, and an oxidizing system to reduce CO and VOC.

Selective Catalytic Reduction (SCR)

SCR refers to a process that chemically reduces NOx by injecting ammonia into the flue gas stream over a catalyst in the presence of oxygen.

The process is termed selective because the ammonia reducing agent preferentially reacts with NOx rather than oxygen, producing inert nitrogen and water vapor. The performance and effectiveness of SCR systems are related to operating temperatures, which may vary with catalyst designs. Flue gas temperatures from a combustion turbine typically range from 950^o to 1,100 ^{o}F.

Catalysts generally operate between 600 degrees to 750 degrees F (CARB 1992), and are normally placed inside the exhaust where the flue gas temperature has cooled. At temperatures lower than 600 degrees F, the ammonia reaction rate may start to decline, resulting in increasing ammonia emissions, called “ammonia slip.” At temperatures above about 800 degrees F, depending on the type of material used in the catalyst, damage to some catalysts can occur. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or a noble metal are also used. These newer catalysts (versus the older alumina-based catalysts) are resistant to fuel sulfur fouling at temperatures below 770 degrees F (EPRI 1990).

Regardless of the type of catalyst used, efficient conversion of NOx to nitrogen and water vapor requires uniform mixing of ammonia into the exhaust gas stream. Also, the catalyst surface has to be large enough to ensure sufficient time for the reaction to take place.

Oxidizing Catalyst

To reduce the turbine CO and VOC emissions, the applicant proposes to install an oxidizing catalyst, which is similar in concept to catalytic converters used in automobiles. The catalyst is usually coated with a noble metal, such as platinum, which will oxidize unburned hydrocarbons and CO to water vapor and carbon dioxide (CO_2). The catalyst is proposed to limit the CO concentrations exiting the exhaust stack to six ppm, corrected to 15 percent excess oxygen and averaged over three-hours.

Emission Offsets

The applicant has not secured sufficient offsets to satisfy either SCAQMD Rule 1303 (which requires Emission Reduction Credits (ERCs)) or Regulation XX (which requires participation in the RECLAIM program) or to mitigate the project impacts under CEQA. Staff understands that the applicant has secured 412 lbs/day of VOC ERCs and unaware of any other ERCs that the applicant has secured. Staff provides AIR QUALITY Table 16 to summarize the current intentions of the applicant to offset or otherwise mitigate the CPV Sentinel project emission impacts.

The Regional Clean Air Incentives Market (RECLAIM) is designed to allow facilities flexibility in achieving emission reduction requirements for NOx and SOx through controls, equipment modifications, reformulated products, operational changes, shutdowns, other reasonable mitigation measures or the purchase of excess emission reductions. The RECLAIM program establishes an initial allocation (beginning in 1994) and an ending allocation (to be attained by the year 2003) for each facility within the program (Rule 2002). Each facility then reduces their allocation annually on a straight line from the initial to the ending allocation. The RECLAIM program supersedes other specified district rules, where there are conflicts. As a result, the RECLAIM program has its own rules for permitting, reporting, monitoring (including continuous emission monitoring (CEM)), record keeping, variances, breakdowns and the New Source Review program, which incorporates BACT requirements (Rules 2004, 2005, 2006 and 2012). RECLAIM also has its own banking rule, RECLAIM Trading Credits (RTCs), which is established in Rule 2007. CPV Sentinel is exempt and excluded from the SOx

RECLAIM program (Rule 2011) because it uses natural gas exclusively (per Rule 2001). However, it will be a NOx RECLAIM project and therefore subject to the rules of RECLAIM for NOx emissions.

AIR QUALITY Table 16
Offsets and Mitigation Proposed by the Applicant

Pollutant	Amount of Offsets Required	Offset or other mitigation
NOx	304,685 lbs/year for the first year of operation 258,856 lbs/year thereafter.	The applicant intends to participate in the SCAQMD NOx RECLAIM program, but has not secured any Reclaim Trading Credits (RTCs).
SOx	103 lbs/day	The applicant intendss to purchase SOx ERCs or other offsets as allowed under District Rules and Regulations; they currently hold no SOx ERCs.
VOC	494 lbs/day	The applicant has purchased or otherwise holds secure 412 lbs/day of VOC ERCs. The applicant must secure an additional 82 lbs/day of VOC ERCs.
PM10	1051 lbs/day	The applicant intendss to purchase PM10 ERCs or other offsets as allowed under District Rules and Regulations; they currently hold no PM10 ERCs.
PM2.5	875 lbs/day	The applicant intends to rely on the PM10 offsets that they will acquire through the PM10 ERC bank or through the development of new PM10 credits.

Adequacy of Proposed Mitigation

Potential Mitigation for VOC, SOx, PM10 and PM2.5

The applicant has purchased 412 lbs/day of VOC emission reduction credits (certificate numbers AQ007877 and AQ007879). The applicant must secure an additional 82 lbs/day of VOC ERCs.

The applicant has not procured any SOx or PM10 ERCs. The applicant has stated that they intend to pursue alternative sources for PM10 ERC development as well as the purchase of standard PM10 ERCs. However, the applicant has offered no specificity of those pursuits. It is the applicant's general intention to use what PM10 offsets are eventually procured to mitigate the project's potential PM2.5 air quality impacts. Potential Mitigation for NOx.

For NOx, staff understands that the RTCs will be obtained after the Energy Commission permitting process is finalized (after the Commission Decision is issued). Consistent with previous Commission Decisions (Inland Empire Energy Center, 01-AFC-17), staff recommends that the first year of the RTCs be obtained prior to the commencement of construction (see Condition of Certification **AQ-SC7**). If that occurs, staff believes that the NOx emission impacts as a contributor to secondary pollutant formation (ozone and PM10/PM2.5) will be adequately mitigated through compliance with Condition of Certification **AQ-SC7**.

<u>Potential Mitigation for CO</u>

As discussed in the Operation and Impacts section, staff believes that the project's potential impacts on the CO ambient air quality standards are not significant. Thus, staff does not recommend any further CO mitigation measures.

Quantification of Mitigation

Staff uses the 30-day average daily emission value for characterizing the project emission profile in the SCAQMD for the purpose of quantifying offset requirements. The 30-day average is different from the estimated worst case daily emissions (AIR QUALITY Table 10). For the 30-day average, the District sums the facility emissions for the worst case month, then divides that sum by 30 (or 31 depending on the month) to obtain a 30-day average daily emissions (in units of lbs/day). This calculation methodology does result in a lower value than is presented in AIR QUALITY Table 10, but it is the method by which the District determines the required amount of offsets for each pollutant.

The ERCs (the offsets) are calculated by taking the total emissions for the year and dividing that number by 365 to create the lbs/day annual average. An annual average calculated in this method is always going to be lower than a 30-day average from the same emitting source. Any emitting source will always have a month where they operate more than any other month, but in an annual average this peak month is washed out over the year. Thus the lbs/day ERC calculation is more conservative than the lbs/day project emission calculation. Therefore, for projects located in the SCAQMD, staff uses the 30-day average lbs/day value to characterize the project emission profile when comparing it to the ERCs being offered.

The project emissions shown in AIR QUALITY Table 17 are calculated by the 30-day average lbs/day values shown (with the exception of NOx which is pounds per year).

AIR QUALITY Table 17
CEQA Mitigation
(30-day average lbs/day)

	NOx (lbs/year)	VOC	SOx	PM10
Total Project Emissions[3]	304,685[1] 258,856[2]	413	87	1,051
Emission Reduction Credits or RECLAIM Trading Credits	304,685[1] 258,856[2]	494	103	1,051
Total Credits	304,685[1] 258,856[2]	494	103	, 1,051

1 First year of operation includes commissioning emission estimates and operational assumptions made in AIR QUALITY Table 11.
2 Second year (and thereafter) of operation includes the assumptions made in AIR QUALITY Table 11.
3 Total project emissions include only the emissions from non-exempted equipment. In this case it includes only the operation of the eight combustion turbines.

Staff Proposed Mitigation

Staff recommends no further mitigation at this time, however that recommendation is predicated on the assumption that the applicant will provide adequate mitigation through the SCAQMD NSR regulations as they have stated is their intent.

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 primarily concerned with "criteria" air pollutants. Such pollutants have impacts that 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. 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.

Much of the preceding discussion is concerned with cumulative impacts. The "Existing Ambient Air Quality" section describes the air quality background in the South Coast Air Basin, including a discussion of historic ambient levels for each of the significant criteria pollutants. The “Construction Impacts and Mitigation” section discusses the project’s contribution to the local existing background caused by project construction. This following section includes four additional analyses:

- a summary of projections for criteria pollutants by the air district and the air district’s programmatic efforts to abate such pollution;
- an analysis of the project’s “localized cumulative impacts”; combining the project’s direct emissions with other local major emission sources; and
- a discussion of chemically reactive pollution impacts; ozone and PM2.5.
- a discussion of greenhouse gas reporting

Summary of Projections

The SCAQMD is the agency with principal responsibility for analyzing and addressing cumulative air quality impacts, including the impacts of ambient ozone and particulate matter. The SCAQMD has summarized the cumulative impact of ozone and particulate matter on the air basin from the broad variety of its sources. Analyses of these cumulative impacts, as well as the measures the SCAQMD proposes to reduce impacts to air quality and public health, are summarized in four publicly available documents that the SCAQMD has adopted or will soon adopt. These adopted air quality plans are summarized below.

- **2007 Air Quality Management Plan** (adopted 6/1/2007)
  Link: www.aqmd.gov/aqmp/07AQMP/07AQMP.html
- **Final 2003 Air Quality Management Plan** (adopted 12/10/1999)
  Link: www.aqmd.gov/aqmp/AQMD03AQMP.htm
- **Final Socioeconomic Report for the Final 2003 AQMP** (adopted 8/1/2003)
  Link: www.aqmd.gov/aqmp/docs/2003AQMPSocio.pdf
- **Final 2003 Coachella Valley PM10 State Implementation Plan** (adopted 8/1/2002)
  Link: www.aqmd.gov/aqmp/docs/f2003CVsip.pdf

2007 Air Quality Management Plan

(*The following paragraphs are excerpts from the Executive Summary of the 2007 Air Quality Management Plan adopted by the SCAQMD June 1, 2007*)

The SCAQMD adopted (June 1, 2007) the 2007 Air Quality Management Plan (AQMP) primarily in response to changes in the federal Clean Air Act (CAA). The CAA requires an 8-hour ozone non-attainment area to prepare a State Implementation Plan (SIP) revision by June of 2007 (which has been completed) and a PM2.5 non-attainment area to submit a SIP revision by late 2007 (which has been completed). The SCAQMD has decided that it is most prudent to prepare a single comprehensive and integrated SIP revision that satisfies both the ozone and PM2.5 requirements. Additionally, the U.S. EPA requires that transportation conformity budgets be established based on the most recent planning assumptions and approved motor vehicle emission model. The AQMP is based on assumptions provided by both the California Air Resources Board (CARB) and the Southern California Association of Governments (SCAG) reflecting their upcoming model (EMFAC) for motor vehicle emissions and demographic updates.

The AQMP relies on a comprehensive and integrated control approach to achieve the PM2.5 standard by 2015 through implementation of short-term and midterm control measures and achieve the 8-hour ozone standard by 2021/2024 based on implementation of additional long-term measures. In order to demonstrate attainment by the prescribed deadlines, emission reductions needed for attainment must be in place by 2014 and 2020/2023 timeframe.

Since PM2.5 in the Basin is overwhelmingly formed secondarily, the overall draft control strategy focuses on reducing precursor emission of SOx, directly-emitted PM2.5, NOx, and VOC instead of fugitive dust. Based on the District's modeling sensitivity analysis, SOx reductions, followed by directly-emitted PM2.5 and NOx reductions, provide the greatest benefits in terms of reducing the ambient PM2.5 concentrations. While VOC reductions are less critical to overall reductions in PM2.5 air quality, they are heavily relied upon for meeting the 8-hour ozone standard. SOx is also the only pollutant that is projected to grow in the future, due to ship emissions at the ports, requiring significant controls.

Directly-emitted PM2.5 emission reductions from ongoing diesel toxic reduction programs and from the short-term and mid-term control measures are also incorporated into the AQMP. NOx reductions primarily based on mobile source control strategies (e.g., add-on control devices, alternative fuels, fleet modernization, repowers, retrofits) are also relied upon for attainment. Adequate VOC controls need to be in place in time for achieving significant VOC reductions needed for the 8-hour ozone standard by 2021/2024. Reducing VOC emissions in early years would also ensure continued progress in reducing the ambient ozone concentrations. The 8-hour ozone control strategy relies on the implementation of the PM2.5 control strategy augmented with additional long-term VOC and NOx reductions for meeting the standard by 2020/2023 timeframe. With respect to PM10, since the Basin did not attain the annual standard by 2006, additional local programs are proposed to address the attainment issue in an expeditious manner.

The AQMP control measures consist of three components: 1) the District's Stationary and Mobile Source Control Measures; 2) State and Federal Control Measures recommended by CARB and/or SCAQMD staff; and 3) Regional Transportation Strategy and Control Measures provided by SCAG.

The SCAQMD control strategy for stationary and mobile sources is based on the following approaches: 1) facility modernization; 2) energy efficiency and conservation; 3) good management practices; 4) market incentives/compliance flexibility; 5) area source programs; 6) emission growth management; and 7) mobile source programs. The AQMP also includes SCAQMD staff's recommended State and federal stationary and mobile source control measures since ARB has only developed an overview of a possible control strategy for PM2.5.

The measures, prepared by SCAQMD staff and recommended for CARB's consideration for inclusion into the final AQMP, include strategies such as Smog Check Program enhancements, extensive fleet modernization of on-road heavy-duty diesel vehicles and off-road diesel equipment, accelerated penetration of advanced technology vehicles, low sulfur fuel for marine engines, accelerated turn-over of high-emitting off-road engines, and gasoline and diesel fuel reformulations.

Finally, the emission benefits associated with the 2004 Regional Transportation Plan and the 2006 Regional Transportation Improvement Program are also reflected in the AQMP.

In order to achieve necessary reductions for meeting air quality standards, all four agencies (i.e., SCAQMD, ARB, U.S. EPA, and SCAG) would have to aggressively develop and implement control strategies through their respective plans, regulations, and alternative approaches for pollution sources within their primary jurisdiction. Even though SCAG does not have direct authority over mobile source emissions, it will commit to the emission reductions associated with implementation of the 2004 Regional Transportation Plan and 2006 Regional Transportation Improvement Program which are imbedded in the emission projections. Similarly, the Ports of Los Angeles and Long Beach have authority they must utilize to assist in the implementation of various strategies if the region is to attain clean air by federal deadlines. The Table below shows the areas of jurisdiction for each agency.

Agency	Jurisdiction
U.S. EPA	Forty-nine state mobile vehicle emission standards. Airplanes, trains, and ships. New off-road construction & farm equipment below 175 hp.
ARB	On-road/Off-road vehicles. Motor vehicle fuels. Consumer products.
SCAQMD	Stationary (e.g., industrial/commercial) and area sources. Indirect sources. Some mobile sources (e.g., visible emissions and use regulations from trains and ships).
SCAG	AQMP conformity assessment. Regional Transportation Improvement Program. Transportation Control Measures.
Local Government/CTCs	Transportation and local government actions (i.e., land use approvals & ports). Transportation facilities.

Although the SCAQMD has completely met its obligations under the 2003 AQMP and stationary sources subject to the District's jurisdiction account for only 11 percent of NOx and 24 percent of SOx emissions in the Basin in 2014, the AQMP contains several short-term and mid-term control measures aimed at achieving further NOx and SOx reductions (as well as VOC and PM2.5 reductions) from these already regulated sources.

These strategies are based on facility modernization, energy conservation measures and more stringent requirements for existing equipment (e.g., space heaters, ovens, dryers, furnaces). In addition to short-term and mid-term control measures, the SCAQMD is also committing to long-term VOC reductions of 32 tons per day by 2020 for the 8-hour ozone attainment.

Clean air for this region requires CARB to aggressively pursue reductions and strategies for on-road and off-road mobile sources and consumer products. In addition, considering the significant contribution of federal sources such as marine vessels, locomotives, and aircraft in the Basin (i.e., 72 percent of SOx and 34 percent of NOx), it is imperative that the U.S. EPA pursue and develop regulations for new and existing federal sources to ensure that these sources contribute their fair share of reductions toward attainment of the federal standards. Unfortunately, regulation of these emission sources has not kept pace with other source categories and as a result, these sources are projected to represent a significant and growing portion of emissions in the Basin. Without a collaborative and serious effort among all agencies, attainment of the federal standards would be seriously jeopardized.

Final 2003 Air Quality Management Plan

(*The following are excerpts from the 2003 Air Quality Management Plan adopted by the SCAQMD December 10, 1999*)

The SCAQMD amended the 1997 Air Quality Management Plan (AQMP) in 1999 to address the U.S. EPA's proposed disapproval of the 1997 Ozone SIP revision to ensure that the 1997 AQMP complied with or exceeded federal requirements. The 1999 AQMP amendments to the 1997 AQMP were subsequently approved by the U.S. EPA into the SIP in April 2000. The SCAQMD updated the PM10 portion of the 1997 AQMP for both the South Coast Air Basin and Coachella Valley in 2002 as part of the District's request to extend the PM10 attainment date from 2001 to 2006 for these areas as allowed under the federal Clean Air Act (CAA). The U.S. EPA approved the 2002 update on April 18, 2003.

The purpose of the 2003 Revision to the Air Quality Management Plan for the South Coast Air Basin (Basin) and those portions of the Salton Sea Air Basin under SCAQMD jurisdiction are to set forth a comprehensive program that will lead these areas into compliance with all federal and state air quality planning requirements. Specifically, the 2003 AQMP Revision is designed to satisfy the California Clean Air Act (CCAA) tri-annual update requirements and fulfill the District's commitment to update transportation emission budgets based on the latest approved motor vehicle emissions model and planning assumptions. The Plan will be submitted to U.S. EPA as a SIP revision once it is approved by the SCAQMD Governing Board and the California Air Resources Board (CARB).

The 2003 AQMP sets forth programs which require the cooperation of all levels of government: local, regional, state, and federal. Each level is represented in the Plan by the appropriate agency or jurisdiction that has the authority over specific emissions sources. Accordingly, each agency or jurisdiction is associated with specific planning and implementation responsibilities.

At the federal level, the U.S. EPA is charged with regulation of 49-state on-road motor vehicle standards; trains, airplanes, and ships; and non-road engines less than 175 horsepower. The CARB, representing the state level, also oversees on-road vehicle emission standards, fuel specifications, some off-road sources and consumer product standards. At the regional level, the SCAQMD is responsible for stationary sources and some mobile sources. In addition, the SCAQMD has lead responsibility for the development and adoption of the Plan. Lastly, at the local level, Associations of Governments have a dual role of leader and coordinator. In their leadership role, they, in cooperation with local jurisdictions and sub-regional associations, develop strategies for these jurisdictions to implement; as a coordinator, they facilitate the implementation of these strategies. For the South Coast Air Basin, the Southern California Association of Governments is the District's major partner in the preparation of the AQMP. Interagency commitment and cooperation are the keys to success of the AQMP.

Since air pollution physically transcends city and county boundaries, it is a regional problem. No one agency can design or implement the Plan alone and the strategies in the Plan reflect this fact.

Past air quality programs have been effective in improving the Basin's air quality. Ozone levels have been reduced by half over the past 30 years, nitrogen dioxide, sulfur dioxide, and lead standards have been met, and other criteria pollutant concentrations have significantly declined. The federal and state CO standards were also met as of the end of 2002. However, the Basin still experiences exceedances of health-based standards for ozone and particulate matter under ten microns in size (PM10).

Progress in implementing the 1997/1999 SIPs can be measured by the number of control measures that have been adopted as rules and the resulting tons of pollutants targeted for reduction. Emission reduction commitments and reductions achieved in 2010 are based on the emissions inventory from the 1997 SIP. Since October 1999, sixteen control measures or rules have been adopted or amended by the SCAQMD through October 2002. The primary focus of the District's efforts had been the adoption and implementation of VOC control measures. The SCAQMD has achieved 158 tons per day VOC reductions, exceeding its 1997/1999 SIP commitment by approximately 44.5 tons per day.

To date, ARB has committed to VOC and NOx emission reductions of approximately 90 and 106 tons per day, respectively, and has achieved 67 and 140 tons per day, respectively. While exceeding its NOx target by 34 tons per day, ARB fell short of the VOC target by 21 tons per day using the 1997 SIP currency. U.S. EPA was obligated to VOC and NOx emission reductions of approximately 35 and 75 tons per day, respectively, and has achieved 38 and 63 tons per day, respectively.

Final Socioeconomic Report for the Final 2003 AQMP

(*The following are excerpts from the Final Socioeconomic Report for the Final 2003 AQMP adopted by the SCAQMD August, 2003*)

The Final Socioeconomic Report accompanies the Final 2003 AQMP and presents the potential socioeconomic impacts resulting from implementation of this Plan. The Plan contains several short- and long-term strategies designed to achieve state and federal ambient air quality standards, and air quality planning requirements. These strategies will be implemented by the SCAQMD, the California Air Resources Board (ARB), the U.S. Environmental Protection Agency (U.S. EPA), and other local and regional governments. Implementation of these control strategies will affect the region's economy.

In recent years, there have been significant improvements in air quality in the Basin. Additional control is still needed in order to bring the Basin into compliance with the federal air quality standards. The benefits of better air quality through implementation of the draft final 2003 AQMP include increases in crop yields, visibility improvements, and a reduction in morbidity, higher survival rates, reduced expenditures on refurbishing building surfaces, and reduced traffic congestion. The total benefits of the draft final Plan are expected to exceed $6.6 billion since not all of the benefits associated with the implementation of the Plan can be quantified.

The projected annual implementation cost of the draft final Plan is $3.2 billion annually, on average. The cost estimate is divided into quantifiable and unquantifiable measures. The projected cost for 31 quantifiable short-term measures and some long-term measures is approximately $1.6 billion. Transportation control measures alone contribute to 57 percent of the total quantifiable cost. The cost of unquantifiable measures is projected to be approximately $1.6 billion. The cost of unquantified measures was derived from emission reductions in 2010 and the average cost effectiveness of quantifiable measures.

Without the AQMP, jobs in the four-county area are projected to grow at an annual rate of about 1.069 percent between 2002 and 2020. Cleaner air would result in 41,934 jobs created annually, on average. This would bring the job growth rate to an annual rate of 1.1 percent. On the other hand, the quantified measures are projected to result in 9,893 jobs forgone annually, on average, which would slow down the job growth rate to 1.054 percent relative to the baseline employment. The four-county region is projected to have 11 million jobs in 2020. The jobs created from clean air benefits would amount to 0.57 percent of the 2020 baseline jobs. The jobs forgone from quantified measures would be 0.2 percent of the 2020 baseline jobs.

All the 19 sub-regions are projected to have additional jobs created from cleaner air. All the ethnic groups are expected to have job gains as a result. The share of whites and Hispanics in job gains is projected to be 84 percent with other ethnic groups representing the balance. Implementation of quantified control measures would also result in additional jobs to be created between 2002 and 2006 of which whites are projected to have a 54 percent share and Hispanics would have a 32 percent share. In later years (2007 to 2020), these measures would result in an average of 19,761 jobs forgone annually of which the share of Hispanics is 25 percent.

Implementation of the final 2003 AQMP is projected to result in air quality improvements sufficient to attain the air quality standards by 2010 throughout the Basin. The air quality modeling results have, however, shown the greatest relative improvements and air quality benefit in the eastern portion of the Basin. The Chino-Redlands area is shown to have the greatest share of the monetary value of these improvements. A demographic analysis of the 2000 census showed that 45 percent of the population there is Hispanic and 36 percent white. The minority population increased from 45 percent in the 1990 census to 64 percent in the 2000 census.

The attainment of the air quality standards in 2010 depends on a full implementation of control measures, as proposed in the final 2003 AQMP. The costs of these measures will spread throughout various communities. The cost of quantified control measures that represent 30 percent of the total emission reductions towards clean air would exert a relatively higher share on the southern portion of Los Angeles County and the Chino-Redlands area than the rest of the communities.

The socioeconomic report examines industrial competitiveness in three areas: the Basin's share of national jobs, product prices and profits, and exports and imports. The quantified measures and benefits of the draft final 2003 AQMP are not expected to result in discernible differences in the four-county region’s share of national jobs. For the majority of sectors, the impact on product prices is projected to be less than one-half of one percent of the baseline index of product prices and the impact on profits is projected to be less than one-half of one percent of the baseline index of profits. The impact on imports and exports is small as well, especially when the size of the four-county region is considered.

Final 2003 Coachella Valley PM10 State Implementation Plan

(*The following are excerpts from the Final 2003 Coachella Valley PM10 State Implementation Plan adopted by the SCAQMD August 1, 2003*)

The Coachella Valley PM10 non-attainment area consists of an approximately 2,500 square mile portion of central Riverside County. Geographically, the Valley is bounded by the San Jacinto Mountains to the west, and the Little San Bernardino Mountains to the east. Elevation ranges from approximately 500 feet above sea level in the northern part of the Valley to about 150 feet below sea level near the Salton Sea.

The Coachella Valley is currently designated as a serious non-attainment area for PM10. The SCAQMD is the air agency responsible for air quality planning and regulations in the Coachella Valley. Since it was designated as a PM10 non-attainment area, Coachella Valley governments, agencies, private and public stakeholders, along with the SCAQMD, have worked to reduce levels of PM10 dust. The 1996 Coachella Valley Plan dust control efforts were so successful that Coachella Valley became the first serious non-attainment area in the nation to request re-designation. The local dust control ordinances and SCAQMD’s fugitive dust rules 403 and 403.1 were SIP-approved by U.S. EPA on January 8, 1999. The SCAQMD has invoked the U.S. EPA’s Natural Events Policy (NEP) to identify high PM10 days that resulted from high-wind natural events. These days are not used in determining the 24-hour or annual average PM10 levels. Based on monitoring data and the NEP, the Coachella Valley demonstrated attainment of the annual average PM10 NAAQS (expected annual average mean for past three years) for each year from 1995 through 1999. It has demonstrated attainment of the 24-hour PM10 NAAQS from 1993 through 2002.

In 1999, annual average PM10 levels jumped up to 52.7 ug/m^3, significantly above levels seen in previous years (PM10 levels all reflect removal of natural events, if any). An improving economy had resulted in greater development, particularly of large resorts and recreational areas, and the area had suffered a number of dry years. After a series of SCAQMD enforcement actions at these large developments, the SCAQMD began a program of greater enforcement and outreach to developers and builders, and local government dust plan review and enforcement staff.

In response to this situation, the 2002 Coachella Valley State Implementation Plan (CVSIP) was developed, including a Most Stringent Measures analysis and additional control measures. It was adopted by the SCAQMD Governing Board on June 21, 2002. It was adopted by Coachella Valley Association of Government's (CVAG) Executive Committee on June 25, 2002. After comments by U.S. EPA, the SCAQMD Governing Board adopted the 2002 CVSIP Addendum on September 12, 2002, which detailed the 2003 milestone year target and emission budgets.

Since adoption of the 1990 CVSIP, the local Coachella Valley jurisdictions, CVAG, and the SCAQMD have worked closely to implement the various 1990 CVSIP control measures. This team approach has resulted in what was the most comprehensive dust control program in the nation at that time. The 1996 CVSIP describes the implementation status of these control measures in detail. In the 1994 CVSIP, additional BACM measures were identified. However, by 1996, the Coachella Valley had achieved the PM10 NAAQS and the SCAQMD requested its re-designation to attainment. At that time, the 1994 CVSIP BACM measures were incorporated as contingency measures in the 1996 CV Plan. In response to elevated PM10 levels from 1999 through 2001, the SCAQMD prepared and adopted the 2002 CVSIP, which included a most stringent measures analysis and enhanced control strategy. The 2002 CVSIP demonstrated attainment of the federal PM10 standards by 2006. The 2002 CVSIP described the previous dust control measures, including the original local dust control ordinances and SCAQMD Rules 403 and 403.1, all of which were adopted in 1992 and 1993 and have been SIP-approved by U.S. EPA, and the Clean Streets Management Program.

The 2002 CVSIP summarizes the dust control efforts that arose in response to significant dust control problems and nuisance situations at large construction sites in Spring 1999 and the rise in local PM10 levels above the annual average standard from 1999 through 2001. These programs, which are described in the 2002 CVSIP and summarized below, are continuing, including the expedited implementation of CMAQ-funded PM10 control projects, CVAG and SCAQMD sponsored Compliance Promotion Classes, "dust czars" for each jurisdiction, and a full-time SCAQMD inspector to coordinate SCAQMD and local enforcement activities.

In May 2001, SCAQMD assigned a full-time inspector to the Coachella Valley to improve outreach and compliance with existing dust control regulations. This was in addition to SCAQMD inspectors who had been responding to potential SCAQMD rule violations. In addition, each Coachella Valley jurisdiction has assigned a "dust czar" to coordinate dust control for that jurisdiction (e.g. dust plan review, ordinance enforcement, public and industry outreach, SCAQMD liaison). All "dust czars" have taken the Compliance Promotion Class and have worked with the SCAQMD inspector to address dust sources within their individual jurisdictions.

On October 4, 2002, the SCAQMD Board approved the FY 2002-03 AB 2766 MSRC Discretionary Fund Work Program in Concept totaling $14.95 million. This included the Coachella Valley PM10 Reduction Program; the total amount of Discretionary Funds allocated to this category was $1,000,000. The Coachella Valley Program offers to co-fund qualifying particulate matter reduction projects, focusing on the early implementation of Most Stringent Measures (MSMs) as defined by the SCAQMD in the new Coachella Valley State Implementation Plan. The goal of the MSRC Program is to assist CVAG jurisdictions in effectively and expeditiously implementing MSMs prior to the imposition of mandatory PM10 Reduction Rules by the SCAQMD. The MSRC Program provides qualifying CMAQ projects an 11.47 percent match against federal CMAQ (TEA-21) funds, a 75 percent match against AB 2766 Subvention Funds, and a 50 percent match when other sources of funds are applied. The solicitation mechanism is a Program Announcement and Application, with a proposal receipt period beginning on November 5, 2002 and ending on April 8, 2003. The funding was available on a first-come, first-serve basis and twelve projects were approved for a total of $1,000,000. Leveraged with CMAQ, AB2766 subvention, and other funds, this program resulted in over $5,000,000 of PM10 mitigation and control projects being initiated in the Coachella Valley. Details can be found in the 2003 February and March SCAQMD Governing Board agendas.

The Coachella Valley Air Quality Ad Hoc Task Force (CV Task Force), sponsored by CVAG, is assisting CVAG and the SCAQMD in implementing the 2002 CVSIP. The CV Task Force includes mayors and city council members of all Coachella Valley cities, a County Supervisor from Riverside County, tribal chairs or vice-chairs from all local Indian tribes, CVAG Energy and Environmental Resources subcommittee members (city managers), the Coachella Valley Economic Partnership, and representatives from the local farm bureau, building industry association, developers, Caltrans, as well as staff from SCAQMD, ARB, and U.S. EPA. Other interested stakeholders, including SunLine Transit Agency, Coachella Valley Water District, Southern California Gas Company, the Building Industry Association (BIA), local developers, the Construction Industry Air Quality Coalition (CIAQC), local farmers, and the “dust czars,” have also participated. The CV Task Force met on March 12, 2003, to review the initial drafts of the model ordinance, dust control handbook, and memorandum of understanding, which taken together, will implement the local government portion of the 2002 CVSIP control measures.

Localized Cumulative Impacts

Since the power plant air quality impacts can be reasonably estimated through air dispersion modeling (see Operational Modeling Analysis section) the project contributions to localized cumulative impacts can be estimated. To represent past and, to an extent, present projects that contribute to ambient air quality conditions, the Commission staff recommends the use of ambient air quality monitoring data (see Environmental Setting section), referred to as the background. The staff undertakes the following steps to estimate what are additional appropriate present projects that are not represented in the background and reasonably foreseeable projects:

- First, the Commission staff (or the applicant) works with the air district to identify all projects that have submitted, within the last year of monitoring data, new applications for an authority to construct (ATC) or permit to operate (PTO) and applications to modify an existing PTO within six miles of the project site. Beyond six miles there is little or no measurable cumulative overlap between stationary emission sources. The non-photochemical-reactant pollutant emission impacts of the criteria pollutant emissions (i.e., NOx, SOx, CO, PM10 and PM2.5) have, from staff's experience with air dispersion modeling, had a finite time and distance to remain airborne. In staff's experience of using the USEPA air dispersion models (SCREEN, ISCST3 and AERMOD), staff has never seen any proposed power plant having non-photochemical-reactant pollutant emission impacts which approach or go beyond 10 kilometers (or six miles). This effectively identifies all new emissions that emanate from a single point (e.g., a smoke stack), referred to as "point sources." The submittal of an air district application is a reasonable demarcation of what is "reasonably foreseeable". So, as an example, if the last year of ambient air quality monitoring data from area monitoring stations was 2003, then Commission staff (or the applicant) would ask the air district for all new applications that are not included in the ambient data.

- Second, the Commission staff (or the applicant) works with the air district and local counties to identify any new area sources within six miles of the project site. As opposed to point sources, area sources include sources like agricultural fields, residential developments or other such sources that do not have a distinct point of emission. New area sources are typically identified through draft or final Environmental Impact Reports (EIR) that are prepared for those sources. The initiation of the EIR process is a reasonable basis on which to determine what is "reasonably foreseeable" for new area sources.
- The data submitted, or generated from the applications with the air district for point sources or initiating the EIR process for area sources provides enough information to include these new emission sources in air dispersion modeling. Thus, the next step is to review the available EIR(s) and permit application(s), determine what sources must be modeled and how they must be modeled.
- Sources that are not new, but may not be represented in ambient air quality monitoring are also identified and included in the analysis. These sources are rare but include existing sources that are co-located with the proposed source (such as an existing power plant). In most cases, the ambient air quality measurements are not recorded close to the proposed project, thus a local major source might not be well represented by the background air monitoring. When these sources are included, it is typically a result of there being an existing source on the project site and the ambient air quality monitoring station being more than 2 miles away.
- When there are a large number of sources (in some cases 15 to 20 sources) and they are primarily of small emission quantities with higher impacts, the modeling results must be carefully interpreted so that they are not skewed towards the smaller, high-impacting sources. The reason being that while small sources can cause higher impacts, they are typically limited to within a hundred yards or similar close proximity of the source. Therefore, a cumulative interaction with the proposed project emission impacts is unlikely.

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

The SCAQMD identified 106 new potential point sources for the applicant and Energy Commission staff to review. Staff identified that there were no new area sources, no additional new air emission sources through local EIRs and the project is not co-located with other existing air emission sources. Staff reviewed the 106 new potential point sources identified by the SCAQMD: 5 were administrative changes that resulted in no new emissions, 5 were applications on hold or canceled, 61 were greater than 6 miles from the project site, 18 are replacements in kind of existing sources, and 17 were sources that emit VOC only (VOC is not modeled). Therefore staff concludes that there are no new sources within six miles of the proposed project site that are required to be in the cumulative analysis. Therefore, the modeling results shown in AIR QUALITY Tables 13, 14 and 15 represent the project cumulative analysis as well as the project direct impacts analysis results.

Chemically Reactive Pollutant Impacts

The project's gaseous emissions of NOx, SO_2, VOC and ammonia can contribute to the formation of secondary pollutants: ozone and PM10/PM2.5.

Ozone Impacts

There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are input into the modeling to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NOx and VOC emissions to ozone formation, the emissions of NOx and VOC from the CPV Sentinel project do have the potential (if left unmitigated) to contribute to higher ozone levels in the region. These impacts would be significant because they would contribute to ongoing violations of the state and federal ozone ambient air quality standards.

PM2.5 Impacts

Secondary PM10 formation, which is assumed to be 100 percent PM2.5, is the process of conversion from gaseous reactants to particulate products. The process of gas-to-particulate conversion, which occurs downwind from the point of emission, is complex and depends on many factors, including local humidity and the presence of air pollutants. The basic process assumes that the SOx and NOx emissions are converted into sulfuric acid and nitric acid first, and then react with ambient ammonia to form sulfate and nitrate. The sulfuric acid reacts with ammonia much faster than nitric acid and converts completely to particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase will tend to fall out, however the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air. There are two conditions that are of interest described as “ammonia rich” and “ammonia poor.” In the case of “ammonia rich,” there is more than enough ammonia to react with all the sulfuric acid and to establish a balance of nitric acid-ammonium nitrate. Further ammonia emissions in this case will not necessarily lead to increases in ambient PM2.5 concentrations. In the case of an “ammonia poor” environment, there is insufficient ammonia to establish a balance and thus additional ammonia will tend to increase PM2.5 concentrations.

An extensive study of the area near Rubidoux in Riverside County and other studies of ambient air quality in the South Coast Basin indicates that the entire Basin is likely to be ammonia rich. The ammonia sources are primarily driven by ammonia emissions from livestock, soil (natural emissions and agricultural additives), motor vehicles and domestic emissions. These sources exist at various intensities across the basin giving rise to the transportation of ammonia (as ammonium, NH_4, which is more stable than ammonia, NH_3) throughout the basin. Since the ambient air concentrations is likely ammonia rich, further ammonia emissions from the CPV Sentinel project might not lead to further formation of ammonium nitrate or sulfate. While there may be some conversion from the ammonia emitted from the project, the conversion rate might also well be zero. Furthermore, there is currently no regulatory model that can predict the conversion rate. Therefore, staff is not able to reasonably estimate what impacts, if any, there will be from the project ammonia emission.

Additionally, the actual ammonia emissions from the CPV Sentinel project will be approximately 10 to 50 percent of the ammonia limit being imposed (5 ppm at 15 percent O_2 averaged over one hour). The point at which the project begins to emit at greater than 50 percent of the limit is typically the indicator to the operator that the SCR requires a major overhaul. Once this major overhaul is completed the SCR performance is typically returned to near new levels (approximately 1 ppm or better). It is in the best interest of the project owner to perform these overhauls as required so that the cost of ammonia stays low for the project. Thus for the vast majority of the project life, the ammonia emission will be below 2 ppm. An emission of any type of pollutant at this level has a very low potential to cause a significant impact.

Staff finds that it is not reasonably possible to estimate the impacts from the CPV Sentinel project emissions of ammonia, but that these emissions are small and well controlled so that it is reasonable to assume that they are not likely to cause or contribute to an exceedance of the PM10 or PM2.5 ambient air quality standards or that at least it is reasonably speculative. Thus, staff concludes that the CPV Sentinel project ammonia emissions do not have the potential to cause a significant impact on the ambient air quality.

The emissions of NOx and SOx from the CPV Sentinel project do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region. These impacts would be significant because they would contribute to ongoing violations of the state and federal PM2.5 ambient air quality standards. The mitigation of the project NOx and SOx emissions is discussed in the Operations Mitigation section above.

Greenhouse Gas Reporting

In addition to regulated criteria pollutants, the combustion of fossil fuels produces air emissions known as greenhouse gases. These include primarily carbon dioxide, nitric oxide, and methane (unburned natural gas). Greenhouse gases are known to contribute to the warming of the earth's atmosphere. 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 greenhouse gas emissions as a condition of state licensing of new electric generating facilities (CEC 2003, p. 42). Staff recommends Condition of Certification **AQ-SC9**, which requires the project owner to report the quantities of relevant greenhouse gases emitted as a result of electric power production.

The calculations specified in Condition of Certification **AQ-SC9** are based on standard protocols developed by the Intergovernmental Panel on Climate Change (IPCC), an international scientific body that is responsible for developing a common methodology for developing greenhouse gas inventories for all world governments to follow. The calculations are for those emissions associated with on-site fuel storage; all fuel combustion associated with the prime mover of the power plant; and the associated emissions of the on-site power transformer equipment. The greenhouse gas emissions to be reported in Condition of Certification **AQ-SC9** are carbon dioxide, methane, nitric oxide and sulfur hexafluoride emissions that are directly associated with the production and transmission of electric power.

The IPCC-approved methodology for calculating the greenhouse gas emissions in an inventory is particular to the type of fossil fuel burned. In its Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual, the IPCC established the factors for oxidation, fuel-based emissions, and global warming potential.

Greenhouse Gas Emissions

Global Climate Change and Electricity Production

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

In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC 1998, p.5). In 2003, the Energy Commission recommended that the state require reporting of greenhouse gas (GHG) or global climate change[1] emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). The Energy Commission's 2007 Integrated Energy Policy Report (IEPR) addresses climate change within the electricity, natural gas, and transportation sectors. For the electricity sector, it recommends such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor's stated goal of a 33 percent renewable portfolio standard.

In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such reductions to be achieved by 2020.[2] To achieve this, ARB has a mandate to define the 1990 emissions level and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The Energy Commission and the Public Utilities Commission are providing recommendations to ARB for how it should reduce emissions in the electricity and natural gas sectors. The agencies recommend a three-pronged approach: (1) require all retail providers in California to achieve all cost-effective energy efficiency, (2) surpass the current 20 percent renewable portfolio standard requirement, and (3) develop a multi-sector cap and trade system to obtain the remaining reductions in the most cost-effective manner. To date, the agencies have issued two joint recommendation reports, the first involving the tracking and reporting of emissions and the second involving the point of regulation.

The ARB adopted early action GHG reduction measures in October 2007 and will establish statewide emissions caps by economic "sectors" in 2008. By January 1, 2009, ARB will adopt a scoping plan that will identify how emission reductions will be achieved from significant sources of GHG via regulations, market mechanisms, and other actions. ARB staff will then draft regulatory language to implement its plan and will hold additional public workshops on each measure, including market mechanisms (ARB 2006b).

Strategies that the state might pursue for managing GHG emissions in California, in addition to those recommended by the Energy Commission and the Public Utilities Commission, 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

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

[2] Governor Schwarzenegger has also issued Executive Order S-3-05 establishing a goal of 80 below 1990 levels by 2050.

fuels are slated to provide substantial reductions by 2020 (CalEPA 2006). ARB has not yet determined how it will apportion the required reductions; however, it is possible that GHG reductions mandated by ARB will be non-uniform or disproportional across emitting sectors, in that most reductions will be based on cost-effectiveness (i.e., the "most bang for the buck").

SB 1368[3], also enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibit utilities from entering into long-term commitments with any baseload facilities that exceed the Emission Performance Standard of 0.500 metric tons CO_2 per megawatt-hour[4] (1,100 pounds CO_2/MWh). Specifically, the Emission 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.[5] If a project, instate or out of state, plans to sell base load electricity to California utilities, the utilities will have to demonstrate that the project complies with the EPS.

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

Project Greenhouse Gas Emissions

The generation of electricity using fossil fuels can produce greenhouse gases in addition to the "criteria air pollutants" that have been traditionally regulated under the federal and state Clean Air Acts. Greenhouse gas emissions contribute to the warming of the earth's atmosphere, leading to climate change. For fossil fuel-fired power plants, these include primarily carbon dioxide, with much smaller amounts of nitrous oxide (N_2O, not NO or NO_2, which are commonly known as NOx or oxides of nitrogen), and methane (CH_4 - unburned natural gas). Also included are sulfur hexafluoride (SF_6) from high voltage equipment. GHG emissions from the electricity sector are dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled or reused/recycled, but are nevertheless documented here as some of the compounds have very large relative global warming potentials.

AIR QUALITY Table 17 shows the estimated greenhouse gas emissions expected from the CPV Sentinel project as currently proposed. All emissions are converted to CO_2-equivalent and totaled. Based on the estimated total greenhouse gas emissions from CPV Sentinel and the rated output, staff estimates that the Greenhouse Gas Emission Performance Factor to be 0.4903 CO_2 eq-mt/MW-hr.

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[3] Public Utilities Code § 8340 et seq.

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

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

AIR QUALITY Table 17
Estimated Annual Greenhouse Gas Emissions

	CO_2 Emission (metric tons)	CH_4 as CO_2 eq (metric tons)	N_2O as CO_2 eq (metric tons)	SF_6 as CO_2 eq (metric tons)	Total CO_2 eq (metric tons)
Turbine Operations Units 1-5	607,916.5	942.64	4,854.79	--	613,713.93
Turbine Startup/Shutdown Units 1-5	8,188.83	12.70	65.40	--	8,266.92
Turbine Operations Units 6-8	444,139.91	688.69	3,546.88	--	448,375.47
Turbine Startup/Shutdown Units 6-8	5,718.3	8.87	45.67	--	5,772.83
Firewater Pump	20.34	0.0053	0.031	--	20.38
Black Start Generator	204.56	0.054	0.31	--	204.93
Gas Insulated Switches	--	--	--	803.04	803.04
Total Estimated Greenhouse Gas Emissions (CO_2 eq metric tons)					1,077,157.51
Estimated Annual Generation (MW-hr)					2,416,125
Estimated Greenhouse Gas Performance Factor (CO_2 eq mt/MW-hr)					0.44582

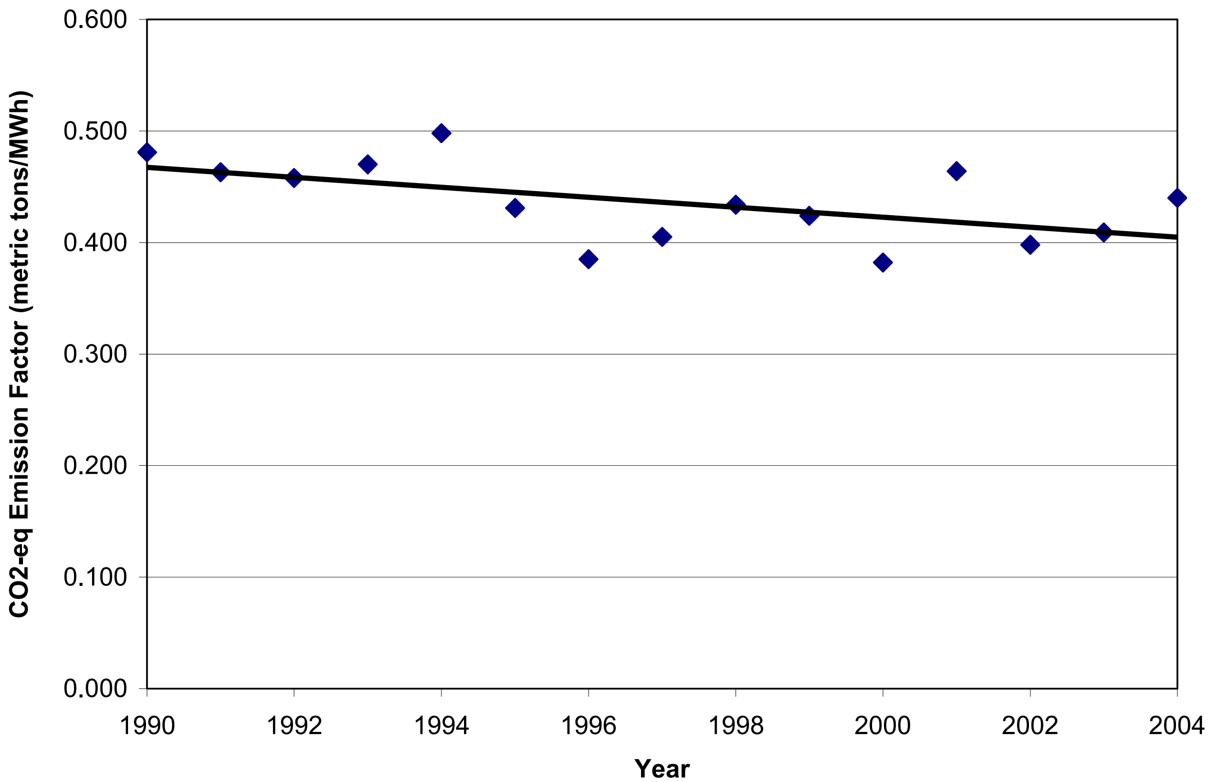
Notes:
Turbine Units 1-5 are assumed to have the following characteristics:
Heat input rate: 875.7 mmBtu/hr
Rated Capacity of 106.25 MW
Hours of Operation: 2,628
Hours in startup and shutdown: 177
Turbine Units 6-8 are assumed to have the following characteristics:
Hest input rate: 875.7 mmBtu/hr
Rated Capacity of 106.25 MW
Hours of Operation: 3,200
Hour in startup and shutdown: 206
The Firewater Pump is assumed to have fuel input rate of 10.3 gal/hr (of diesel fuel; 137,000 btu/gal) and to operate for no more than 199 hours per year.
The Black Start Generator is assumed to have a fuel input rate of 103.57 gal/hr (of diesel fuel: 137,000 btu/gal) and to operate no more than 199 hours per year.
The Gas Insulated Switches (numbering 8 in total) are assumed to each have 126 kg of SF_6.
Staff followed the calculation methodologies recommended by the Intergovernmental Panel on Climate Change.

Source: Staff Calculations Attachment 1

System Averages

Because most power plants are interconnected to a utility grid, and in turn to the Western Electricity Coordinating Council (WECC), it is also important to look at the proposed project in the context of all electricity systems delivering electricity to California consumers. **Air Quality Figure 6** shows the trends in GHG emission rates for each MWh consumed in California. From 1990 to 2004, California electricity generation became almost 20 percent ”cleaner” of GHG emissions on a per MWh basis. This improvement was due in part to retirements of dirtier, less efficient plants, despite electricity demand growth of almost 20 percent from 1990 to 2004. Note that the trend line, a linear regression of the annual GHG emission rates, is a better representation of the statewide GHG emission rates than the actual number in any one year. GHG emissions and electricity consumption can vary from year to year due to variations in the availability of hydroelectric power, economic activity, and anomalous events such as the energy crisis of 2000-2001. AIR QUALITY Figure 1 is based on the published data in the California Energy Demand Forecast 1980-2018 from the California Energy Commission and the Carbon Dioxide Emission Inventory 1990-2004 from the Air Resources Board.

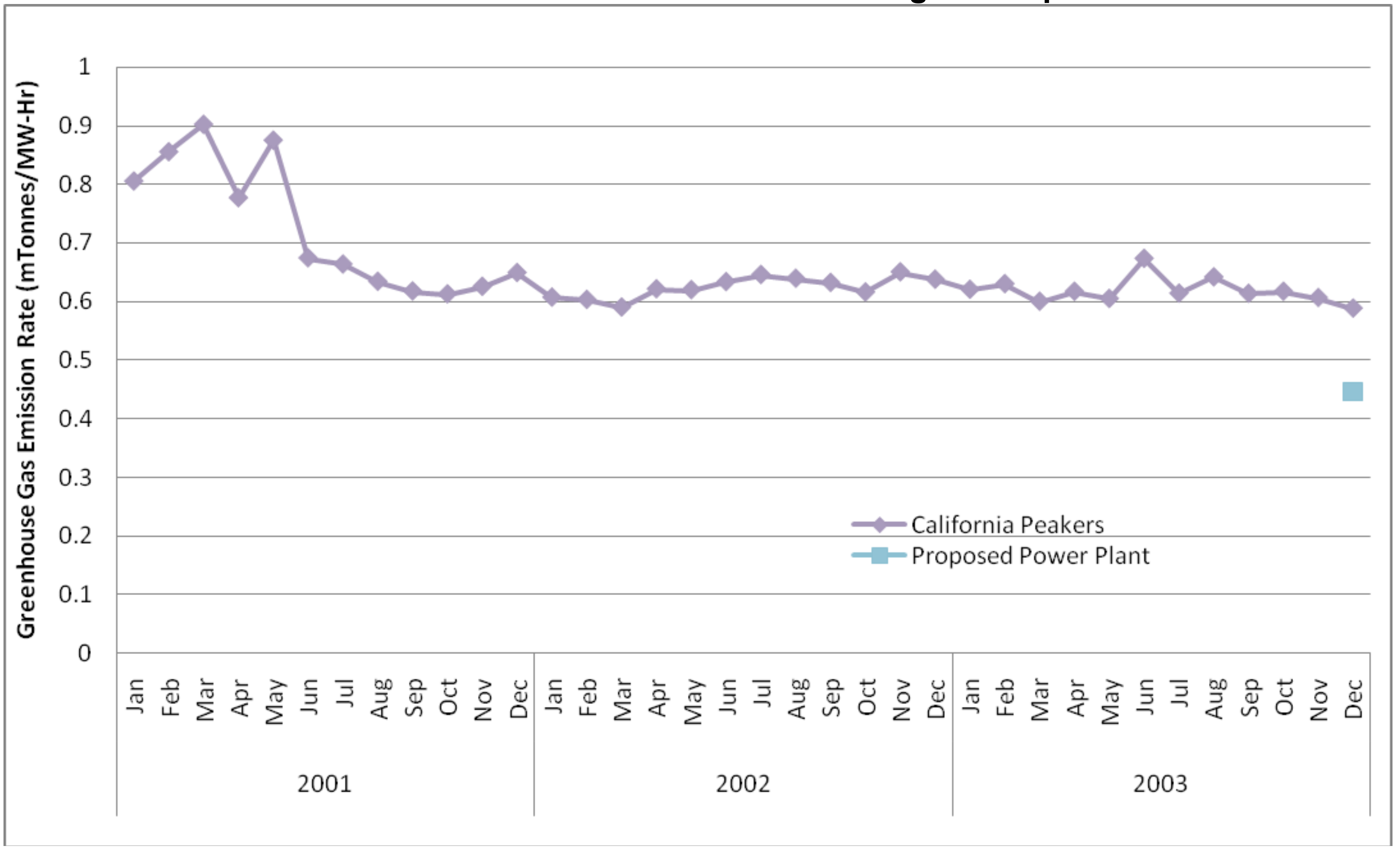
AIR QUALITY Figure 6
GHG Emission Rates with a Linear Regression for Electricity Consumed in California



Source: ARB and CEC unpublished.

AIR QUALITY Figure 7 shows the trend of CO_2 eq emission performance of California power plants operating as peakers. Since the CPV Sentinel Power Project is proposed to operate as a peaker, comparing it to the system as a whole is not relevant, in staff's opinion. It is more relevant to compare the project to other power plants that are operating as peakers. AIR QUALTIY Figure 7 shows the system peakers from 2001 through 2003 GHG performance factors on a monthly basis, as well as the proposed project. As can be seen, the proposed project performance factor is significantly lower than that of the system peakers. Therefore, the addition of the project will tend to slightly improve the system peaker average GHG performance factor.

AIR QUALITY Figure 7
Greenhouse Gas Emission Rate of California Peaking Power plants



Source: see Attachment 1

Ultimately, ARB's AB 32 regulations may address both the degree of electricity generation emissions reductions, and the method by which those reductions will be achieved, through the programmatic approach currently under its development. That regulatory approach may address emissions not only from the newer, more efficient, and lower emitting facilities licensed by the Commission, but also the older, higher-emitting facilities not subject to any GHG reduction standard that this agency could impose. This programmatic approach is necessary to have an effective GHG reduction program for the entire electricity sector.

To facilitate ARB's future regulatory regime, staff recommends Condition of Certification **AQ-SC9**, which requires the project owner to report the quantities of relevant GHGs emitted as a result of electric power production until such time that AB32 is implemented and its reporting requirements are in force. The GHG emissions to be reported in **AQ-SC9** are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFCs and PFCs emissions that are directly associated with the production and transmission of electric power. Note that reporting GHG emissions under **AQ-SC9** does not ensure that the project will comply with the potential reporting and reduction regulations likely under AB32. The project may have to provide additional reports and GHG reductions not discussed here.

Since the project will emit less than 0.500 mt CO_2/MWh (0.44582 mt CO_2/MW-hr) it is compliant under SB1368. While the explicit regulations required under AB32 are not known at this time, the proposed project GHG emission rate is less than the current estimated system wide average for peaking units and thus the addition of the project is not expected to impede the progress of the ARB towards the goals of AB32. Therefore, staff concludes that the proposed project GHG emissions are not cumulatively considerable and thus do not represent a significant impact under CEQA.

COMPLIANCE WITH LORS

FEDERAL

PSD requires major sources to obtain permits for attainment pollutants. A major source for a simple-cycle combustion turbine is defined as any one pollutant exceeding 250 tons per year. Since the emissions from the CPV Sentinel project are not expected to exceed 250 tons per year, PSD does not apply. Thus the SCAQMD did not issue a Prevention of Significant Deterioration (PSD) permit as part of their Final Determination of Compliance (FDOC) for the project.

STATE

The applicant will demonstrate that the project will comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause nuisance or injury, with the SCAQMD FDOC (issued April 30, 2008) and the Energy Commission staff's affirmative finding for the project.

LOCAL

Compliance with specific SCAQMD rules and regulations is discussed below via excerpts from the FDOC (SCAQMD 2008a). For a more detailed discussion of the compliance of the project, please refer to the FDOC (SCAQMD 2008a).

SCAQMD Regulation II-Permits

RULE 212-Standards for Approving Permits

Rule 212 requires that a person shall not build, erect, install, alter, or replace any equipment, the use of which may cause the issuance of air contaminants or the use of which may eliminate, reduce, or control the issuance of air contaminants without first obtaining written authorization for such construction from the Executive Officer. A public notice will be issued followed by a 30-day public comment period prior to issuance of a permit. Compliance is expected.

SCAQMD Regulation IV-Prohibitions

RULE 401-Visible Emissions

This rule limits visible emissions to an opacity of less than 20 percent (Ringlemann No.1), as published by the United States Bureau of Mines. It is unlikely, with the use of the SCR /CO catalyst configuration that there will be visible emissions. Compliance is expected.

RULE 402-Nuisance

This rule requires that a person not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which cause, or have a natural tendency to cause injury or damage to business or property. Compliance is expected.

RULE 403-Fugitive Dust

The purpose of this rule is to reduce the amount of particulate matter entrained in the ambient air as a result of man-made fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. The provisions of this rule apply to any activity or man-made condition capable of generating fugitive dust such as construction activities. This rule prohibits emissions of fugitive dust beyond the property line of the emission source. The applicant will be taking steps to prevent and/or reduce or mitigate fugitive dust emissions from the project site. Such measures include covering loose material on haul vehicles, watering, and using chemical stabilizers when necessary. The installation and operation of the CTGs is expected to comply with this rule.

RULE 407-Liquid and Gaseous Air Contaminants

This rule limits CO emissions to 2,000 ppmvd and SO_2 emissions to 500 ppmvd, averaged over 15 minutes. For CO, the CTGs will meet the BACT limit of 6.0 ppmvd @ 15 percent O_2, 1-hr average, and the turbines will be conditioned as such. For SO_2, equipment which complies with Rule 431.1 is exempt from the SO_2 limit in Rule 407. The applicant will be required to comply with Rule 431.1 and thus the SO_2 limit in Rule 407 will not apply.

RULE 409-Combustion Contaminants

This rule restricts the discharge of contaminants from the combustion of fuel to 0.1 grain per cubic foot of gas, calculated to 12 percent CO_2, averaged over 15 minutes. The equipment is expected to meet this limit.

RULE 431.1-Sulfur Content of Gaseous Fuels

CPV Sentinel will use pipeline quality natural gas which will comply with the 16 ppmv sulfur limit, calculated as H_2S, specified in this rule.

RULE 475-Electric Power Generating Equipment

Requirements of the rule specify that the equipment must comply with a PM10 mass emission limit of 11 lb/hr or a PM10 concentration limit of 0.01 grains/dscf. The PM10 mass emissions from the CPV Sentinel project turbines are estimated to be 6 lb/hr. Therefore, compliance is expected.

Regulation XIII – New Source Review

RULE 1303(a) and Rule 2005(b)(1)(A)-BACT – LMS100 CTGs

These rules state that the Executive Officer shall deny the Permit to Construct for any new source which results in an emission increase of any non-attainment air contaminant, any ozone depleting compound, or ammonia unless the applicant can demonstrate that BACT is employed for the new source. The applicant has provided a performance warranty which accompanied the initial application package which indicates that each LMS100 operating on a simple cycle can comply with, and for NOx, even exceed the BACT requirements. SCAQMD now considers the more restrictive 1-hour averaging times to be achieved in practice and CPV Sentinel will therefore be required to comply with the 1-hour averages for NOx, CO, and VOC as opposed to the three hour as was proposed. The proposed project emission characteristics are lower than that required by BACT for the combustion turbines, therefore compliance is expected.

RULE 1303(a) and Rule 2005(b)(1)(A)-BACT – Emergency Fire Pump & Black Start Engine

The emergency fire pump is required to employ BACT because the maximum daily emissions from this source are expected to exceed 1 lb/day. CPV Sentinel will be required to evaluate the technological feasibility of using a particulate trap on the emergency fire pump. In the event that it is not technologically feasible to install a particulate trap to control PM10 emissions, the Tier II BACT levels will apply to the emergency fire pump. BACT for SOx emissions for compression ignition emergency fire pumps is diesel fuel with a sulfur content no greater than 0.0015 percent by weight. The manufacturer has indicated that this engine can comply with the Tier II emission levels and the user will only purchase diesel fuel with a sulfur content of no greater than 0.0015 percent by weight. The emergency fire pump is expected to comply with BACT.

RULE 1303(a)-BACT – Cooling Tower

Rule 219(e)(3) provides an exemption for water cooling towers and water cooling ponds not used for evaporative cooling of process water or not used for evaporative cooling of water from barometric jets or from barometric condensers and in which no chromium compounds are contained. The two cooling towers being proposed at CPV Sentinel will meet the requirements of Rule 219(e)(3) and is therefore exempt from NSR. BACT therefore does not apply.

RULE 1303(a)-BACT – Ammonia Storage Tank

A pressure relief valve that will be set at no less than 25 psig will control ammonia emissions from the storage tank. In addition, a vapor return line will be used to control ammonia emissions during storage tank filling operations. Based on the above, compliance with BACT requirements is expected.

RULE 1303(b)(1) and Rule 2005(b)(1)(B) - Modeling

The applicant has conducted air dispersion modeling using the U.S. EPA AERMOD air dispersion model. The Tier 4 Health Risk Assessment was conducted in accordance with guidelines set forth by the California Office of Environmental Health Hazard

Assessment (OEHHA) and the California Air Resources Board (CARB). The OEHHA/CARB computer program (HARP) was used to determine the health risk assessment. SCAQMD staff's review of the modeling and HRA analyses concluded that the applicant used U.S. EPA AERMOD along with the appropriate model options in the analysis for NO_2, CO, PM10, and SO_2. The applicant modeled both the cumulative and individual permit unit impacts for the project. No significant deficiencies in methodology were noted. Therefore, the applicant is expected to comply with BACT for the ammonia storage tank.

RULE 1303(b)(2) and Rule 2005(b)(2)-Offsets – LMS100 PA CTGs

Since CPV Sentinel is a new facility with an emissions increase, offsets will be required for all criteria pollutants. CPV Sentinel will be included in NOx RECLAIM and as such, NOx increases will be offset with RTCs at a 1.0 to1 ratio. Non-RECLAIM criteria pollutants (CO, VOC, SOx, and PM10) will be offset by either the purchase of Emission Reduction Credits (ERCs) and/or other means, as allowed under District Rules and Regulations at a 1.2 to 1 ratio. CPV Sentinel has indicated that the required amounts of offsets will be provided prior to issuance of the Facility Permit. Compliance with offset requirements of Rules 1303(b)(2) and 2005(b)(2) is expected.

RULES 1303(b)(3)-Sensitive Zone Requirements and 2005(e)-Trading Zone Restrictions

Both rules state that ERCs must be obtained from the appropriate trading zone. In the case of Rule 1303(b)(3), unless credits are obtained from the Priority Reserve, facilities located in the South Coast Air Basin are subject to the Sensitive Zone requirements specified in Health & Safety Code Section 40410.5. CPV Sentinel is located in Zone 2a and is therefore eligible to obtain its ERCs from either Zone 1 or Zone 2a. Similarly in the case of Rule 2005(e), CPV Sentinel, because of its location may obtain RECLAIM Trading Credits (RTCs) from either Zone 1 or Zone 2, at its choosing. Compliance is expected with both rules.

RULE 1303(b)(4)-Facility Compliance

The new facility will comply with all applicable Rules and Regulations of the SCAQMD.

RULE 1303(b)(5)-Major Polluting Facilities

Rule 1303(b)(5)(A) – Alternative Analysis

The applicant is required to conduct an analysis of alternative sites, sizes, production processes, and environmental control techniques for the CPV Sentinel project and to demonstrate that the benefits of the proposed project outweigh the environmental and social costs associated with this project. The applicant has performed a comparative evaluation of alternative sites as part of the AFC process and has concluded that the benefits of providing additional electricity and increased employment in the surrounding area will outweigh the environmental and social costs incurred in the construction and operation of the proposed facility. Compliance is expected.

Rule 1303(b)(5)(B) – Statewide Compliance

The applicant has certified in the 400-A form that all major sources under its ownership or control in the State of California are in compliance with all federal, state, and local air quality rules and regulations. In addition, the applicant has submitted an email to the SCAQMD dated October 19, 2006 stating that "any and all facilities that the applicant owns or operates in the State of California (including the proposed CPV Sentinel project) are in compliance or are on a schedule for compliance with all applicable emission limitations and standards under the Clean Air Act." Therefore, compliance is expected.

Rule 1303(b)(5)(C) – Protection of Visibility

Modeling is required if the source is within a Class I area and the NOx and PM10 emissions exceed 40 TPY and 15 TPY respectively. Since the nearest Class I area is located over 28 miles from the proposed CPV Sentinel project site, modeling for plume visibility is not required, however, the applicant has provided modeling impact data for the Class I areas as part of the AFC process. Compliance is expected.

Rule 1303(b)(5)(D) – Compliance through CEQA

The Energy Commission is the Lead Agency under CEQA. Since the applicant is required to receive a certification from the Energy Commission, the applicable CEQA requirements and deficiencies will be addressed. Compliance is expected.

REGULATION XVII-PREVENTION OF SIGNIFICANT DETERIORATION

The SCAQMD Governing Board, in its action on February 7, 2003, authorized the Executive Officer, upon withdrawal of the U.S. EPA Prevention of Significant Deterioration (PSD) delegation, not to request any further delegation and to allow the U.S. EPA to terminate the SCAQMD's PSD delegation agreement and for U.S. EPA to become the permitting agency for PSD sources in the SCAQMD.

The Board determined that Regulation XVII is inactive upon U.S. EPA's withdrawal of delegation and shall remain inactive unless and until the U.S. EPA provides the SCAQMD with new delegation of authority to act either in full or on a Facility/Permit-Specific basis. The delegation was rescinded on March 3, 2003, by U.S. EPA.

The SCAQMD Governing Board in its April 1, 2005, meeting reaffirmed its previous action on February 7, 2003, to relinquish PSD analysis back to federal government and render Regulation XVII inactive unless the SCAQMD receives new delegation in part or in full from the U.S. EPA.

Based on the Governing Board's actions, this rule is ineffective and no analysis is required for any pollutant subject to federal PSD requirement. The SCAQMD has sent the applicant a notification to contact the U.S. EPA directly for applicability of PSD to the proposed project. SCAQMD sent a letter to the applicant on December 8, 2005, and instructed the applicant to contact U.S. EPA directly regarding implementation of PSD. PSD requires major sources to obtain permits for attainment pollutants. A major source for a simple-cycle combustion turbine is defined as any one pollutant exceeding 250 tons per year. Since the emissions from the CPV Sentinel project are not expected to exceed 250 tons per year, PSD does not apply.

REGULATION XX-RECLAIM

Rule 2005(g) – Additional Requirements

As with Rule 1303(b)(5) for the Non-RECLAIM pollutants, CPV Sentinel has addressed the alternative analysis, statewide compliance, protection of visibility, and CEQA compliance requirements of this rule for NOx. These requirements are essentially the same as those found in Rule 1303(b)(5), subparts A through D for non-RECLAIM pollutants, and are summarized below. Compliance is expected.

Rule 2005(g)(1) – Statewide Compliance

The applicant has certified in the 400-A form that all major sources under its ownership or control in the State of California are in compliance with all federal, state, and local air quality rules and regulations. In addition, the applicant has submitted an email to the SCAQMD dated October 19, 2006 stating that "any and all facilities that the applicant owns or operates in the State of California (including the proposed CPV Sentinel project) are in compliance or are on a schedule for compliance with all applicable emission limitations and standards under the Clean Air Act. Therefore, compliance is expected.

Rule 2005(g)(2) – Alternative Analysis

The applicant is required to conduct an analysis of alternative sites, sizes, production processes, and environmental control techniques for the CPV Sentinel project and to demonstrate that the benefits of the proposed project outweigh the environmental and social costs associated with this project. The applicant has performed a comparative evaluation of alternative sites as part of the AFC process and has concluded that the benefits of providing additional electricity and increased employment in the surrounding area will outweigh the environmental and social costs incurred in the construction and operation of the proposed facility. Compliance is expected.

Rule 2005(g)(3) – Compliance through CEQA

The Energy Commission is the Lead Agency under CEQA. Since the applicant is required to receive certification from the Energy Commission, the applicable CEQA requirements and deficiencies will be addressed. Compliance is expected.

Rule 2005(g)(4) – Protection of Visibility

Modeling is required if the source is within a Class I area and the NOx emissions exceed 40 TPY. Since the nearest Class I area is located over 28 miles from the proposed CPV Sentinel project site, modeling from plume visibility is not required, however, the applicant has provided modeling impact data for the Class I areas as part of the AFC process. Compliance is expected.

Rule 2005(h) – Public Notice

CPV Sentinel will comply with the requirements for Public Notice found in Rule 212. Therefore compliance with Rule 2005(h) is demonstrated.

Rule 2005(i) – Rule 1401 Compliance.

CPV Sentinel will comply with Rule 1401 as demonstrated in the Tier 4 analysis and subsequently reviewed and found to be satisfactory by SCAQMD modeling staff. Compliance is expected.

Rule 2005(j) – Compliance with State and Federal NSR.

CPV Sentinel will comply with the provisions of this rule by having demonstrated compliance with SCAQMD NSR Regulations XIII and Rule 2005-NSR for RECLAIM.

REGULATION XXX – TITLE V

CPV Sentinel is a Title V facility because the cumulative emissions will exceed the Title V major source thresholds and because it is also subject to the federal acid rain provisions. The initial Title V permit will be processed and the required public notice will be sent along with the Rule 212(g) Public Notice, which is also required for this project. U.S. EPA is afforded the opportunity to review and comment on the project within a 45-day review period. Compliance is expected.

RESPONSE TO COMMENTS FROM PUBLIC AGENCIES

Staff received comments from the California Public Utilities Commission for the Preliminary Staff Assessment (CPUC 2008) regarding CPV Sentinel. Staff has the following responses to the comments submitted regarding air quality.

Comment 1: Does the Air Quality Construction Impact table (AIR QUALITY Table 12, page 4.1-23) include impacts from construction of the generation-tie between CPV Sentinel's switchyard and the SCE Devers substation?

Comment 2: Does assessment of state violations of annual and 24-hour PM10 and 24-hour federal violations of PM2.5 AAQS (AIR QUALITY Table 12, page 4.1-23) include the impacts from transmission line construction and relocations of the project?

Response to Comments 1 & 2: The construction impacts do not include linear construction elements, with exception of those that happen on the main construction site. CEC Staff has found through experience that while linear elements do have emissions and potential impacts, those impacts are small and near-field (at most approximately 50 feet). Such an impact is beyond the ability of the air dispersion model (AERMOD) to accurately predict. We therefore assume an impact and implement a mitigation strategy (Conditions of Certification AQ-SC1 through AQ-SC6).

Comment 3: Are greenhouse gas emissions calculated for the transmission line construction and relocations of the project?

Response to Comment 3: The GHG emissions presented do not include construction emissions. GHG emissions associated with construction of the project main site and linear elements (gas line and transmission lines) have been estimated by the applicant and are presented in ATTACHMENT 1.

Comment 4: The low-sulfur requirement for diesel-fueled vehicles used during construction on the facility should apply to transmission construction and relocations as well.

Response to Comment 4: Ultra-Low Sulfur fuel is required for all diesel fuel powered construction equipment via Condition of Certification AQ-SC5 element 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."

Staff interprets this requirement to include the construction equipment used on all linear construction elements as well as the main construction site.

CONCLUSIONS

At this time, the applicant has not secured or identified sufficient ERCs, RTCs or other offsets allowed under District Rules and Regulations to comply with New Source Review offset requirements or mitigate the potential air quality impacts from the project emissions of NOx, SO_2, VOC, PM10 and PM2.5. Unmitigated, these pollutants have the potential to contribute to existing violations of the ambient air quality standards.

Therefore, staff cannot determine whether CPV Sentinel is likely to conform with applicable federal, state and District air quality laws, ordinances, regulations and standards; nor whether the mitigation proposed for the project is adequate to lessen any potentially significant impacts to a less than significant level.
Since the project will emit less than 0.500 mt CO_2/MWh (0.44582 mt CO_2/MW-hr) it is compliant under SB1368. While the explicit regulations required under AB32 are not known at this time, the proposed project GHG emission rate is less than the current estimated system wide average for peaking units and thus the addition of the project is not expected to impede the progress of the ARB towards the goals of AB32. Therefore, staff concludes that the proposed project GHG emissions are not cumulatively considerable and thus do not represent a significant impact under CEQA.

Staff proposes the following conditions of certification that include the SCAQMD proposed conditions from the FDOC with appropriate staff proposed verification language for each condition. Even though staff is not recommending certification of the Sentinel project, staff is including the proposed conditions of certification for informational purposed only.

The Staff has proposed a number of permit conditions that are in addition to the permit conditions that the SCAQMD has proposed in the FDOC. In most cases the staff proposed permit conditions deal with air quality issues that the SCAQMD are not required to address. Conditions **AQ-SC1** through **AQ-SC5** are construction related permit conditions. Condition **AQ-SC6** deals with the administrative procedures for project modifications. Condition **AQ-SC7** is a reporting requirement for the providing of emission offsets. Condition **AQ-SC9** is the Commission Greenhouse Gas reporting requirement. Condition **AQ-SC10** is a quarterly emission reporting requirement. Conditions **AQ-SC11** and **AQ-SC12** are cooling tower permit requirements. Staff proposes these conditions for the operation of the cooling towers because the SCAQMD does not consider cooling towers as permit units (see discussion of SCAQMD rule 1303(a)-BACT for Cooling Towers above), and thus they do not include permit conditions. However staff believes that they are potential sources of PM10/PM2.5 as shown in our analysis, and thus permit limits and verifications of those permit limits should be proposed. Conditions **AQ-1** through **AQ-18** are the SCAQMD permit conditions with staff proposed verification language. Condition **AQ-2** incorporates a District rule regarding emission limit compliance for NOx emission within the RECLAIM program.

PROPOSED CONDITIONS OF CERTIFICATION

The SCAQMD has a unique system of structuring and numbering their permit conditions. In order for the reader to avoid confusion between how the SCAQMD numbers their permit conditions and how the Energy Commission staff normally numbers permit conditions, the staff prepared the following table that cross references the conditions in the FDOC with the conditions presented by staff in this analysis.

AIR QUALITY Table 18
SCAQMD Permit Conditions with Corresponding Commission Conditions of Certification

SCAQMD Permit Conditions	CEC Condition of Certification	Condition Description
Combustion Turbines		
A63.1	AQ-1	Monthly contaminant emission limit (PM10, CO, Sox & VOC) Units 1-5
A63.2	AQ-1	Monthly contaminant emission limit (PM10, CO, Sox, & VOC) Units 6-8
SCAQMD Rule 2004	AQ-2	Annual contaminant emissions limit (NO_2).
A99.1	AQ-3	Relief from 2.5ppm NOx limit during commissioning, startup and shut down. Commissioning, startup & shutdown time limits. Limit of number of startups per year. Units 1-5
A99.2	AQ-3	Relief from 2.5ppm NOx limit during commissioning, startup and shut down. Commissioning, startup & shutdown time limits.

		Limit of number of startups per year. Units 6-8
A99.3	AQ-3	Relief from 6.0 ppm CO limits during commissioning, startup and shut down. Commissioning, startup & shutdown time limits. Limit of number of startups per year. Units 1-5
A99.4	AQ-3	Relief from 6.0 ppm CO limits during commissioning, startup and shut down. Commissioning, startup & shutdown time limits. Limit of number of startups per year. Units 6-8
A99.5	AQ-3	NOx limit during the turbine commissioning, not to exceed 12 months.
A99.7	AQ-3	NOx limit for interim time period of end of commissioning to continuous emission monitoring system (CEMS) certification, not to exceed 12 months.
A99.9	AQ-3	Relief from 2.0 ppm VOC limit during commissioning, startup and shut down. Commissioning, startup & shutdown time limits. Limit of number of startups per year. Units 1-5
A99.10	AQ-3	Relief from 2.0 ppm VOC limit during commissioning, startup and shut down. Commissioning, startup & shutdown time limits. Limit of number of startups per year. Units 6-8
A195.1	AQ-4	CO emission limit of 6.0 ppm @ 15% O_2 averaged over 1-hour.
A195.2	AQ-4	NOx emission limit of 2.5 ppm @ 15% O_2 averaged over 1-hour.
A193.3	AQ-4	VOC emission limit of 2.0 ppm @ 15% O_2 averaged over 1-hour.
A327.1	AQ-5	Relief from emission limits, under Rule 475; project may violate either the mass emission limit or concentration emission limit, but not both at the same time.
A433.1	AQ-3	NOx emission limit during startup. Units 1-5
A433.2	AQ-3	NOx emission limit during startup.

		Units 6-8
B61.1	AQ-6	H_2S concentration limit for natural gas.
C1.1	AQ-6	Limits the fuel usage for each turbine to 418 mmcf per month (non-commissioning). Units 1-5
C1.2	AQ-6	Limits the fuel usage for each turbine to 598 mmcf per month (non-commissioning). Units 6-8
C1.3	AQ-6	Limits the fuel usage for each turbine to 301 mmcf per month (commissioning).
C1.6	AQ-6	Limits the fuel usage for each turbine to 2,411 mmcf per year (non-commissioning). Units 1-5.
C1.7	AQ-6	Limits the fuel usage for each turbine to 2,928 mmcf per year (non-commissioning). Units 6-8.
D12.1	AQ-6	Requires the installation of a fuel flow meter.
D29.1	AQ-7	Requires source tests for specific pollutants (Nox, CO, SOx, VOC, PM10, NH3) within 180 days of initial startup.
D29.2	AQ-8	Requires source tests for ammonia (NH3); quarterly for the first year and annually thereafter.
D29.3	AQ-7	Requires source tests for specific pollutants (Sox, VOC, PM10) once every three years.
D82.1	AQ-9	Requires the installation of CEMS for CO emissions.
D82.2	AQ-9	Requires the installation of CEMS for NOx emissions.
E193.1	AQ-SC10	Requires that the turbines be operated within the mitigation measures stipulated in the Commission Decision.
E193.3	AQ-3	Requires the project to be operational within 3 years of the issuance of the permit to construct.
H23.1	NA	Establishes the applicability of 40CFR60 Subpart KKKK for the project contaminant NOx and SOx.
I296.1	AQ-16	Prohibited from operation unless the operator hold sufficient RTCs

		for the CTGs. Units 1-5
I296.2	AQ-16	Prohibited from operation unless the operator hold sufficient RTCs for the CTGs. Units 6-8
K40.1	AQ-7, -8 & -9	Source test reporting requirements.
K67.1	AQ-10	Requires record keeping of fuel use during commissioning, prior to and after CEMs certification.
SCR/CO Catalyst		
A195.4	AQ-11	Establishes the 5 ppm ammonia slip limit.
D12.2	AQ-12	Requires a flow meter for the ammonia injection.
D12.3	AQ-13	Requires a temperature meter at the SCR inlet.
D12.4	AQ-14	Requires a pressure gauge to measure the differential pressure across the SCR grid.
E179.1	AQ-12 & -13	Defines “continuously record” for D12.2 and D12.3 as recording once an hour based on the average of continuous monitoring for that hour.
E179.2	AQ-14	Defines “continuously record” for D12.4 as recording once a month based on the average of continuous monitoring for that month.
E193.1	AQ-SC10	Requires that the SCR/CO catalyst be operated within the mitigation measures stipulated in the Commission Decision.
Ammonia Storage Tank		
C157.1	See Hazardous Material section	Requires the installation of a pressure relief valve.
E144.1	See Hazardous Material section	Requires venting of the storage tank during filling only to the vessel from which it is being filled.
E193.1	AQ-SC10	Requires that the Ammonia Storage Tank be operated within the mitigation measures stipulated in the Commission Decision.
K67.2	See Hazardous Material section	Requires record keeping in the manner approved by the District Executive Officer.

Emergency Firewater Pump		
C1.4	AQ-15	Limited to 50 hours per year (for operation and ready test firing).
D12.5	AQ-15	Requires the installation of a non-resettable time meter.
B61.2	AQ-15	Restricts the sulfur content of the diesel fuel to no more than 15 ppm by weight.
E193.1	AQ-SC10	Requires that the firewater pump be operated within the mitigation measures stipulated in the Commission Decision.
I296.2	AQ-16	Prohibited from operation unless the operator holds sufficient RTCs for the firewater pump.
K67.2	AQ-15	Required record keeping for the firewater pump.
Black Start Engine		
B61.2	AQ-18	Restricts the sulfur content of the diesel fuel to no more than 15 ppm by weight.
C1.5	AQ-18	Limited to 12 hours per year (for operation and ready test firing).
D12.5	AQ-18	Requires the installation of a non-resettable time meter.
E193.1	AQ-SC10	Requires that the black start engine be operated within the mitigation measures stipulated in the Commission Decision.
E193.5	AQ-18	Establishes the operational restrictions for the black start engine, including a restriction of 50 hours/year for ready test firing.
I296.2	AQ-16 & AQ-18	Prohibited from operation unless the operator holds sufficient RTCs for the black start engine.
K67.4	AQ-18	Required record keeping for the black start engine.
Portable Architectural Coating Equipment		
K67.5	NA	Required record keeping of thinners and no-thinners architectural applications (paint).

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with conditions **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 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. The AQCMM and all Delegates must be approved by the CPM before the start of ground disturbance.

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

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 CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt. The AQCMP must be approved by the CPM before the start of ground disturbance.

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 site and linear facility routes. 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 may 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 CPM.

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

i) All paved roads within the construction site shall be swept at least twice daily (or less during periods of precipitation) 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 the potential to cause visible emissions from the material 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 two feet 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 project owner shall include in the MCR (1) a summary of all actions taken to maintain compliance with this condition, (2) copies of any complaints filed with the air 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-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 AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

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

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

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

Verification: The AQCMP shall include a section detailing how the additional mitigation measures will be accomplished within the time limits specified.

AQ-SC5 Diesel-Fueled Engines 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 or U.S. Environmental Protection Agency 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 project owner shall include in the MCR (1) a summary of all actions taken to maintain compliance with this condition, (2) copies of all diesel fuel purchase records, (3) 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 (4) 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 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 SCAQMD or U.S. EPA, and any revised permit issued by the SCAQMD or U.S. EPA, for the project.

<u>Verification:</u> The project owner shall submit 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-SC7 The project owner shall provide emission reduction credits to offset turbine exhaust and emergency equipment NOx, VOC, SOx, PM10 and PM2.5 emissions in the form and amount required by the District. RECLAIM Trading Credits (RTCs) shall be provided for NOx as is necessary to demonstrate compliance with Condition of Certification **AQ-16**.

Emission reduction credits (ERCs) shall be provided for SOx (103 lb/day includes offset ratio of 1.2), PM10 (1051 lb/day, includes offset ratio of 1.2) and VOC (494 lb/day, includes offset ratio of 1.2).

The project owner shall surrender the ERCs for SOx, VOC and PM10 from among those that are listed in the table below or a modified list, as allowed by this condition. If additional ERCs are submitted, the project owner shall submit an updated table including the additional ERCs to the CPM. The project owner shall request CPM approval for any substitutions, modifications, or additions of credits listed.

The CPM, in consultation with the District, may approve any such change to the ERC list provided that the project remains in compliance with all applicable laws, ordinances, regulations, and standards, the requested change(s) will not cause the project to result in a significant environmental impact, and the SCAQMD confirms that each requested change is consistent with applicable federal and state laws and regulations.

The project owner shall request from the SCAQMD a report of the NSR Ledger Account for the project after the SCAQMD has issued the Permit to Construct. This report is to specifically identify the ERCs used to offset the project emissions.

Certificate Number	Amount (lbs/day)	Pollutant
AQ007877	348	VOC
AQ007879	64	VOC
To be determined (TBD)	TBD	TBD

<u>Verification:</u> The project owner shall submit to the CPM the NSR Ledger Account, showing that the project's offset requirements have been met, 15 days prior to initiating construction for Priority Reserve credits, and 30 days prior to turbine first fire for traditional ERCs. Prior to commencement of construction, the project owner shall obtain sufficient RTCs to satisfy the District's requirements for the first year of operation as prescribed in Condition of Certification **AQ-16**. If the CPM approves a substitution or modification to the list of ERCs, the CPM shall file a statement of the approval with the project owner and commission docket. The CPM shall maintain an updated list of approved ERCs for the project.

AQ-SC8 Deleted

AQ-SC9 Until the ARB enacts a program to report and restrict GHG emissions from the electricity sector under the California Global Warming Solutions Act of 2006 (AB32), 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. When ARB's GHG reporting regulations become effective, the project owner shall comply with the requirements of that GHG program, and the reporting requirements of this condition of certification shall cease, provided that the Energy Commission continues to receive the data required by the ARB program. Until then, the project owner shall do what is described in the following paragraphs.

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 (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.

<u>Verification:</u> The project annual GHG emissions shall be reported as required by the ARB under the California Global Warming Solutions Act of 2006 (AB32) and, until such requirements are enacted, as a CO_2 equivalent, by the project owner to a climate action registry approved by the CPM, or to the CPM annually as part of the operational report required (**AQ-SC10**) or the annual Air Quality Report.

AQ-SC10 The project owner shall submit to the CPM Quarterly Operation Reports, following the end of each calendar quarter, that include operational and emissions information as necessary to demonstrate compliance with the Conditions of Certification herein. The Quarterly Operation Report will specifically note or highlight incidences of noncompliance.

<u>Verification:</u> The project owner shall submit the Quarterly Operation Reports to the CPM and APCO no later than 30 days following the end of each calendar quarter.

AQ-SC11 The project owner shall perform quarterly cooling tower recirculating water quality testing, or shall provide for continuous monitoring of conductivity as an indicator, for total dissolved solids content.

<u>Verification:</u> The project owner shall submit to the CPM cooling tower recirculating water quality tests or a summary of continuous monitoring results and daily recirculating water flow in the Quarterly Operation Report (**AQ-SC10**). If the project owner uses continuous monitoring of conductivity as an indicator for total dissolved solids content, the project owner shall submit data supporting the calibration of the conductivity meter and the correlation with total dissolved solids content at least once each year in a Quarterly Operation Report (**AQ-SC10**).

AQ-SC12 The cooling towers daily PM10 emissions shall be limited to 18.82 lb/day in total for all eight cooling tower cells. The cooling towers shall be equipped with a drift eliminator to control the drift fraction to 0.0005 percent of the circulating water flow. The project owner shall estimate daily PM10 emissions from the cooling towers using the water quality testing data or continuous monitoring data and daily circulating water flow data collected on a quarterly basis. Compliance with the cooling tower PM10 emission limit shall be demonstrated as follows:
PM10 = cooling water recirculation rate * total dissolved solids concentration in the blowdown water * design drift rate.

Verification: The project owner shall submit to the CPM daily cooling tower PM10 emission estimates in the Quarterly Operation Report (**AQ-SC10**).

AQ-1 The project owner shall limit the emissions from **each** gas fired combustion turbine train exhaust stack as follows:

Units 1, 2, 3, 4 and 5

Contaminant	Emissions Limit
PM10	2,910 lbs in any one month
CO	8,201 lbs in any one month
SOx	288 lbs in any one month
VOC	1,425 lbs in any one month

Units 6, 7 and 8

Contaminant	Emissions Limit
PM10	4,170 lbs in any one month
CO	10,631 lbs in any one month
SOx	417 lbs in any one month
VOC	1,888 lbs in any one month

For the purpose of this condition, the limit(s) shall be based on the emissions from a single exhaust stack.

The project owner shall calculate the emission limit(s) by using the monthly fuel use data and the following emission factors: PM10: 6.97 lb/mmscf, VOC: 2.189 lb/mmscf & SOx: 0.71 lb/mmscf.

Compliance with the CO emission limit shall be verified through valid CEMS data.

The project owner shall calculate the emission limit(s) for CO for the purpose of determining compliance with the monthly emission limit in the absence of valid CEMS data by using the following emission factor(s):

A. During the commissioning period and prior to CO catalyst installation: 38.48 lb/mmscf.

B. After installation of the CO catalysis but prior to CO CEMS certification testing: 18.73 lb/mmscf the emission rate shall be recalculated in accordance with Condition AQ-10 if the approved CEMS certification test resulted in emission concentration higher than 6 ppmv.

C. After CO CEMS certification testing: 18.73 lb/mmscf After CO CEMS certification test is approved by the AQMD, the emissions monitored by the CEMS and calculated in accordance with Condition AQ-10 shall be used to calculated emissions.

For the purpose of this condition, the limit(s) shall be based on the emissions from a single turbine. During Commissioning, the CO emissions shall not exceed 11,602 lbs/month and the VOC emissions shall not exceed 620 lbs/month.

The project owner shall provide the AQMD with written notification of the date of initial CO catalyst use within (7) days of this event.

For the purpose of this condition the turbine shall not commence with normal operation until the commissioning process has been completed. Normal operations may proceed in the same commissioning month provided the project owner follows the requirements listed below.

The project owner shall calculate the commissioning emissions for VOC, SOx and PM10) for the commissioning month (beginning of the month to the last day of commissioning) using the equation below and the following emission factors: VOC: 2.06 lb/mmcf; PM10: 2.99 lb/mmcf; and SOx: 0.12 lb/mmcf.

The commissioning emissions for VOC, SOx, and PM10 shall be subtracted from the monthly emissions limits (listed in the table at the top of this condition) and the revised monthly emission limits will be the maximum emissions allowed for the remaining of the month.

For the purpose of this condition, the term “normal operations” is defined as the turbine is able to supply electrical energy to the power grid.

Verification: The project owner shall submit all emission calculations, fuel use, CEM records and a summary demonstrating compliance of all emission limits stated in this Condition for approval to the CPM on a quarterly basis in the quarterly emissions report (**AQ-SC10**).

AQ-2 The project owner/operator shall not produce emissions of oxides of nitrogen from the facility, including the firewater pump and all eight gas turbines combined, that exceed the RECLAIM Trading Credits holdings required in Condition of Certification **AQ-16** within a calendar year.

Verification: The project owner/operator shall submit to the CPM no later than 60 days following the end of each calendar year, the SCAQMD required (via Rule 2004) Quarterly Certification of Emissions (or equivalent) for each quarter and the Annual Permit Emissions Program report (or equivalent) as prescribed by the SCAQMD Executive Officer.

AQ-3 The 2.5 ppm NOx emission limit, the 2.0- ppm VOC limit and the 6.0 ppm CO emission limit shall not apply during turbine commissioning, start-up and shutdown. The commissioning period shall not exceed 150 operating hours per turbine from the initial start-up. Following commissioning, start-ups shall not exceed 25 minutes and shutdowns shall not exceed 10 minutes. Written records of commissioning, start-ups and shutdowns shall be kept and made available to SCAQMD and submitted to the CPM for approval. Emissions of NOx shall not exceed 29.52 lbs/hr for any hour in which a startup occurs.

Units 1, 2, 3, 4 and 5 shall be limited to a maximum of 300 startups per year; Units 6, 7 and 8 shall be limited to a maximum of 350 startups per year.

The 19 lb/mmscf NOx emission limit(s) shall only apply during interim reporting period during initial turbine commissioning and the 12.40 lbs/mmscf shall apply only during the interim reporting period after the initial turbine commissioning period, to report RECLAIM emissions. The interim period shall not exceed 12 months from the initial start-up date.

For this condition startup shall be defined as the start up process to bring the turbine in full successful operations. If during startup the process is aborted and the startup is restarted, then the startup and restart is defined as one startup. In this case the startup time shall not exceed 1 hour.

The project owner/operator shall complete construction and the project shall be fully operational within three years of the issuance of the permit to construction from the District.

Verification: The project owner shall provide the SCAQMD and the CPM with the written notification of the initial start-up date no later than 60 days prior to the startup date. The project owner shall submit, commencing one month from the time of gas turbine first fire, a monthly commissioning status report throughout the duration of the commissioning phase that demonstrates compliance with this condition and the emission limits of Condition **AQ-13**. The monthly commissioning status report shall include criteria pollutant emission estimates for each commissioning activity and total commissioning emission estimates. The monthly commissioning status report shall be submitted to the CPM until the report includes the completion of the initial commissioning activities. The project owner shall provide start-up and shutdown occurrence and duration data as part as part of the Quarterly Operation Report (**AQ-SC10**) including records of all aborted turbine startups. The project owner shall make the site available for inspection of the commissioning and startup/shutdown records by representatives of the District, CARB and the Commission.

AQ-4 Each combustion turbine stack shall have the following emission limitations. 2.5 PPM NOx emission averaged over 60 minutes at 15 percent oxygen, dry basis.

6.0 ppm CO emission averaged over 60 minutes at 15 percent oxygen, dry basis.

2.0 ppm VOC emission averaged over 60 minutes at 15 percent oxygen, dry basis.

5.0 ppm NH_3 emission averaged over 60 minutes at 15 percent oxygen, dry basis.

Verification: The project owner shall submit to the CPM for approval all emissions and emission calculations on a quarterly basis as part of the quarterly emissions report of Condition of Certification **AQ-SC10**.

AQ-5 The project owner may at no time purposefully exceed either the mass or concentration emission limits set forth in Conditions of Certification **AQ-1, -2, -3** or **-4**.

<u>Verification:</u> The project owner shall submit to the CPM for approval all emissions and emission calculations on a quarterly basis as part of the quarterly emissions report of Condition of Certification **AQ-SC10**.

AQ-6 The project owner shall limit the fuel usage during a commissioning period from each turbine to no more than 301 mmscf of pipeline quality natural gas per month. After the completion of commissioning, units 1,2,3,4 and 5 shall limit the fuel usage from each turbine to no more than 418 mmcf in any one non-commissioning calendar month and 2,411 mmcf in any one non-commissioning year. After the completion of commissioning units 6,7 and 8 shall limit the fuel usage from each turbine to no more than 598 mmcf in any one non-commissioning calendar month and 2,928 mmcf in any one non-commissioning year.

The operator shall maintain records in a manner approved by the District to demonstrate compliance with this condition. The operator shall install and maintain a fuel flow meter and recorder to accurately indicate and record the fuel usage being supplied to each turbine. The natural gas shall not exceed H_2S concentrations of more than 0.25 gr/100scf on an annual average of the monthly samples of gas composition or gas supplier documentation. The natural gas fuel sample shall be tested using District Method 307-91 for total sulfur calculated as H_2S.

<u>Verification:</u> The project owner shall submit to the CPM for approval all fuel usage records on a quarterly basis as part of the quarterly emissions report of Condition of Certification **AQ-SC10**.

AQ-7 The project owner shall conduct an initial source test for NOx, CO, SOx, VOC, NH_3 and PM10 and periodic source test every three years thereafter for NOx, CO, SOx, VOC and PM10 of each gas turbine exhaust stack in accordance with the following requirements:

- The project owner shall submit a source test protocol to the SCAQMD and the CPM 45 days prior to the proposed source test date for approval. The protocol shall include the proposed operating conditions of the gas turbine, the identity of the testing lab, a statement from the lab certifying that it meets the criteria of SCAQMD Rule 304, and a description of all sampling and analytical procedures.
- The initial source test shall be conducted no later than 180 days following the date of first fire.
- The SCAQMD and CPM shall be notified at least 10 days prior to the date and time of the source test.
- The source test shall be conducted with the gas turbine operating under maximum, average and minimum loads.

- The source test shall be conducted to determine the oxygen levels in the exhaust.
- The source test shall measure the fuel flow rate, the flue gas flow rate and the turbine generating output in MW.
- The source test shall be conducted for the pollutants listed using the methods, averaging times, and test locations indicated and as approved by the CPM:

Pollutant	Method	Averaging Time	Test Location
NOx	SCAQMD Method 100.1	1 hour	Outlet of SCR
CO	SCAQMD Method 100.1	1 hour	Outlet of SCR
SOx	District Method 307.91	N/A	Fuel Sample
VOC	District Method 25.3	1 hour	Outlet of SCR
PM10	District Method 5	4 hours	Outlet of SCR
Ammonia	SCAQMD Methods 5.3 and 207.1 or U.S. EPA Method 17.	1 hour	Outlet of SCR

- The source test results shall be submitted to the SCAQMD and the CPM no later than 60 days after the source test was conducted.
- All emission data is to be expressed in the following units:
  1. ppmv corrected to 15 percent oxygen dry basis,
  2. pounds per hour,
  3. pounds per million cubic feet of fuel burned and
  4. additionally, for PM10 only, grains per dry standard cubic feet of fuel burned.
- Exhaust flow rate shall be expressed in terms of dry standard cubic feet per minute and dry actual cubic feet per minute.
- All moisture concentrations shall be expressed in terms of percent corrected to 15 percent oxygen.
- For the purpose of this condition, alternative test methods may be allowed for each of the above pollutants upon concurrence of the AQMD, CARB, EPA and the CEC.

Verification: The project owner shall submit the proposed protocol for the initial source tests 45 days prior to the proposed source test date to both the SCAQMD and

CPM for approval. The project owner shall submit source test results no later than 60 days following the source test date to both the SCAQMD and CPM. The project owner shall notify the SCAQMD and CPM no later than 10 days prior to the proposed initial source test date and time.

AQ-8 The project owner shall conduct source testing of each gas turbine exhaust stack in accordance with the following requirements:

- The project owner shall submit a source test protocol to the SCAQMD and the CPM for approval no later than 45 days prior to the proposed source test date. The protocol shall include the proposed operating conditions of the gas turbine, the identity of the testing lab, a statement from the lab certifying that it meets the criteria of SCAQMD Rule 304, and a description of all sampling and analytical procedures.
- Source testing for ammonia slip only shall be conducted quarterly for the first 12 months of operation and annually thereafter.
- NOx concentrations as determined by CEMS shall be simultaneously recorded during the ammonia test. If the NOx CEMS is inoperable, a test shall be conducted to determine the NOx emission by using SCAQMD Method 100.1 measured over a 60 minute time period.
- Source testing shall be conducted to determine the ammonia emissions from each gas turbine exhaust stack using SCAQMD Method 5.3 and 207.1 or U.S. EPA Method 17 measured over a 1 hour averaging period at the outlet of the SCR.
- The SCAQMD and CPM shall be notified of the date and time of the source testing at least 7 days prior to the test.
- The source test shall be conducted and the results submitted to the SCAQMD and CPM within 45 days after the test date.
- Source testing shall measure the fuel flow rate, the flue gas flow rate and the gas turbine generating output.
- The test shall be conducted when the equipment is operating at 80 percent load or greater.
- If the turbine is not in operation during one quarter, then no testing is required during that quarter.
- All emission data is to be expressed in the following units:
    1. ppmv corrected to 15 percent oxygen,
    2. pounds per hour,
    3. pounds per million cubic feet of fuel burned and

<u>**Verification:**</u> The project owner shall submit the proposed protocol for the source tests 45 days prior to the proposed source test date to both the SCAQMD and CPM for approval. The project owner shall notify the SCAQMD and CPM no later than 7 days

prior to the proposed source test date and time. The project owner shall submit source test results no later than 45 days following the source test date to both the SCAQMD and CPM.

AQ-9 The project owner shall install and maintain a CEMS in each exhaust stack of the combustion turbine trains to measure the following parameters:

NOx concentration in ppmv and CO concentration in ppmv.

Concentrations shall be corrected to 15 percent oxygen on a dry basis.
The CEMS will convert the actual CO concentrations to mass emission rates (lb/hr) and record the hourly emission rates on a continuous basis.

The CEMS shall be installed and operated to measure CO concentration over a 15 minute averaging time period.

The CEMS shall be installed and operated in accordance with an approved SCAQMD Rule 218 CEMS plan application and the requirements of Rule 2012.

The CO CEMS shall be installed and operating no later than 90 days after initial start-up of the turbine.

The NOx CEMS shall be installed and operating no later than 12 months after initial start-up of the turbine.

During the interim period between the initial start-up and the provisional certification date of the CEMS, the project owner shall comply with the monitoring requirements of Rule 2012 (h)(2) and Rule 2012 (h)(3). Within two weeks of the turbine start-up date, the project owner shall provide written notification to the SCAQMD of the exact date of start-up.

<u>Verification:</u> Within 30 days of certification, the project owner shall notify the CPM of the completion of the certification process for the CEMS.

AQ-10 The project owner shall keep records in a manner approved by the SCAQMD for the following items:

Natural Gas use after CEMS certification

Natural Gas use during the commissioning period

Natural Gas use after the commissioning period and prior to the CEMS certification.

<u>Verification:</u> The project owner shall submit to the CPM for approval all fuel usage records on a quarterly basis as part of the quarterly emissions report of Condition of Certification **AQ-SC10**.

AQ-11 The owner/operator shall determine the hourly ammonia slip emissions from each exhaust stack for each gas turbine individually via both the following formula:

SCAQMD Requirement

NH3 (ppmv) = [a-b*(c*1.2)/1E6]*1E6/b

Where:

a = NH3 injection rate (lb/hr) / 17(lb/lbmol),

b = dry exhaust flow rate (scf/hr) / 385.5 (scf/lbmol),

c = change in measured NOx across the SCR (ppmvd at 15 percent O2)

The above described ammonia slip calculation procedure shall not be used for compliance determination or emission information determination without corroborative data using an approved reference method for the determination of ammonia for the District.

Energy Commission Requirement:

NH3 (ppmv @ 15 percent O2) = ((a-b*(c/1E6))*1E6/b)*d, where:

a = NH3 injection rate (lb/hr)/17(lb/lbmol),

b = dry exhaust gas flow rate (lb/hr)/ (29(lb/lbmol), or

b = dry exhaust flow rate (scf/hr) / 385.5 (scf/lbmol),

c = change in measured NOx concentration ppmv corrected to 15 percent O2 across catalyst, and

d = correction factor.

The correction factor shall be derived through compliance testing by comparing the measured and calculated ammonia slip. The correction factor shall be reviewed and approved by the CPM on at least an annual basis. The correction factor may rely on previous compliance source test results or other comparable analysis as the CPM finds the situation warrants. The above described ammonia slip calculation procedure shall be used for Energy Commission compliance determination for the ammonia slip limit as prescribed in Condition of Certification **AQ-4** and reported to the CPM on a quarterly basis as prescribed in Condition of Certification **AQ-SC10**.

An exceedance of the ammonia slip limit as demonstrated by the above Energy Commission formula shall not in and of itself constitute a violation of the limit. An exceedance of the ammonia slip limit shall not exceed 6 hours in duration. In the event of an exceedance of the ammonia slip limit exceeding 6 hours duration, the project owner shall notify the CPM within 72 hours of the occurrence. This notification must include, but is not limited to: the date and time of the exceedance, duration of the exceedance, estimated emissions as a result of the exceedance, the suspected cause of the exceedance and the corrective action taken or planned. Exceedances of the ammonia limit that are less than or equal to 6 hours in duration shall be noted in a specific section within the Quarterly Report (**AQ-SC10**). This section shall include, but is not limited to: the date and time of the exceedance, duration of the exceedance, and the estimated emissions as a result of the exceedance. Exceedances shall be deemed chronic if they total more than 10 percent of the operation for any single exhaust stack. Chronic exceedances must be investigated and redressed in a timely manner and in conjunction with the CPM through the cooperative development of a compliance plan. The compliance plan shall be developed to bring the project back into compliance first and foremost and shall secondly endeavor to do so in a feasible and timely manner, but shall not be limited in scope.

The owner/operator shall maintain compliance with the ammonia slip limit, redress exceedances of the ammonia slip limit in a timely manner, and avoid chronic exceedances of the ammonia slip limit. Exceedances shall be deemed a violation of the ammonia slip limit if they are not properly redressed as prescribed herein.

The owner/operator shall install a NOx analyzer to measure the SCR inlet NOx ppm accurate to within +/- 5 percent calibrated at least once every 12 months.

Verification: The project owner shall include ammonia slip concentrations averaged on an hourly basis calculated via both protocols provided as part of the Quarterly Operational Report required in Condition of Certification **AQ-SC10**. The project owner shall submit all calibration results performed to the CPM within 60 days of the calibration date. The project owner shall submit to the CPM for approval a proposed correction factor to be used in the Energy Commission formula at least once a year but not to exceed 180 days following the completion of the annual ammonia compliance source test. Exceedances of the ammonia limit shall be reported as prescribed herein. Chronic exceedances of the ammonia slip limit shall be identified by the project owner and confirmed by the CPM within 60 days of the fourth quarter Quarterly Operational Report (**AQ-SC10**) being submitted to the CPM. If a chronic exceedance is identified and confirmed, the project owner shall work in conjunction with the CPM to develop a reasonable compliance plan to investigate and redress the chronic exceedance of the ammonia slip limit within 60 days of the above confirmation.

AQ-12 The operator shall install and maintain an ammonia injection flow meter and recorder to accurately indicate and record the ammonia injection flow rate being supplied to each turbine. The device or gauge shall be accurate to within plus or minus 5 percent and shall be calibrated once every twelve months. The ammonia injection system shall be placed in full operation as soon as the minimum temperature is reached. The minimum temperature is listed as 540 degrees F at the inlet to the SCR reactor.

Continuously recording is defined for this condition as at least once every hour and is based on the average of the continuous monitoring for that hour.

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate device has been installed and is functioning properly. The project owner shall submit annual calibration results within 30 days of their successful completion.

AQ-13 The operator shall install and maintain a temperature gauge and recorder to accurately indicate and record the temperature in the exhaust at the inlet of the SCR reactor. The gauge shall be accurate to within plus or minus 5 percent and shall be calibrated once every twelve months. The catalyst temperature range shall remain between 740 degree F and 840 degree F. The catalyst temperature shall not exceed 840 degrees F. The temperature range requirement of this condition does not apply during startup operations of the turbine.

Continuously recording is defined for this condition as at least once every hour and is based on the average of the continuous monitoring for that hour.

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate device has been installed and is functioning properly. The project owner shall submit annual calibration results within 30 days of their successful completion.

AQ-14 The operator shall install and maintain a pressure gauge and recorder to accurately indicate and record the pressure differential across the SCR catalyst bed in inches of water column. The gauge shall be accurate to within plus or minus 5 percent and shall be calibrated once every twelve months. The pressure drop across the catalyst shall not exceed 12 inches of water column during the start-up period.

Continuously recording is defined for this condition as at least once every month and is based on the average of the continuous monitoring for that month.

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate device has been installed and is functioning properly. The project owner shall submit annual calibration results within 30 days of their successful completion.

AQ-15 The project owner shall limit the operating time of the firewater pump to no more than 199.99 hours per year. The firewater pump shall be equipped with a non-resettable elapsed meter to accurately indicate the elapsed operating time of the engine. The firewater pump shall be equipped with a non-resettable totalizing fuel meter to accurately indicate the fuel usage of the engine. The firewater pump shall burn only diesel fuel that contains sulfur compounds less than or equal to 15 ppm by weight.

An engine operating log shall be kept in writing, listing the date of operation, the elapsed time, in hours, and the reason for operation. The log shall be maintained for a minimum of 5 years and made available to SCAQMD personnel and CPM upon request.

The project owner shall keep records in a manner approved by the Executive Officer; consisting of emergency use hours of operation, maintenance and testing hours, other operating hours (describe the reason for operation).

<u>Verification:</u> The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate devices have been installed and are functioning properly. The project owner shall submit all dates of operation, elapsed time in hours, and the reason for each operation in the Quarterly Operations Report (**AQ-SC10**).

AQ-16 The project equipment shall not be operated unless the project owner demonstrates to the SCAQMD Executive Officer that the facility holds sufficient RTCs to offset the prorated annual emissions increase for the first compliance year of operation. In addition, this equipment shall not be operated unless the project owner demonstrates to the Executive Officer that, at the commencement of each compliance year after the first compliance year of operation, the facility holds sufficient RTCs in an amount equal to the annual emission increase. The project owner shall submit all such information to the CPM for approval.

To comply with this condition, the project owner, for the first year commissioning and operation, shall hold a minimum of:

- 35,767 lbs for each of Units 1-5, a total of 178,835 lbs.
- 41,835 lbs for each of Units 6-8, a total of 125,505 lbs.
- 127 lbs for the operation of the firewater pump.
- 218 lbs for the operation of the black start engine.

A First Year Total of: 304,685 lbs NOx RTC.

To comply with this condition, the project owner, for the second year operation, shall hold a minimum of:

- 30,038 lbs for each of Units 1-5, a total of 150,190 lbs.
- 36,107 lbs for each of Units 6-8, a total of 108,321 lbs.
- 127 lbs for the operation of the firewater pump.

- 218 lbs for the operation of the black start engine.

A Second Year Total of: 258,856 lbs NOx RTC.

<u>Verification:</u> The project owner shall submit evidence of sufficient RTCs to the CPM demonstrating compliance on an annual basis as part of the annual compliance report.

AQ-17 Deleted

AQ-18 The project owner shall limit the operating time of the black start emergency engine to no more than 199.99 hours per year. The black start emergency engine shall be equipped with a non-resettable elapsed meter to accurately indicate the elapsed operating time of the engine. The black start emergency engine shall be equipped with a non-resettable totalizing fuel meter to accurately indicate the fuel usage of the engine. The black start emergency engine shall burn only diesel fuel that contains sulfur compounds less than or equal to 15 ppm by weight.

The project owner shall operate and maintain the black start emergency engine according to the following requirements:

1. This equipment shall only operate if utility electricity is not available.
2. This equipment shall only be operated for the primary purpose of providing a backup source of power to start one turbine.
3. This equipment shall only be operated for maintenance and testing, not to exceed 12 hours in any one year.
4. An engine operating log shall be kept in writing, listing the date of operation, the elapsed time, in hours, and the reason for operation. The log shall be maintained for a minimum of 5 years and made available to SCAQMD personnel and CPM upon request.

The project owner shall keep records in a manner approved by the Executive Officer; consisting of emergency use hours of operation, maintenance and testing hours, other operating hours (describe the reason for operation), exhaust temperature, backpressure, and date and time for each of the duty cycle of the engine as downloaded from the Hiback data logging system.

The Cleanair System "PERMIT" filter system installed for the equipment shall be operated according to the following criteria:

1 The maximum consecutive minutes at idle shall not exceed 240 minutes;

2 The number of 10-minute idle session before regeneration is required shall be after 24 consecutive sessions.

3 The minimum temperature/load/time for regeneration shall not be less than 40 percent load of 300 degree C for 30 percent of operation time or 2 hours, whichever is longer.

The Cleanair system “PERMIT” filter system installed for the equipment shall be provided with a data logging and alarm system to record and monitor the equipment’s exhaust backpressure and temperature during operation.

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate devices have been installed and are functioning properly. The project owner shall submit all dates of operation, elapsed time in hours, and the reason for each operation in the Quarterly Operations Report (**AQ-SC10**).

ACRONYMS

AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
CARB	California Air Resources Board
BACT	Best Available Control Technology
bhp	brake horse power
CEC	California Energy Commission (or Energy Commission)
CEQA	California Environmental Quality Act
CO	Carbon Monoxide
CPM	(CEC) Compliance Project Manager
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
gr	Grains (1 gr $\cong$ 0.0648 grams)
HRSG	Heat Recovery Steam Generator
ISCST3	Industrial Source Complex Short Term, version 3
MMBtu	Million British thermal units
MW	Megawatts (1,000,000 Watts)
NH_3	Ammonia
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen *or* Nitrogen Oxides
NSR	New Source Review
PDOC	Preliminary Determination Of Compliance
PM10	Particulate Mater less than 10 microns in diameter
PM2.5	Particulate Mater less than 2.5 microns in diameter
ppm	Parts Per Million
ppmv	Parts Per Million by Volume
ppmvd	Parts Per Million by Volume, Dry
PRC	Priority Reserve Credit
PSA	Preliminary Staff Assessment (this document)
PSD	Prevention of Significant Deterioration
RECLAIM	Regional Clean Air Incentives Market
RTC	RECLAIM Trading Credit
SCAQMD	South Coast Air Quality Management SCAQMD (also: District)
scf	Standard Cubic Feet
SCR	Selective Catalytic Reduction
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_3	Sulfate
SOx	Oxides of Sulfur
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
CPV Sentinel	CPV Sentinel Energy Project

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ATTACHMENT 1

Greenhouse Gas Emission Rate Comparison
California Peakers vs. CPV Sentinel Power Project

CALCULATION OF GREENHOUSE GAS EMISSIONS

The proposed power project will burn pipeline grade natural gas to produce electric power; in so doing they will also produce greenhouse gas emissions, as well as criteria air pollution. Staff notes that the methods used to calculate the greenhouse gas emission for the project have changed since the project originally submitted the AFC. Therefore, staff has been requested to calculate the project greenhouse gas emission for the applicant.

Greenhouse gas emission estimates are based on the type, quantity and method of fuel burned. The applicant will burn pipeline grade natural gas in a GE LMS100 combustion turbine; and diesel fuel (ultra low sulfur) in a firewater pump and black start generator. Also certain activities or use of equipment may also cause the release of greenhouse gases. In this case, the use of gas insulated switching (GIS) equipment (which used SF_6 as the insulating material). The greenhouse gas that staff will be calculating include CO_2, CH_4, and N_2O emitted from the gas turbines and the firewater pump and SF_6 leaks from the GIS equipment. All the greenhouse gas emissions will be converted to carbon dioxide equivalent units (CO_2eq), as prescribed by the Intergovernmental Panel on Climate Change (IPCC).

GE LMS100 Greenhouse Gas Emissions
Each GE LMS100 combustion turbine has a maximum fuel input rate of 875.7 mmBtu/hr (high heating value). Staff makes the conservative assumption that the turbine will be at maximum output whenever operating. The project expects to operate units 1-5 no more than 2,628 hours each year and units 6-8 no more than 3,200 hours each year. During startup and shutdown (another 177 and 206 hours per year respectively) staff assumes that the combustion turbines use approximately 20 percent of the maximum rated fuel input rate. The actual fuel use during startup and shutdown varies dramatically and is not readily available for this turbine. However, staff is reasonably confident that this assumption is a conservative one and regardless the greenhouse gas emissions during startup and shutdown represent less than 2 percent of the total emission. Using these assumptions and the appropriate IPCC emission factors, staff shows the calculations for the CO_2eq emissions associated with the combustion turbines in AIR QUALITY Attachment 1 Table 1.

AIR QUALITY Attachment 1 Table 1
CO_2eq Estimated Emissions from the GE LMS100 Combustion Turbines

	MAXIMUM FUEL INPUT RATE (MMBTU/HR)	ANNUAL HOURS	FUEL CONSUMPTION (MMBTU)	CO_2 (TONNES)	CH_4 AS CO_2EQ (TONNES)	N_2O AS CO_2EQ (TONNES)
ANNUAL OPERATION (1 TURBINE) UNITS 1-5	**875.7**	**2,628**	**2301339.6**	**121583**	**188.5**	**971.0**
ANNUAL STARTUP/SHUTDOWN (1 TURBINE) UNITS 1-5	**175.14**	**177**	**30999.78**	**1637.8**	**2.54**	**13.1**
ANNUAL OPERATION (1 TURBINE) UNITS 6-8	**875.7**	**3,200**	**2802240**	**148047**	**229.6**	**1182.3**
ANNUAL STARTUP/SHUTDOWN (1 TURBINE) UNITS 6-8	**175.14**	**206**	**36078.84**	**1906.1**	**2.96**	**15.2**
TURBINE UNITS 1-5 ANNUAL OPERATION WITH STARTUP & SHUTDOWN	**--**	**--**	**--**	**616,105**	**955**	**4,920**
TURBINE UNITS 6-8 ANNUAL OPERATION WITH STARTUP & SHUTDOWN	**--**	**--**	**--**	**449,858**	**698**	**3,593**
TURBINE UNITS 1-8 ANNUAL OPERATION WITH STARTUP & SHUTDOWN	**--**	**--**	**--**	**1,065,964**	**1,653**	**8,513**

NOTES: THE FOLLOWING FACTORS WERE USED TO CALCULATE THE CO_2 AND CO_2EQ EMISSIONS:

DEFAULT CO_2 EMISSION FACTOR FOR NATURAL GAS: 53.05 KG/MMBTU

DEFAULT CH_4 EMISSION FACTOR FOR LARGE NATURAL GAS FIRED TURBINES: 0.003901 KG/MMBTU

DEFAULT N_2O EMISSION FACTOR FOR LARGE NATURAL GAS FIRED TURBINES: 0.001361 KG/MMBTU

GLOBAL WARMING POTENTIAL FOR CH_4: 21 CO_2/CH_4

GLOBAL WARMING POTENTIAL FOR N_2O; 310 CO_2/N_2O

CONVERSION FROM KG TO METRIC TONS (OR TONNES): 0.001 TONNE/KG

Firewater Pump Greenhouse Gas Emissions

The firewater pump is powered by a Clarke (model JW6H) 240 brakehorse power (bhp) diesel fueled engine. It has a fuel input rate of 10.3 gallons per hour and the energy content of the CARB Ultra Low Sulfur diesel fuel is 137,000 btu per gallon. The firewater pump will be tested weekly for approximately 1 hour (less than 50 hours per year); however, the full annual operational limit of the firewater pump is 199 hours per year. Staff made the conservative assumption that the firewater pump would operate for 199 hours per year. With these assumptions and the IPCC methodologies, staff calculated the CO_2eq emissions from the operation of the firewater pump in AIR QUALITY Attachment 1 Table 2.

AIR QUALITY Attachment 1 Table 2
CO_2eq Estimated Emissions from Firewater Pump Operation

	FUEL INPUT RATE (GAL/HOUR)	ENERGY CONTENT OF FUEL (BTU/GAL)	ANNUAL HOURS	FUEL CONSUMPTION (MMBTU)	CO_2 (TONNES)	CH_4 AS CO_2EQ (TONNES)	N_2O AS CO_2EQ (TONNES)
FIREWATER PUMP	**10.3**	**137,000**	**199**	**280.81**	**20.34**	**0.0053**	**0.0311**

NOTES: THE FOLLOWING FACTORS WERE USED TO CALCULATE THE CO_2 AND CO_2EQ EMISSIONS:

- DEFAULT CO_2 EMISSION FACTOR FOR DIESEL FUEL: 73.14 KG/MMBTU
- DEFAULT CH_4 EMISSION FACTOR FOR DIESEL FUEL, NORMAL FIRING: 0.000907 KG/MMBTU
- DEFAULT N_2O EMISSION FACTOR FOR DIESEL FUEL, NORMAL FIRING: 0.000358 KG/MMBTU
- GLOBAL WARMING POTENTIAL FOR CH_4: 21 CO_2/CH_4
- GLOBAL WARMING POTENTIAL FOR N_2O; 310 CO_2/N_2O
- CONVERSION FROM KG TO METRIC TONS (OR TONES): 0.001 TONNE/KG

Black Start Engine Greenhouse Gas Emissions

The black start engine is a Caterpillar (model 3512CDITA) 2,206 bhp diesel fueled engine with PM control, clean air aftercooler and turbocharger. It has a fuel input rate of 0.333 lbs(fuel)/bhp-hr (assuming a fuel density of 7.1 lbs/gal for diesel), that is approximately equal to 103.57 gallons per hour and the energy content of the CARB Ultra Low Sulfur diesel fuel is 137,000 btu per gallon. The firewater pump will be tested weekly for approximately 1 hour (less than 50 hours per year), however, the full annual operational limit of the firewater pump is 199 hours per year. Staff made the conservative assumption that the firewater pump would operate for 199 hours per year. With these assumptions and the IPCC methodologies, staff calculated the CO_2eq emissions from the operation of the firewater pump in AIR QUALITY Attachment 1 Table 3.

AIR QUALITY Attachment 1 Table 3
CO_2eq Estimated Emissions from Black Start Engine Operation

	FUEL INPUT RATE (GAL/HOUR)	ENERGY CONTENT OF FUEL (BTU/GAL)	ANNUAL HOURS	FUEL CONSUMPTION (MMBTU)	CO_2 (TONNES)	CH_4 AS CO_2EQ (TONNES)	N_2O AS CO_2EQ (TONNES)
BLACK START ENGINE	**103.57**	**137,000**	**199**	**2823.62**	**204.56**	**0.0538**	**0.3134**

NOTES: THE FOLLOWING FACTORS WERE USED TO CALCULATE THE CO_2 AND CO_2EQ EMISSIONS:

DEFAULT CO_2 EMISSION FACTOR FOR DIESEL FUEL: 73.14 KG/MMBTU

DEFAULT CH_4 EMISSION FACTOR FOR DIESEL FUEL, NORMAL FIRING: 0.000907 KG/MMBTU

DEFAULT N_2O EMISSION FACTOR FOR DIESEL FUEL, NORMAL FIRING: 0.000358 KG/MMBTU

GLOBAL WARMING POTENTIAL FOR CH_4: 21 CO_2/CH_4

GLOBAL WARMING POTENTIAL FOR N_2O; 310 CO_2/N_2O

CONVERSION FROM KG TO METRIC TONS (OR TONNES): 0.001 TONNE/KG

Gas Insulated Switching Equipment Greenhouse Gas Emissions

The greenhouse gas emission potential from gas insulated switching (GIS) equipment is based on the assumption that this equipment will leak SF_6 (the insulating material) over time. SF_6 is a greenhouse gas with a global warming potential of 23,900 CO_2/SF_6. However, the methodology reveals that there is very little potential for leaks in this equipment. Staff assumes that there are eight GIS that contain approximately 126 kg of SF_6 each. The methodology is to assume that 1 percent of the mass of SF_6 will leak per year and that at the end of the GIS useful life (30 years), 70 percent of the SF_6 will be lost to the atmosphere during attempted recovery. Using this methodology shows the expected CO_2eq emission from the GIS equipment in AIR QUALITY Attachment 1 Table 4.

AIR QUALITY Attachment 1 Table 4
CO_2eq Estimated Emissions from Gas Insulated Switch Operation

	CAPACITY (KG)	ANNUAL EMISSION (KG)	END-OF-LIFE EMISSION (KG)	TOTAL 30 YEAR EMISSION (KG)	AVERAGE ANNUAL EMISSION (KG)	SF_6 AS CO_2 (TONNES)
GIS (1)	126	1.26	88.2	126	4.2	100.38
GIS (8)	--	--	--	--	--	803.04

NOTES: THE FOLLOWING FACTORS WERE USED TO CALCULATE THE CO_2 AND CO_2EQ EMISSIONS:

ANNUAL EMISSION IS 1 PERCENT OF CAPACITY

END-OF-LIFE EMISSION IS 70 PERCENT OF CAPACITY

TOTAL 30 YEAR LIFE IS 30 TIMES THE ANNUAL EMISSION PLUS THE END-OF-LIFE EMISSION.

AVERAGE ANNUAL EMISSION IS THE TOTAL 30 YEAR EMISSION DIVIDED BY 30 YEARS.

GLOBAL WARMING POTENTIAL FOR SF_6; 23,900 CO_2/SF_6

CONVERSION FROM KG TO METRIC TONS (OR TONNES): 0.001 TONNE/KG

Total Facility Greenhouse Gas Emissions and Emission Performance

Taking the greenhouse gas emissions from each of the three emission sources (AIR QUALITY Attachment 3 Tables 1, 2, 3 and 4) and combining them into a facility greenhouse gas emission, AIR QUALITY Attachment 1 Table 5, results in a total estimated emission of 1,077,157.51 tonnes (metric tons) of CO_2eq. Assuming that the eight GE LMS100 turbines will generate 106.25 MW of power each whenever they are in operation, staff estimates that the annual potential power generation from the project is 2,416,125 megaWatt-hours (MW-hrs). Dividing the emission by the generation, staff estimates the greenhouse gas performance factor for the project to be 0.44582 CO_2eq tonnes/MW-hr

AIR QUALITY Attachment 1 Table 5
Estimated Annual Greenhouse Gas Emissions

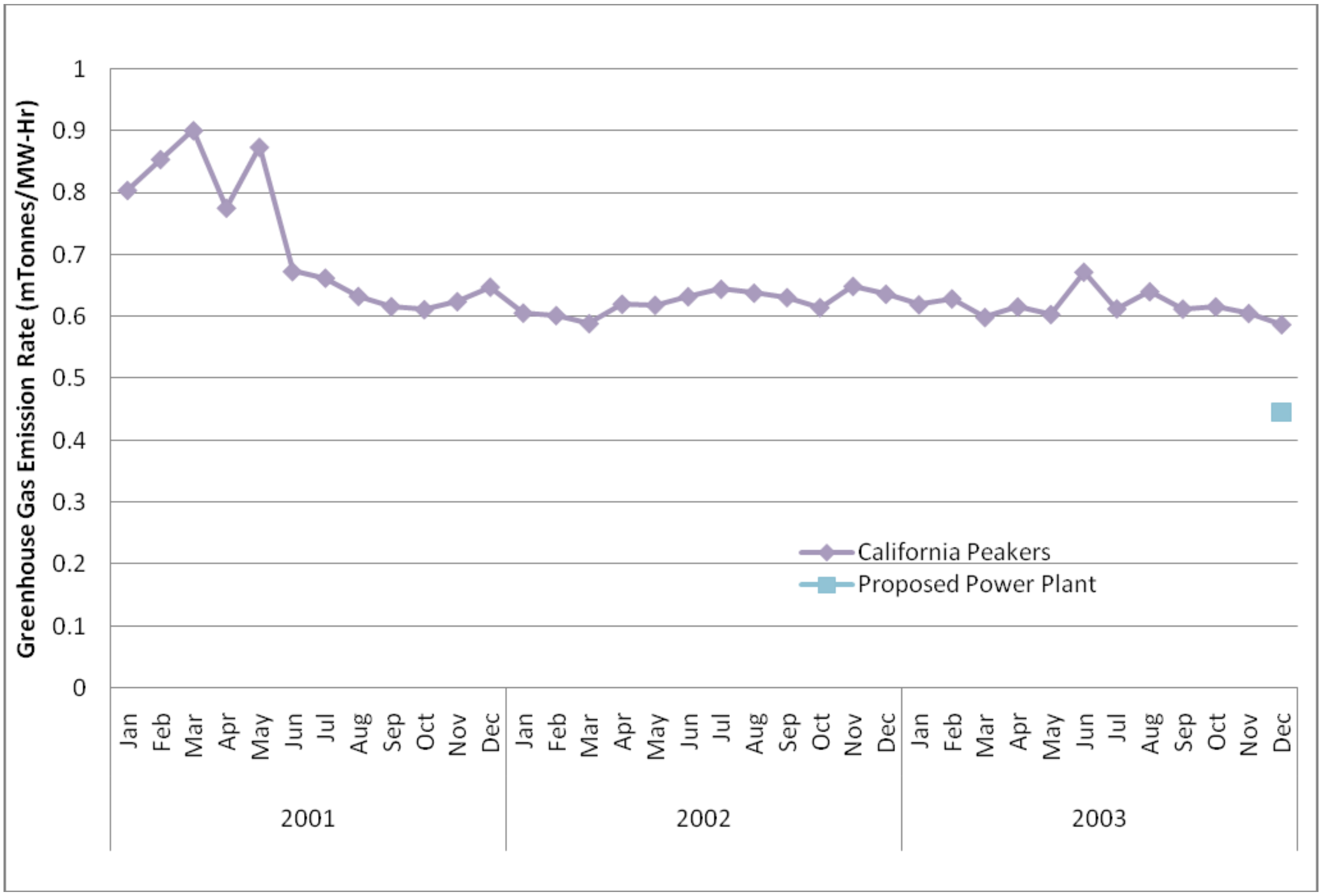
	CO_2 Emission (metric tons)	CH_4 as CO_2 eq (metric tons)	N_2O as CO_2 eq (metric tons)	SF_6 as CO_2 eq (metric tons)	Total CO_2 eq (metric tons)
Turbine Operations Units 1-5	607,916.5	942.64	4,854.79	--	613,713.93
Turbine Startup/Shutdown Units 1-5	8,188.83	12.70	65.40	--	8,266.92
Turbine Operations Units 6-8	444,139.91	688.69	3,546.88	--	448,375.47
Turbine Startup/Shutdown Units 6-8	5,718.3	8.87	45.67	--	5,772.83
Firewater Pump	20.34	0.0053	0.031	--	20.38
Black Start Generator	204.56	0.054	0.31	--	204.93
Gas Insulated Switches	--	--	--	803.04	803.04
Total Estimated Greenhouse Gas Emissions (CO_2 eq metric tons)					1,077,157.51
Estimated Annual Generation (MW-hr)					2,416,125
Estimated Greenhouse Gas Performance Factor (CO_2 eq mt/MW-hr)					0.44582

Notes:
Turbine Units 1-5 are assumed to have the following characteristics:
Heat input rate: 875.7 mmBtu/hr
Rated Capacity of 106.25 MW
Hours of Operation: 2,628
Hours in startup and shutdown: 177
Turbine Units 6-8 are assumed to have the following characteristics:
Hest input rate: 875.7 mmBtu/hr
Rated Capacity of 106.25 MW
Hours of Operation: 3,200
Hour in startup and shutdown: 206
The Firewater Pump is assumed to have fuel input rate of 10.3 gal/hr (of diesel fuel; 137,000 btu/gal) and to operate for no more than 199 hours per year.
The Black Start Generator is assumed to have a fuel input rate of 103.57 gal/hr (of diesel fuel: 137,000 btu/gal) and to operate no more than 199 hours per year.
The Gas Insulated Switches (numbering 8 in total) are assumed to each have 126 kg of SF_6.
Staff followed the calculation methodologies recommended by the Intergovernmental Panel on Climate Change.

Comparison to System Greenhouse Gas Performance Factors

In order to compare the project to other power plants operating in California in a peaking capacity, staff queried the 2003 Environmental Performance Report (2003 EPR), issued by the California Energy Commission in June of 2003 (100-03-010SD). The 2003 EPR is a data base of power plants operating in California for the years 2001 through 2003. It includes the amount and type of fuel burned, power produced, emissions of criteria pollutants and greenhouse gases. The 2003 EPR data base also indicates what power generating units are considered peakers, or units dispatched against the daily peak load. From this data base, staff culled the peaking units and reported their CO_2 equivalent emission rate per unit of power generated. Because this is a derived number, staff cannot easily show it for each generating unit in AIR QUALITY Attachment 1 Table 6. Instead, staff includes this Table only to show the relative contribution of each unit to the graph shown in AIR QUAITY Attachment 1 Figure 1.

AIR QUALITY Attachment 1 Figure 1
Greenhouse Gas Emission Rate of California Peaking Power Plants



AIR QUALITY Attachment 1 Table 5
Power Generation from Peaking Power Plants in California

Operational Category	Peaker			
Sum of Generation (MWhr)		Year		
Plant Name	Unit	2001	2002	2003
Alameda	1	2,687.00	740.00	1,213.00
	2	5,778.00	650.00	625.00
Alliance Century	Unit 1	847.00	3,946.00	1,830.00
	Unit 2	781.00	4,414.00	1,629.00
	Unit 3	886.00	4,448.00	1,513.00
	Unit 4	839.00	4,688.00	1,666.00
Alliance Drews	D1	1,122.00	4,194.00	1,815.00
	D2	1,508.00	4,363.00	1,576.00
	D3	897.00	4,467.00	1,736.00
	D4	1,077.00	4,641.00	1,591.00
Anaheim CT	1	94,431.00	129,065.00	109,669.00
Brawley	Unit 1	9.00	42.00	-
	Unit 2	6.00	58.00	133.00
CalPeak Power - Border	2		33,691.00	11,742.00
CalPeak Power - El Cajon	6		26,534.00	7,005.00
CalPeak Power - Enterprise	1		32,639.00	9,466.00
CalPeak Power - Panoche	3		24,625.00	4,994.00
CalPeak Power - Vaca Dixon	4		17,041.00	6,769.00
Coachella	Unit 1	2,099.00	1,276.00	2,305.00
	Unit 2	1,873.00	1,031.00	2,358.00
	Unit 3	1,778.00	1,010.00	2,410.00
	Unit 4	1,910.00	1,257.00	2,449.00
Creed Energy Center	CD1JT1			13,753.00
Division	Unit 1	10,077.00	744.00	1,742.00
El Cajon	Unit 1	11,581.00	1,357.00	2,169.00
Encina	Unit 6GT	10,016.00	1,274.00	2,352.00
Feather River Energy Center	GL4JT1			15,412.00
Fresno Cogeneration Partners, LP PKR	1		2,516.00	1,511.00
Gianera	1	3,340.00	1,129.00	1,182.00
	2	5,083.00	1,161.00	748.00
Glenarm	G9	3,886.00	569.00	56.00
	GT1	100.00	-	-
Goose Haven Energy Center	GH1JT1			13,056.00
Hanford Energy Park Peaker	1	14,214.00	20,297.00	9,346.00
	2	11,850.00	19,130.00	8,691.00
Henrietta Peaker	HPP 1		14,424.00	9,763.00
	HPP 2		14,634.00	9,933.00
Humboldt Bay	Unit 332	9,877.00	3,719.00	6,045.00
	Unit 333	9,421.00	4,186.00	6,418.00
Hunters Point	Unit 321	36,236.00	5,234.00	4,603.00
Kearny	Kearny 1	14,107.00	1,097.00	2,661.00

	Kearny 2A	13,367.00	1,186.00	2,308.00
	Kearny 2B	14,202.00	1,240.00	3,513.00
	Kearny 2C	12,180.00	1,115.00	2,800.00
	Kearny 2D	12,577.00	1,053.00	2,847.00
	Kearny 3A	12,162.00	1,397.00	3,021.00
	Kearny 3B	5,130.00	1,216.00	2,886.00
	Kearny 3C	11,694.00	1,013.00	1,582.00
	Kearny 3D	11,842.00	1,110.00	2,417.00
King City	KC1CT1	603,610.00	679,832.00	645,875.00
	KC1ST1	265,569.00	305,716.00	260,358.00
King City Energy Center	KC2JT1		16,171.00	16,719.00
Lambie Energy Center	LA1JT1			13,635.00
Linde Wilmington	GEN 1	-	-	
	Gen 2	-	-	
Lodi	1	4,910.00	523.00	1,033.00
Los Esteros Energy Center	LE1JT1			42,118.00
	LE1JT2			38,317.00
	LE1JT3			36,918.00
	LE1JT4			41,026.00
McClellan	1	78,815.00		
	Unit 1		19,135.00	2,429.00
McClure	1	12,164.00	2,926.00	10,764.00
	2	12,872.00	8,995.00	6,789.00
Miramar 1A 1B	Unit 1A	15,132.00	1,824.00	2,041.00
	Unit 1B	15,139.00	1,849.00	2,581.00
Naval Station	Unit 1	20,225.00	1,406.00	-
Naval Training Center	Unit 1	11,520.00	637.00	-
North Island	Unit 1	14,363.00	738.00	-
	Unit 2	13,997.00	787.00	-
NP Cogen Inc	GNGT	-		
	GNST	-		
Oakland Power Plant	1	43,233.00	3,930.00	2,902.00
	2	29,673.00	3,422.00	5,431.00
	3	41,152.00	2,275.00	5,806.00
Potrero Power	POT4	29,894.00	9,880.00	18,319.00
	POT5	52,880.00	9,691.00	11,159.00
	POT6	50,306.00	8,185.00	10,426.00
Riverview Energy Center	RP1JT1			15,147.00
Rockwood	Unit 1	4,608.00	5,014.00	12,277.00
	Unit 2	5,657.00	211.00	177.00
Roseville	1	-	2,344.00	1,169.00
	2	-	2,118.00	2,639.00
San Jose FMC	Unit 1	19,400.00		
Smurfit Stone Container Corporation	1	142,828.00	35,148.00	-
South Bay Power Plant	CT	2,959.00	84.00	1,496.00
Springs Generation Project	1		2,644.00	723.00
	2		2,610.00	760.00
	3		2,728.00	747.00

	4		1,508.00	516.00
Tracy Peaker Plant	TPP 1			4,269.00
	TPP 2			6,191.00
Vernon	VER1	29.00	13.00	-
	VER2	11.00	20.00	-
	VER3	25.00	22.00	-
	VER4	-	-	-
	VER5	24.00	16.00	-
	VER6	486.00	29.00	-
	VER7	527.00	248.00	-
Walnut	212813	-	1,375.00	1,569.00
	212814	22,631.00	-	-
Wellhead Power Gates, LLC	1		6,343.00	3,660.00
Wellhead Power Panoche, LLC	1		11,118.00	3,968.00
Wolfskill Energy Center	WS1JT1			16,222.00
Woodland	NA1	243,242.00	98,502.00	305,808.00
Yuba City Energy Center	GL3JT1			18,301.00

Greenhouse Gas Emission Estimates from Construction

While the GHG emissions from construction are small compared to those from operation, the Commission has been requested to estimate them for this and potentially future projects.

Due to the size of the various construction elements of this project, the GHG emission estimate will be broken down into five district areas or sources: Main Site, Transmission Line, Gas Line, Laydown Area and On-Site Road & Parking Lot. Since the Gas Line and Transmission Line are relatively short (1.8 miles and 2,300 feet respectively) they will be using the same laydown and parking area as the Main Site.

At staff's request, the applicant recalculated the project construction emissions of both criteria and GHG using the newly added GHG emission factors in the SCAQMD OFFROAD and the EMFAC2007 models. The emissions include: diesel construction equipment, deliveries, and worker vehicles emissions. Construction emission estimates for criteria emissions are intended to be used in air dispersion modeling applications and are thus estimated in terms of "worst case day" and "worst case year." So as not to unnecessarily change the previous construction emissions estimate assumptions, and thus require a new dispersion modeling, the applicant has reported the GHG emissions in terms of "worst case year." The GHG emission estimates for construction shown in AIR QUALITY Attachment 1 Table 6 are considered to be conservative in nature. The GHG emissions from construction are approximately 0.1 percent of the operational GHG emissions (AIR QUALITY Attachment 1 Table 4).

AIR QUALITY Attachment 1 Table 6
Maximum Annual Construction Emissions of Greenhouse Gases

Emission Source	CO_2eq (tonnes/year)	Percent of Operational GHG Emissions
Main Site	932.77	0.09 %
Transmission Line	57.11	0.005 %
Laydown Area	104.70	0.01 %
Gas Line	95.18	0.009 %
On-site Road and Parking Lot	13.32	0.001 %
Total	1203.07	0.1 %

The project operational GHG emissions will be addressed by the California Air Resources Board implementation of AB32 as they reduce GHG emissions to 1990 levels (see discussion in Final Staff Assessment starting on page 4.1-51). Thus staff believes that it is reasonable to assume that the CARB AB32 implementation will be substantial enough to absorb the extremely small addition of the construction GHG emissions. Furthermore, staff does not believe that this diminutive emission of GHG from construction activates can possibly represent a deterrent to the CARB AB32 implementation. Therefore, staff recommends that the GHG emissions associated with the construction of the project be considered not significant.

Staff presents below the calculations performed by the applicant to fully disclose the calculation methodology. Staff has reviewed these calculations and confirms that they are conservative in nature and reasonably accurate based on the assumptions made.

Table 7.1-10							
Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day)							
Activity	**PM_{10}**	**$PM_{2.5}$**	**CO**	**ROC**	**NO_x**	**SO_x**	**CO_2e**
Onsite Combustion Emissions							
Diesel Construction Equipment	7.41	6.82	65.23	19.64	118.38	0.12	10087.32
Dump trucks, pickup trucks and worker vehicles	0.05	0.04	0.49	0.10	1.03	0.00	121.878
Construction Combustion Subtotal (lbs)	***7.5***	***6.9***	***65.7***	***19.7***	***119.4***	***0.12***	***10209.2***
Onsite Fugitive Dust Emissions							
Vehicle Travel on Unpaved Roads and Parking Lot	1.65	0.35					
Earth clearing/Bulldozing	1.46	0.30					
Earth Loading/Storage	2.46	0.51					
Subtotal of Offsite Emissions (lbs)	***5.6***	***1.2***					
Offsite On-Highway Emissions							
Worker Passenger Vehicle – Combustion Emissions	0.02	0.01	2.09	0.21	0.22	0.002	236.781
Worker Passenger Vehicle – Paved Road Dust	1.38	0.23					
Subtotal of Offsite Emissions (lbs)	***1.40***	***0.24***	***2.09***	***0.21***	***0.22***	***0.002***	***236.781***
Total Max. Daily Emissions (lbs)	**14.4**	**8.3**	**67.8**	**20.0**	**119.6**	**0.12**	**10446.0**

Notes:
PM_{10} = particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter
ROC = reactive organic compounds
CO = carbon monoxide
NO_x = nitrogen oxide(s)
SO_x = sulfur oxide(s)

Table 7.1-11 Maximum Annual Construction Emissions of Criteria Pollutants (ton/year [tpy])							
Activity	**PM_{10}**	**$PM_{2.5}$**	**CO**	**ROC**	**NO_x**	**SO_x**	**CO_2e**
Onsite Combustion Emissions							
Diesel Construction Equipment	0.96	0.88	8.36	2.61	14.97	0.02	1311.48
Dump trucks, pickup trucks and worker vehicles	0.002	0.002	0.109	0.013	0.046	0.000	14.678
Construction Combustion Subtotal (tpy)	***1.0***	***0.9***	***8.5***	***2.6***	***15.0***	***0.02***	***1326.16***
Onsite Fugitive Dust Emissions							
Vehicle Travel on Unpaved Roads and Parking Lot	0.16	0.03					
Earth clearing/Bulldozing	1.12	0.23					
Earth Loading/Storage	0.15	0.03					
Subtotal of Offsite Emissions (tpy)	***1.4***	***0.3***					
Offsite On-Highway Emissions							
Worker Passenger Vehicle – Combustion Emissions	0.003	0.002	0.375	0.038	0.039	0.000	42.621
Worker Passenger Vehicle – Paved Road Dust	0.25	0.04					
Subtotal of Offsite Emissions (tpy)	***0.25***	***0.04***	***0.38***	***0.04***	***0.04***	***0.00***	***42.621***
Total Max. Daily Emissions (tpy)	**2.6**	**1.2**	**8.8**	**2.7**	**15.1**	**0.02**	**1368.8**

Notes:
PM_{10} = particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter
ROC = reactive organic compounds
CO = carbon monoxide
NO_x = nitrogen oxide(s)
SO_x = sulfur oxide(s)

Table 7.1-11a		
Maximum Annual Construction Emissions of Greenhouse Gases		
Emission Location	**CO_2e (ton/year)**	**CO_2e (Metric ton / year)**
Main Site	1028.20	932.77
Transmission Line	62.95	57.11
Laydown Area	115.41	104.70
Gas Line	104.92	95.18
On-site Road and Parking Lot	14.68	13.32
Total	**1326.16**	**1203.07**

Worker Commuting Emissions

Combustion EMISSION FACTOR FOR ONROAD VEHICLES

Onroad Vehicle	Fuel Type	Total Vehicle Count/ Year	Vehicle Count/ Constr Project	Weight (lbs)	Vehicle Type	EF (lbs/mile) PM_{10}	$PM_{2.5}$	CO	VOC	NOx	SO_2	CO_2	CH_4	CO_2e
Passenger Vehicles	G/D	2584	3003	4000	LDA	8.60E-05	5.38E-05	9.69E-03	9.92E-04	1.01E-03	1.07E-05	1.10E+00	8.77E-05	1.10E+00

EMISSION CALCULATION FOR ONROAD VEHICLES

Highway Vehicles	Total Days / Year	Total Days / Constr. Project	Daily VMT / Vehicle	Annual VMT	Constr Project Total VMT	Daily Emissions (lbs/day) PM_{10}	$PM_{2.5}$	CO	VOC	NOx	SO_2	CO_2	CH_4	CO_2e
Passenger Vehicles	360	540	30	77534.7572	90075.87349	0.02	0.01	2.09	0.21	0.22	0.00	236.38	0.02	236.78

Annual Emission Rate (tons/year)								
PM_{10}	$PM_{2.5}$	CO	VOC	NOx	SO_2	CO_2	CH_4	CO_2e
0.003	0.002	0.375	0.038	0.039	0.000	42.549	0.003	42.621

Total Project Emission Rate (tons)								
PM_{10}	$PM_{2.5}$	CO	VOC	NOx	SO_2	CO_2	CH_4	CO_2e
0.004	0.002	0.436	0.045	0.045	0.000	49.432	0.004	49.514

Emission Factors from
SCAQMD Prepared - Highest (Most Conservative) EMFAC2007 (version 2.3) http://www.aqmd.gov/CEQA/handbook/onroad/onroad.html
Emission Factors for On-Road Passenger Vehicles
Scenario Year: 2009
All model years in the range 1965 to 2009

Greenhouse Gas Global Warming Potential
Source: Intergovernmental Panel on Climate Change, Second Assessment Report (1996)

Greenhouse Gas	GWP (SAR, 1996)
CO_2	1
CH_4	21
N_2O	310

Annual Combustion Emissions

Maximum annual construction equipment activity occurs in months 3 - 14.

Diesel Fired Offroad Equipment

						Emission factors (lb/hr)								Annual Emissions (ton/yr)								
Equipment	Quantity /year	Hours/ Day	OFFROAD EF HP	Horse-power	Days/month	PM10	CO	ROC	NOx	SOx	CO_2	CH_4	CO_2e	PM10	PM2.5	CO	VOC	NOx	SOx	CO_2	CH_4	CO_2e
Farm Tractor	0	8.4	50	72	30	0.0337	0.3685	0.1394	0.3165	0.0004	30.3471	0.0126	30.6112	0.0	0.0	0.0	0.0	0.0	0.0	0.0000	0.0000	0.0000
Ingersoll Rand VR-90 Rough Terrain Forklift (9,000	24	6	120	113	30	0.0716	0.4493	0.1306	0.7797	0.0007	62.4498	0.0118	62.6973	0.2	0.1	1.0	0.3	1.7	0.0	134.8916	0.0255	135.4261
Liebherr 500 Ton Truck Crane @ Rail Siding	6	3	500	408	30	0.0726	0.7157	0.1913	1.8770	0.0018	180.1012	0.0173	180.4636	0.0	0.0	0.2	0.1	0.5	0.0	48.6273	0.0047	48.7252
Manitowoc 888 Series II Crawler Crane	11	6	250	330	30	0.0501	0.3664	0.1314	1.3105	0.0013	112.1589	0.0119	112.4078	0.0	0.0	0.4	0.1	1.3	0.0	111.0373	0.0117	111.2837
Grove RT865B Rough Terrain Hydraulic Crane (65	11	7.8	250	250	30	0.0501	0.3664	0.1314	1.3105	0.0013	112.1589	0.0119	112.4078	0.1	0.1	0.5	0.2	1.7	0.0	144.3485	0.0153	144.6689
Grove RT745 Rough Terrain Hydraulic Crane (45 T	11	7.8	175	195	30	0.0564	0.4905	0.1276	0.9849	0.0009	80.3446	0.0115	80.5864	0.1	0.1	0.6	0.2	1.3	0.0	103.4035	0.0148	103.7148
Grove AMZ66 Articulating Boom Manlift, Diesel, (66	21	7.8	50	70	30	0.0197	0.1979	0.0798	0.2013	0.0003	19.6128	0.0072	19.7640	0.0	0.0	0.5	0.2	0.5	0.0	48.1885	0.0177	48.5602
Ingersoll Rand 250 CFM Diesel Air Compressor	10	3	120	95	30	0.0563	0.3375	0.1066	0.6253	0.0006	46.9502	0.0096	47.1522	0.0	0.0	0.2	0.0	0.3	0.0	21.1276	0.0043	21.2185
Caterpillar 416B Backhoe Loader, 4 x 4, 74 HP	20	9	50	75	30	0.0337	0.3685	0.1394	0.3165	0.0004	30.3471	0.0126	30.6112	0.1	0.1	1.0	0.4	0.9	0.0	81.9372	0.0340	82.6502
Ditchwitch Trencher 3610 Model	2	5.4	50	34	30	0.0421	0.4460	0.1929	0.3666	0.0004	32.9178	0.0174	33.2832	0.0	0.0	0.1	0.0	0.1	0.0	5.3327	0.0028	5.3919
Caterpillar Wheel Loader	3	8.4	175	175	30	0.0698	0.6351	0.1564	1.2251	0.0012	106.3152	0.0141	106.6116	0.0	0.0	0.2	0.1	0.5	0.0	40.1871	0.0053	40.2992
Caterpillar Elevating Scrapers	3	10.8	175	175	30	0.1101	0.9371	0.2510	1.9270	0.0017	148.0738	0.0226	148.5494	0.1	0.0	0.5	0.1	0.9	0.0	71.9639	0.0110	72.1950
Caterpillar Articulated Dump Truck 30 Ton	2	9	250	300	30	0.0614	0.4534	0.1725	1.7336	0.0019	166.5454	0.0156	166.8722	0.0	0.0	0.1	0.0	0.5	0.0	44.9672	0.0042	45.0555
Caterpillar 325L Crawler Excavator, 1.5 CY Bucket	9	10.2	175	168	30	0.0704	0.6716	0.1564	1.1993	0.0013	112.2216	0.0141	112.5180	0.1	0.1	0.9	0.2	1.7	0.0	154.5291	0.0194	154.9373
Caterpillar D5M XL Dozer	2	10.8	175	110	30	0.1077	0.8774	0.2498	1.8708	0.0015	129.4768	0.0225	129.9501	0.0	0.0	0.3	0.1	0.6	0.0	41.9505	0.0073	42.1038
Caterpillar D9 Dozer with Ripper	0	10.8	500	405	30	0.1431	1.8608	0.3754	3.3530	0.0026	264.8724	0.0339	265.5838	0.0	0.0	0.0	0.0	0.0	0.0	0.0000	0.0000	0.0000
Bomag BW 172 Vibratory Roller	12	10.8	50	76	30	0.0307	0.3258	0.1354	0.2795	0.0003	25.9831	0.0122	26.2397	0.1	0.1	0.6	0.3	0.5	0.0	50.5112	0.0237	51.0099
Bomag Walk Behind Vibratory Roller	10	10.8	15	13.5	30	0.0023	0.0386	0.0074	0.0462	0.0001	6.3202	0.0007	6.3342	0.0	0.0	0.1	0.0	0.1	0.0	10.2388	0.0011	10.2614
Caterpillar Motor Grader, 155 HP	7	10.8	175	175	30	0.0823	0.7443	0.1846	1.4391	0.0014	123.9215	0.0167	124.2713	0.1	0.1	0.8	0.2	1.6	0.0	140.5270	0.0189	140.9237
Jumping Jacks Compactors	18	6	15	3.3	30	0.0018	0.0263	0.0051	0.0321	0.0001	4.3138	0.0005	4.3234	0.0	0.0	0.0	0.0	0.1	0.0	6.9884	0.0007	7.0040
Vibratory Plate Compactors	24	6	15	8.5	30	0.0018	0.0263	0.0051	0.0321	0.0001	4.3138	0.0005	4.3234	0.0	0.0	0.1	0.0	0.1	0.0	9.3178	0.0010	9.3386
Welder, Trailer Mounted Diesel, Miller, 400 Amp	20	3	50	48	30	0.0299	0.3084	0.1292	0.2760	0.0003	25.9581	0.0117	26.2029	0.0	0.0	0.3	0.1	0.2	0.0	23.3623	0.0105	23.5826
Light Plant, 8 kW w/ Four 1,000 Watt Lights	24	3.6	15	12	30	0.0037	0.0617	0.0118	0.0739	0.0002	10.1073	0.0011	10.1297	0.0	0.0	0.1	0.0	0.1	0.0	13.0991	0.0014	13.1281
													Total	**1.0**	**0.9**	**8.4**	**2.6**	**15.0**	**0.0**	**1306.5**	**0.2**	**1311.5**

Notes:

Emission factors from SCAQMD-ready SCAB Fleet Average Emission Factors - for year 2009 (original CARB-OFFROAD).

Equipment list, quantity, horsepower, and hours of operation from client.

PM2.5 emission factors from updated CEIDARS List with PM2.5 fractions. PM2.5 numbers obtained by multiplying the PM10 values by fraction in CEIDARS list for onroad or offroad diesel vehicles.

Light Plant is Other Construction Equipment

Combustion Exhaust from Travel on Unpaved Roads

						Emission factor (lb/mile)										Annual Emissions (ton/yr)								
Vehicle Type	Quantity/year[1]	Round Trips /Day/ Unit	Round Trip Distance (mile)	Daily VMT per Unit	Annual VMT for all Units	PM10	PM2.5	CO	VOC	NOx	SOx	CO_2	CH_4	CO_2e	Emission factor vehicle type	PM10	PM2.5	CO	VOC	NOx	SOx	CO_2	CH_4	CO_2e
Pickup, 1/2 Ton, 4 x 2	12	4	0.5	2	720	0.0001	0.0001	0.0097	0.0010	0.0010	0.0000	1.0976	0.0001	1.0994	passenger	0.000	0.000	0.003	0.000	0.000	3.84E-06	0.39512	3.2E-05	0.39578
1 Ton Flat Bed Truck	19	1	0.25	0.25	143	0.0008	0.0007	0.0202	0.0028	0.0224	0.0000	2.7233	0.0001	2.7262	Delivery	0.000	0.000	0.001	0.000	0.002	1.91E-06	0.19404	9.7E-06	0.19424
Fuel/Lube Truck (150 Gal Gas/ 850 Gal Diesel)	3	1	0.01	0.01	1	0.0008	0.0007	0.0202	0.0028	0.0224	0.0000	2.7233	0.0001	2.7262	Delivery	0.000	0.000	0.000	0.000	0.000	1.21E-08	0.00123	6.1E-08	0.00123
Service Truck	4	1	0.01	0.01	1	0.0019	0.0017	0.0128	0.0033	0.0418	0.0000	4.2108	0.0002	4.2140	HHD truck	0.000	0.000	0.000	0.000	0.000	2.41E-08	0.00253	9.1E-08	0.00253
Dump Truck Operated & Maintained	10	1	1	1	300	0.0019	0.0017	0.0128	0.0033	0.0418	0.0000	4.2108	0.0002	4.2140	HHD truck	0.000	0.000	0.002	0.000	0.006	6.02E-06	0.63162	2.3E-05	0.6321
Water Truck 4,000 Gal with Monitor	5	4	2	8	1200	0.0019	0.0017	0.0128	0.0033	0.0418	0.0000	4.2108	0.0002	4.2140	HHD truck	0.001	0.001	0.008	0.002	0.025	2.41E-05	2.52648	9.1E-05	2.52841
Concrete Pumper Truck Services	17	1	0.25	0.25	128	0.0019	0.0017	0.0128	0.0033	0.0418	0.0000	4.2108	0.0002	4.2140	HHD truck	0.000	0.000	0.001	0.000	0.003	2.56E-06	0.26844	9.7E-06	0.26864
Worker Vehicles in Parking lot	2584	1	0.25	0.25	19384	0.0001	0.0001	0.0097	0.0010	0.0010	0.0000	1.0976	0.0001	1.0994	passenger	0.001	0.001	0.094	0.010	0.010	0.000103	10.6373	0.00085	10.6552
															Total Unpaved Road	**0.002**	**0.002**	**0.109**	**0.013**	**0.046**	**0.000**	**14.657**	**0.001**	**14.678**

Notes:

SCAQMD Prepared - Highest (Most Conservative) EMFAC2007 (version 2.3)

Emission Factors for On-Road Passenger Vehicles & Delivery Trucks & Heavy Heavy Duty Diesel Trucks

Scenario Year: 2009

All model years in the range 1965 to 2009

1. Truck quantity based on monthly maximums, worker vehicle quantity based on total vehicles per day per month

30 Maximum number of days per month of construction

BIOLOGICAL RESOURCES

Testimony of Heather Blair

SUMMARY OF CONCLUSIONS

The proposed Competitive Power Ventures Sentinel Energy Project (CPV Sentinel Project) is located adjacent to other energy facilities in a previously disturbed area that does not provide quality suitable habitat for special-status species. Although two years of focused and/or protocol-level surveys have been conducted for this project with negative results, Conditions of Certification requiring preconstruction surveys for special-status species allow for the continued confidence that species would not migrate into the project area undetected and be adversely impacted by the project.

Without mitigation, operational impacts from project groundwater use would contribute to groundwater drawdown in the Willow Hole Conservation Area resulting in impacts to the groundwater-dependant mesquite hummock vegetation and the special-status species it supports. Using groundwater modeling, staff identified a water recharge schedule that would ensure an adequate amount of water is recharged into the Mission Creek spreading grounds sufficiently in advance of project groundwater pumping to prevent groundwater drawdown, thereby avoiding impacts to mesquite hummocks. Based on recent conversations between staff and United States Fish and Wildlife Service (USFWS), USFWS is in agreement with implementation of this water recharge schedule to avoid impacts to mesquite hummocks and consultation under the Endangered Species Act is not required; a letter from USFWS documenting this position is expected soon after FSA publication (Avery 2008).

Compliance with applicable laws, ordinances, regulations, and standards (LORS) and with the terms and conditions of the Conditions of Certification recommended herein is required to ensure that construction of the CPV Sentinel Project would not result in significant impacts to biological resources.

INTRODUCTION

This section provides the California Energy Commission (Energy Commission) staff's analysis of potential impacts to biological resources from the construction and operation of the CPV Sentinel Project as proposed by CPV Sentinel, LLC (applicant). This analysis addresses potential impacts to special-status species, wetlands and other waters of the U.S., and areas of critical biological concern. Information contained in this document includes a detailed description of the existing biotic environment, an analysis of potential impacts to biological resources and, where necessary, specifies mitigation measures to reduce potential impacts to less than significant levels. Additionally, this analysis assesses compliance with applicable LORS, and identifies applicable Conditions of Certification.

This analysis is based, in part, on information provided in the CPV Sentinel Application for Certification – Volumes 1, 2, & 3 (CPVS 2007a), responses to data requests, staff's observations during field visits on October 5 and 8, 2007, and discussions with Mission Springs Water District (MSWD), USFWS, and California Department of Fish and Game (CDFG).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicant will need to abide by the following LORS during project construction and operation as listed in **BIOLOGICAL RESOURCES Table 1**.

BIOLOGICAL RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Administering Agency	Description
Federal		
Federal Endangered Species Act (FESA) (Title 16, United States Code, section 1531 *et seq.*, and Title 50, Code of Federal Regulations, part 17.1 *et seq.*)	USFWS and National Marine Fisheries Service (NMFS)	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)	USFWS	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird, e.g. eggs) as designated in the Migratory Bird Treaty Act.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	USFWS	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.
Clean Water Act (Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26))	U.S. Army Corps of Engineers (Corps)	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 (Corps) for a discharge from dredged or fill materials into waters of the U.S., including wetlands. Section 401

Applicable Law	Administering Agency	Description
		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.
Section 401 of the Clean Water Act of 1977	Regional Water Control Board (RWQCB)	Requires applicant to conduct water quality impact analysis for the project when using 404 permits and for discharge to waterways.
Section 10(a)(1)(A) of the Endangered Species Act (ESA)	USFWS	Requires a permit to “take” threatened or endangered species during lawful project activities. If there is no federal nexus for the project, a Habitat Conservation Plan (HCP) may be required.
State		
California Endangered Species Act (CESA) of 1984 (Fish and Game Code, sections 2050 through 2098)	CDFG	Protects California’s rare, threatened, and endangered species.
Natural Communities Conservation Planning (NCCP) Act of 2002 (Fish and Game Code, sections 2800 through 2835)	CDFG	Established the NCCP program, which is a cooperative effort between public and private partners that uses a broad-based ecosystem approach to protecting multiple habitats and species.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	CDFG	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)	CDFG	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)	CDFG	Protects California’s birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs

Applicable Law	Administering Agency	Description
		of any bird.
Migratory Birds (Fish and Game Code section 3513)	CDFG	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.*)	CDFG	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
Native Plant Protection Act of 1977 (Fish and Game Code section 1900 *et seq.*)	CDFG	Designates state rare, threatened, and endangered plants.
Streambed Alteration Agreement (Fish and Game Code sections 1600 *et seq.*)	CDFG	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.
CDFG Policies and Guidelines, Wetlands Resources Policy	CDFG	Provides for the protection, preservation, restoration, enhancement, and expansion of wetland habitats in California, including vernal pools
Public Resources Code, sections 25500 & 25527	CDFG, USFWS	Prohibits siting of facilities in certain areas of critical concern for biological resource, such as ecological preserves, refuges, etc.
Title 20 CCR section 1702 (q) and (v)	CDFG, USFWS	Protects "areas of critical concern" and "species of special concern" identified by local, state, or federal resource agencies within the project area, including the CNPS.
Title 14 CCR section 15000 *et seq.*	CDFG, USFWS	Describes the types and extent of information required to evaluate the effects of a proposed project on the biological resources of a project site.

Applicable Law	Administering Agency	Description
California Desert Native Plant Act, Food and Agriculture Code sections 80001 through 80006	California Agricultural Commission	Protects California desert native plants from unlawful harvesting on both privately and public owned lands
Local		
Coachella Valley Multi-Species Habitat Conservation Plan (CVMSHCP)	Coachella Valley Association of Governments (CVAG)	Addresses current and potential future State and federal ESA issues within the plan area. Satisfies the legal requirements for the issuance of permits that will allow the take of species covered by the Plan.
County of Riverside General Plan	Riverside County	The Riverside County General Plan (Riverside County 1993) has a tiered structure: the General Plan itself covers unincorporated areas, and its supplemental plans such as Western Coachella Valley Area Plan and San Gorgonio Wind Policy Area Specific Plan, which include more detailed information. These plans include policies pertaining to conservation of biological resources in their Multipurpose Open Space Elements. The policies focus on sensitive species and habitats, habitat linkages, and common native species such as oak trees.
City of Palm Springs General Plan	City of Palm Springs	Provides guidance on the types of development activity and allowable uses for those areas within the city limits.

SETTING

REGIONAL SETTING

The CPV Sentinel project area is located in unincorporated Riverside County, California, just north of the City of Palm Springs and immediately west of the City of Desert Hot Springs. Regionally, the area is known as the Coachella Valley, a broad, low elevation valley comprising the westernmost limits of the Sonoran Desert. The valley extends for approximately 45 miles in Riverside County, southeast from the San Bernardino Mountains to the Salton Sea. The Coachella Valley is approximately 15 miles wide along most of its length, bounded on the west by the San Jacinto Mountains and the Santa Rosa Mountains and on the north and east by the Little San Bernardino

Mountains. The project site is located in the northwest portion of the Coachella Valley. Portions of the proposed laydown area, gas line route, and recycled water pipeline would be located within the City of Palm Springs.

PROJECT AREA AND VICINITY DESCRIPTION

The project area consists of the proposed CPV Sentinel site and all associated linear facilities. The 37-acre CPV Sentinel site is currently vacant and is located east of State Route (SR) 62, north of Interstate 10 (I-10), and west of Indian Avenue, with Powerline Roads North and South running along the south side of the property. The CPV Sentinel site is located approximately 700 feet east of the Southern California Edison (SCE) Devers Substation and 1.8 miles northwest of the Indigo Energy Facility. The project components include a 2,300 foot transmission interconnection to SCE Devers Substation, 2.6 miles of new natural gas pipeline (24-inch diameter), a new access road (3,200 feet) connecting the site to Dillon Road, a new potable water supply line (3,200 feet), eight natural gas-fired, GE Energy LMS100 combustion turbine generators (13.5 feet in diameter and 90 feet tall), and a 14-acre construction laydown area. In addition, a proposed 900-foot recycled water pipeline (12-inch diameter) would connect from an existing Desert Water Authority service main to the Palm Springs National Golf Course, approximately 10 miles south of the CPV Sentinel site (LW 2008a).

Groundwater for cooling and other power plant processes would be pumped via wells within the Mission Creek Groundwater Sub-basin. The proposed project would use a zero-liquid discharge (ZLD) system, resulting in zero wastewater discharge from the site. The CPV Sentinel site, linears, and construction laydown area are located within the boundaries of the proposed Coachella Valley Multi-Species Habitat Conservation Plan (CVMSHCP), but outside of any designated conservation area.

The CPV Sentinel site and the surrounding areas are primarily characterized by industrial uses with extensive development of wind energy and transmission infrastructure. Adjacent land uses include the SCE Devers Substation to the west, transmission lines to the south, and a wind energy farm and scattered single family rural residences to the east and south. The site itself is vacant and the nearest residence is located approximately 330 feet to the east. The applicant has secured control of this property under an option to purchase.

The project area and immediate vicinity support primarily Sonoran creosote bush scrub. This native habitat community has been disturbed and appears to be stressed throughout the project area from vehicle traffic, encroachment from neighboring developed areas, and extended drought conditions. Sonoran creosote bush scrub north of the project area exhibits a lower level of disturbance; however, this area is anticipated to be developed for wind power. An unnamed desert wash runs northwest-southeast near the intersection of Diablo Road and 16th Avenue, approximately 2,000 feet southwest of the construction laydown area. This wash has been described as a relict drainage which has been disconnected from the watershed by the SCE Devers Substation. Garnet Wash is approximately 1.3 miles south of the CPV Sentinel site. Both Garnet Wash and the unnamed wash have native channels with unarmored banks and native soil beds. No jurisdictional aquatic resources occur in the project area.

A local geologic feature is Devers Hill, which is approximately 2,000 feet east of the CPV Sentinel site. Devers Hill peaks at 1,168 feet above mean sea level (msl); this is locally the highest point in the relatively flat plain sloping to the southeast.

Habitats and Wildlife

Project Site and Transmission Line Corridor

As mentioned above, the most common vegetation community in the project area is Sonoran creosote bush scrub. This community is dominated by creosote (*Larrea tridentata)* shrubs with annual grasses in the understory and in open areas. Species commonly observed in the project area include white bursage (*Ambrosia dumosa*), teddy bear cholla (*Cylindropuntia bigelovii*), barrel cactus (*Ferocactus cylindraceus*), pencil cholla (*Opuntia ramossima*), California buckwheat (*Eriogonum fasciculatum*), and smoke tree (*Psorothamnus schotti*).

Scattered ornamental and ruderal species surround residential, industrial, and commercial land uses including eucalyptus (*Eucalyptus sp*.), Russian olive (*Elaeagnus angustifolia*), and tamarisk (*Tamarix sp.).*

Common bird species observed during the various reconnaissance and protocol surveys include common raven (*Corvus corax*), Say's phoebe (*Sayornis saya*), house finch (*Carpodacus mexicanus*), and American kestrel (*Falco sparverius*). In addition, several desert woodrat (*Neotoma lepida*) middens were observed at the bases of creosote shrubs and around cactus bases. Side-blotched lizards (*Uta stansburiana*) and Great Basin whiptails (*Cnemidophorus tigris tigris*) were often observed around and near the bases of creosote shrubs and other vegetation. Coyote (*Canis latrans*) and black-tailed jackrabbit (*Lepus californicus*) were also detected.

Construction Laydown Area

A 14-acre construction laydown area would be located south of Powerline Road and 16th Avenue and would include a combination of temporary construction offices, parking, equipment storage, and material storage areas. The proposed laydown area is located within an existing wind energy farm with moderately to heavily disturbed vegetation.

Habitat within the construction laydown area is consistent with the project area; disturbed Sonoran creosote bush scrub dominated by creosote shrubs intermixed with white bursage, teddy bear cholla, and barrel cactus. Several decommissioned wind power generation units are lying on the ground with a few larger, operational units in the remaining portion of the laydown area. Roads, pads, and equipment storage areas for the wind farm exist within the area.

Gas Transmission Corridor

Similar to the other project areas, the gas transmission corridor is vegetated by disturbed Sonoran creosote scrub habitat. The corridor generally follows existing roads, other gas pipeline corridors, and access roads for wind energy farms. Grading, fences, buildings, roads and roadsides, and vehicle traffic are evident along the corridor.

Garnet Wash runs approximately 2,750 feet west of the southern terminus of the gas transmission corridor. Garnet Wash is a regionally large and biologically important jurisdictional drainage that is a source of sand migration within Coachella Valley and as critical habitat for the Coachella Valley fringe-toed lizard (*Uma inornata*) (CVAG 2007). The portion of Garnet Wash closest to the project area is dry except after rain events; the vegetation and habitat in this portion of the wash resemble the surrounding desert. This area at Garnet Wash comprises the only potential habitat for Coachella Valley fringe-toed lizards of all the surveyed areas; however, it is not prime or favorable habitat.

Recycled Water Pipeline Corridor

The proposed recycled water pipeline would be constructed underground within an existing road and golf course. The habitat along the corridor is ornamental landscaping and municipal hardscape (i.e., paved roads and concrete walkways). The treated recycled water would discharge into a water feature on the golf course. Sensitive biological resources are not expected to occur in the vicinity of this project component.

Special-Status Species and Sensitive Natural Communities

BIOLOGICAL RESOURCES Table 2 lists the special-status species that could potentially occur in the project vicinity. These species were identified from the following sources:

- USFWS species lists provided for the 7.5-minute U.S. Geological Survey (USGS) quadrangle encompassing the project area (Desert Hot Springs quadrangle)(USFWS 2008);
- A search of the California Natural Diversity Database (CNDDB) for all special status species occurrences in the Desert Hot Spring quadrangle (CDFG 2008);
- The CNPS Inventory of Rare and Endangered Plants for the Desert Hot Springs quadrangle (CNPS 2008); and
- Application for Certification for the CPV Sentinel Energy Project, Riverside County, CA. Volumes 1 and 2. Submitted to the California Energy Commission, June 29, 2007. (CPVS 2007a).

A lack of suitable, natural habitat in the project area reduces the likelihood of occurrence of the majority of these species. However, suitable habitat within the project area and nearby occurrence records exist for several special-status plants (i.e., Coachella valley milk-vetch [*Astragalus lentiginosus var. coachellae*] and triple-ribbed milk-vetch [*Astragalus tricarinatus*]) and wildlife species (i.e., Coachella Valley fringe-toed lizard, flat-tailed horned lizard [*Phrynosoma mcallii*], desert tortoise [*Gopherus agassizii*], and burrowing owl [*Athene cunicularia*]). No special-status species were found during reconnaissance or protocol surveys for the project area and vicinity conducted by URS on February 26 and April 3, 2007, and by URS and Xeric Specialties Consulting from May 7 through May 10, 2007 and March 25, 26, and 28, 2008. In addition, no special-status species were observed during a reconnaissance survey of the proposed project area and natural gas pipeline route conducted by staff on October 5 and 8, 2007.

BIOLOGICAL RESOURCES Table 2
Special-Status Species Potentially Occurring in Project Area

Scientific Name	Common Name	Listing Status*		
		Federal	**State**	**Other**
Invertebrates				
Stenopelmatus cahuilaensis	Coachella Valley Jerusalem cricket	----	----	CVMSHCP
Macrobaenetes valgum	Coachella Valley giant sand treader cricket	----	----	CVMSHCP
Reptiles				
Crotalus ruber ruber	northern red-diamond rattlesnake	----	SC	
Phrynosoma coronatum blainvillei	coast (San Diego) horned lizard	----	SC	
Phrynosoma mcallii	flat-tailed horned lizard	----	SC	CVMSHCP
Uma inornata	Coachella Valley fringe-toed lizard	T	E	CVMSHCP
Gopherus agassizii	desert tortoise	T	T	CVMSHCP
Amphibians				
NONE IDENTIFIED				
Birds				
Athene cunicularia	burrowing owl	----	SC	CVMSHCP
Vireo bellii pusillus	least Bell's vireo	E	E	CVMSHCP
Falco mexicanus	prairie falcon	----	----	
Toxostoma lecontei	Le Conte's thrasher	----	SC	CVMSHCP
Falco peregrinus anatum	American peregrine falcon	----	E/FP	
Lanius ludovicianus	loggerhead shrike	----	SC	
Eremophila alpestris actia	California horned lark	----	----	
Toxostoma crissale	crissal thrasher	----	----	CVMSHCP
Asio flammeus	short-eared owl	----	SC	
Aquila chrysaetos	golden eagle	----	FP	
Buteo regalis	ferruginous hawk	----	----	
Circus cyaneus	northern harrier	----	SC	
Falco columbarius	merlin	----	----	
Accipiter cooperii	Cooper's hawk	----	----	
Buteo jamaicensis	red-tailed hawk	----	----	
Mammals				
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	----	SC	
Chaetodipus fallax pallidus	pallid San Diego pocket mouse	----	SC	
Perognathus longimembris bangsi	Palm Springs pocket mouse	----	SC	CVMSHCP
Spermophilus tereticaudus var. chlorus	Palm Springs round-tailed ground squirrel	C	SC	CVMSHCP
Ovis canadensis nelsoni	Nelson's bighorn sheep	E	T/FP	
Ovis canadensis nelsoni DPS	peninsular bighorn sheep	E	T/FP	CVMSHCP
Nyctinomops macrotis	big free-tailed bat	----	SC	
Macrotus californicus	California leaf-nosed bat	----	SC	
Choeronycteris mexicana	Mexican long-tongue bat	----	SC	
Antrozous pallidus	pallid bat	----	SC	

Scientific Name	Common Name	Listing Status* Federal	State	Other
Nyctinomops femorosaccus	pocketed free-tailed bat	----	SC	
Euderma maculatum	spotted bat	----	SC	
Myotis velifer	cave myotis	----	SC	
Corynorhinus townsendii	Townsend's big-eared bat	----	SC	
Eumops perotis	western mastiff bat	----	SC	
Plants				
Abronia villosa var. aurita	chaparral sand-verbena	----	----	CNPS 1B
Astragalus lentiginosus var. coachellae	Coachella Valley milk-vetch	E	----	CNPS 1B CVMSHCP
Astragalus tricarinatus	triple-ribbed milk-vetch	E	----	CNPS1B CVMSHCP
Chorizanthe xanti var. leucotheca	white-bracted spineflower	----	----	CNPS 1B
Euphorbia misera	cliff spurge	----	----	CNPS 2
Linanthus maculatus	Little San Bernardino Mtns. linanthus	----	----	CNPS 1B CVMSHCP
Nemacaulis denudata var. gracilis	slender woolly-heads	----	----	CNPS 2
Erigeron parishii	Parish's Daisy	----	----	CNPS 1B
Ayenia compacta	ayenia	----	----	CNPS 2
Chamaesyce arizonica	Arizona spurge	----	----	CNPS 2
Selaginella eremophila	desert spike-moss	----	----	CNPS 2
Xylorhiza cognata	Mecca-aster	----	----	CNPS 1B

***Status Legend:** **E** = listed Endangered; **T** = listed Threatened; **SC** = Species of Concern (only applies to State, no longer a Federal category); **FP** = fully protected (state category); **C** = Candidate for Listing; **California Native Plant Society** (**CNPS**) List, CNPS list is for plants only: **List 1B** = Rare, threatened or endangered in California and elsewhere; **List 2** = Rare, threatened or endangered in California, more common elsewhere; **CVMSHCP** = included in the Coachella Valley Multiple Species Habitat Conservation Plan. **Sources**: California Natural Diversity Database (CDFG 2008), CNPS (2008), CVMSHCP (2008).

In addition to the special-status species listed above, a search of the CNDDB and the CVMSHCP revealed the presence of two sensitive vegetation communities in the vicinity of the project area: mesquite bosque and mesquite hummocks. These vegetation communities do not occur in the project area, but could be directly impacted by the use of groundwater by the proposed project; this is discussed in more detail later in this analysis.

Sensitive Habitat

Critical Habitat

USFWS has designated critical habitat in Riverside County for a number of special status species, including Coachella Valley fringe-toed lizard and desert tortoise. Both species are also included under the CVMSHCP. The nearest Critical Habitat Unit (CHU) for the Coachella Valley fringe-toed lizard is located within Garnet Wash approximately 2,750 feet east of the proposed gas transmission corridor. The closest CHU for the desert tortoise is over 5 miles northeast of the project area within Joshua Tree National Park, designated as a Desert Wildlife Management Area (DWMA) by USFWS in 1994. In addition, the CVMSHCP includes a desert tortoise linkage and conservation area that abuts the southern border of the Joshua Tree National Forest and DWMA and extends south across I-10. Due to a lack of suitable habitat, neither the Coachella Valley fringe-toed lizard nor desert tortoise are likely to occur in the project area.

CVMSHCP Sensitive Areas

The proposed natural gas pipeline route traverses portions of unincorporated Riverside County and the City of Palm Springs. Coachella Valley Association of Governments (CVAG) prepared the CVMSHCP, which is intended to serve as both a Habitat Conservation Plan (HCP) pursuant to section 10(a)(1)(b) of the Federal Endangered Species Act (FESA) and a Natural Communities Conservation Plan (NCCP) under the NCCP Act of 2002. The draft CVMSHCP was approved by all signatory agencies in October 2007, including Riverside County and the City of Palm Springs, and is expected to be permitted by State and federal regulatory agencies in 2008. Although the project occurs within the boundaries of the CVMSHCP it does not fall within any of the 21 Conservation Areas or the 6 Reserve Management Units (RMUs) identified within the plan. Additionally, the proposed project does not require permits from any of the signatories to the CVMSHCP.

Sensitive Aquatic Habitat

No U.S. Army Corps of Engineers or State jurisdictional wetland habitats were identified within or proximate to the proposed project area, including the associated linear facilities, and construction laydown areas. No other aquatic resources occur within the project area.

The nearest jurisdictional aquatic resource occurs in Garnet Wash at the intersection of Karen Avenue and 19th Avenue, approximately 2,750 feet east of the southern end of the gas transmission corridor. Garnet Wash is a large and biologically important jurisdictional aquatic resource in the region. At this intersection, the wash flows in a southeastwardly direction under I-10 and connects with the Whitewater River near Indian Avenue. Vegetation within the wash includes cheesebush (*Hymenoclea salsola*), indigobush (*Psorothamnus aborescens*), desert almond (*Prunus fasiculata*), and joint-fir (*Ephedra californica*).

Other Sensitive Habitats

As mentioned above, a search of the CNDDB revealed the presence of a sensitive natural community, mesquite bosque, in the vicinity of the proposed project area. In addition, the CVMSHCP has included both mesquite bosque and a second sensitive community, mesquite hummocks, for conservation. These communities do not occur in the CPV Sentinel project area, but could be directly impacted by the use groundwater for power plant cooling and the subsequent reduction of groundwater levels in the Mission Creek Groundwater Sub-basin, as described under Operation Impacts and Mitigation.

Mesquite Bosque

Mesquite bosque is an open to fairly dense, drought-deciduous streamside riparian forest found along floodplains of streams and rivers, often dominated by screwbean mesquite (*Prosopis pubescens*). The community generally has open interiors under the canopy, which are maintained by frequent flooding or fire. This community is frequently used by riparian bird species during migration, including the State and federally endangered least Bell's vireo (*Vireo bellii pusillus*) and the State species of concern vermillion flycatcher (*Pyrocephalus rubinus*). Mesquite bosques are threatened by agriculture and residential development, groundwater pumping, flood control and invasion by tamarisk (*Tamarix sp.)*, a noxious weed.

Within the CVMSHCP planning area, the mesquite bosque community is found in the Dos Palmas Conservation Area located along the eastern shore of the Salton Sea, over 50 miles from the project location. In addition, the CNDDB identified a small mesquite bosque population over 5 miles north of the project area and another population was mapped approximately 3 miles to the northeast (CDFG 2008; CVAG 2007). These latter two locations occur within the CVMSHCP boundaries, but are not located within a Conservation Area and are therefore not afforded any additional protection. In addition, both of these populations of mesquite bosque occurs up-gradient of the CPV Sentinel site. Therefore, neither population is expected to be impacted by the use of groundwater by the proposed project within the Mission Creek Groundwater Sub-basin, and are not considered further in this analysis.

Mesquite Hummocks

Mesquite hummocks are composed of large clumps of low-growing honey mesquite (*Prosopis glandulosa*) shrubs that form hummocks (small sediment mounds) over sand dunes or on level terrain. This habitat occurs in areas with high soil moisture or springs and is often associated with fault areas. In the Coachella Valley, the Banning branch of the San Andreas Fault has created groundwater damming making the water available to the deep rooted mesquite (CVAG 2007). This groundwater welling supports the mesquite hummock plant community, the dune ecosystem the mesquite create, and associated resident and migratory wildlife. The CVMSHCP has identified mesquite hummocks for conservation in 8 of the 21 proposed Conservation Areas, including the Willow Hole Conservation Area occurring within the Mission Creek Groundwater Sub-basin (CVAG 2007). The Willow Hole Conservation Area has the largest concentration of mesquite hummocks in the CVMSHCP and is located down gradient approximately 5 miles southeast from the CPV Sentinel site, approximately 2 miles southeast of the CPV Sentinel gas line and 3 miles southeast of the projects groundwater pumping region.

Mesquite hummocks were historically widespread throughout the Coachella Valley, but are now restricted in range due to groundwater pumping for agriculture and urban development. It is estimated that mesquite hummocks have been reduced by almost 90 percent since 1939, from 8,300 acres to 870 acres by 1998 (Avery 2005). In addition, many of the remaining occurrences are highly fragmented and often senescent (e.g., mature and with limited or no seedlings, saplings, or young shrubs). This apparent inability to reproduce successfully is also likely the result of changes in soil moisture and water table declines, which make it difficult for seedlings to establish.

The mesquite hummocks that rely on the groundwater within the Mission Creek Groundwater Sub-basin are likely the most ecologically important in the Coachella Valley (Avery 2005). This habitat is considered valuable for the direct benefits to the various protected species it supports, including the Coachella Valley round-tailed ground squirrel (*Spermophilus tereticaudus var. chlorus*), Palm Springs pocket mouse (*Perognathus longimembris bangsi*), Le Conte's thrasher (*Toxostoma lecontei*), Crissal thrasher (*Toxostoma crissale*), Coachella Valley giant sand-treader cricket (*Macrobaenetes valgum*), Coachella Valley fringe-toed lizard, and Coachella Valley milk-vetch. Mesquite hummocks provide indirect benefits by anchoring the dunes made of active aeolian sands. Active aeolian sands are habitat for a number of listed species including Coachella Valley giant sand-treader cricket and the Coachella Valley fringe-toed lizard. Additionally, mesquite hummocks may provide stop-over habitat for the migratory southwestern willow flycatcher (*Empidonax traillii extimus*) and least Bell's vireo. A comprehensive list of the special-status species that benefit from mesquite hummocks is provided in **BIOLOGICAL RESOURCES Table 3**.

BIOLOGICAL RESOURCES Table 3
Special-Status Species Benefiting from Mesquite Hummocks

Scientific Name	Common Name	Listing Status*		
		Federal	State	Other
Invertebrates				
Macrobaenetes valgum	Coachella Valley Giant Sand Treader Cricket	----	----	CVMSHCP
Reptiles				
Uma inornata	Coachella Valley fringe-toed lizard	T	E	CVMSHCP
Birds				
Toxostoma lecontei	Le Conte's thrasher	----	SC	CVMSHCP
Toxostoma crissale	crissal thrasher	----	----	CVMSHCP
Mammals				
Perognathus longimembris bangsi	Palm Springs pocket mouse	----	SC	CVMSHCP
Spermophilus tereticaudus var. chlorus	Palm Springs round-tailed ground squirrel	C	SC	CVMSHCP
Plants				
Astragalus lentiginosus var. coachellae	Coachella Valley milk-vetch	E	----	CNPS 1B.2 CVMSHCP

***Status Legend: E** = listed Endangered; **T** = listed Threatened; **SC** = Species of Special Concern (only applies to State, no longer a federal category); **FP** = Fully Protected (State category); **C** = Candidate for Listing; **California Native Plant Society** (**CNPS**) List, CNPS list is for plants only: **List 1B.2** = Rare, Threatened or Endangered in California and elsewhere; **CVMSHCP** = included in the Coachella Valley Multiple Species Habitat Conservation Plan. **Sources**: California Natural Diversity Database (CDFG 2008), CNPS (2008), CVMSHCP (2008).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The threshold for determining significance is based on the biological resources present or potentially present within the proposed project area in consideration of the proposed project description. A proposed project would have a significant impact to biological resources, if it would:

- Have an adverse impact, either directly through take, or indirectly through habitat modification or interruption of migration corridors, on any State- or federally-listed species;
- Have an indirect or direct adverse effect on any sensitive natural community identified in federal, State or local plans, policies, or regulations;
- Interfere with the movement of any native wildlife species (resident or migratory) or with established native wildlife (resident or migratory) corridors; or
- Conflict with applicable federal, State, or local laws, ordinances, regulations and standards protecting biological resources, as listed in **Biological Resources Table 1**.

DIRECT AND INDIRECT IMPACTS AND MITIGATION

The California Environmental Quality Act (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 and are still reasonably foreseeable and related to the operation of the project. Significance of impacts is generally determined by compliance with applicable LORS; however, guidelines adopted by resource agencies may also be used.

This section analyzes the potential for direct and indirect impacts of construction and operation of the proposed project to biological resources and provides mitigation, as necessary, in an effort to reduce the severity of potentially adverse impacts.

<u>Construction-Related Impacts and Mitigation</u>

Preparation of the site would include permanent removal of disturbed Sonoran creosote bush scrub and annual grassland on the CPV Sentinel project site and temporarily disturb these same vegetation communities and existing dirt roads in the construction laydown area and gas transmission corridor. The habitats that would be permanently removed are already degraded and provide limited wildlife use for regionally common species. However, construction activities could potentially disturb migratory or nesting birds. The loss of active bird nests or young is regulated by the federal Migratory Bird Treaty Act and Fish and Game Code.

The applicant proposed several mitigation measures in an effort to reduce construction-related impacts to biological resources. Staff agrees with these measures and has incorporated many of them into the following Conditions of Certification: **BIO-1, BIO-2, BIO-3, BIO-4** (Designated Biologist and Biological Monitor Selection, Duties, Qualifications, and Authority), **BIO-5** (Worker Environmental Awareness Program), **BIO-**

6 (Biological Resources Mitigation Implementation and Monitoring Plan), **BIO-7** (Impact Avoidance), **BIO-8** (Avoidance of Harassment and Harm), **BIO-9** (Pre-Construction Surveys for Desert Tortoise and Impact Avoidance), **BIO-10** (Pre-Construction Surveys for Listed Plants and Impact Avoidance), and **BIO-11** (Burrowing Owl and Nesting Bird Surveys and Impact Avoidance). Following is a list of applicant-proposed mitigation measures as provided in the AFC (CPVS 2007a, page 7.2-20 – 23):

- Pre-construction survey for rare plants
- Impact avoidance if rare plants are identified (relocation of project components)
- Pre-construction survey for sensitive animals (e.g., desert tortoise)
- Pre-construction surveys for burrowing owl and impact avoidance if an occupied burrow is discovered
- Maintenance of essential ecological processes (ensuring the continuation of sand movement and accumulation for the Coachella Valley fringe-toed lizard)
- Clearance surveys for desert tortoise (if identified as necessary in pre-construction surveys)
- Implementation of a worker education program
- Exotic plant species avoidance (use of native plants in restoration of temporarily disturbed areas)
- Invasive predator control (prevention of common raven nesting)
- Animal-proof fencing (designed to exclude burrowing animals from entering the construction site)
- Small mammal trapping (removal of small mammals from construction area after animal-proof fencing is in place)
- Vegetated overburden removal (nesting bird and common wildlife impact avoidance, worker education program)

CPV Sentinel Power Plant Site and Transmission Line to Devers Substation

The 37-acre CPV Sentinel site and 2,300-foot long 220-kilovolt (kV) transmission line are surrounded by the SCE Devers Substation to the west and wind energy and transmission infrastructure to the east and south. The CPV Sentinel site and transmission line areas are vegetated with disturbed Sonoran creosote bush scrub and annual grassland. The 37-acre project site would be permanently impacted by the proposed project and the transmission line would require the placement of tower footings. The CPV Sentinel site and transmission line are within the range of special status species, including the desert tortoise, burrowing owl, Coachella Valley fringe-toad lizard, and the flat-tailed horned lizard. None of these species have been observed during focused or protocol-level surveys and it is unlikely that they occur in the project area. Sensitive species, however, could use adjacent areas for foraging or nesting. Habitat on-site may also provide foraging habitat for common mammals and other wildlife, as well as potentially suitable nesting habitat for resident and migratory birds.

Among the Conditions of Certification identified above, **BIO-9** through **BIO-11** require the applicant to conduct pre-construction surveys for sensitive species and nesting birds with the potential to occur in the project vicinity. This allows for the continued confidence that species would not migrate into the project area undetected and be adversely impacted by the project. Condition of Certification **BIO-7** requires implementation of a 5-day capture and release program and installation of silt fencing to exclude burrowing small mammals from entering the construction area. In conjunction with the other Conditions of Certification, these conditions reduce the likelihood of sensitive species being present and ensure that if a sensitive species or nesting birds are detected, appropriate actions will be executed to avoid and/or mitigate the effects of project implementation.

Because the proposed project and transmission line towers would be located on disturbed land adjacent to existing energy facilities, sensitive biological resources are not expected to occur. With implementation of the mitigation measures proposed by the applicant and Conditions of Certification **BIO-1** through **BIO-11**, staff concludes that construction of the CPV Sentinel power plant and transmission interconnection would not result in significant direct impacts to biological resources.

Construction Laydown Area

The construction laydown area is approximately 14 acres and located to the south of the CPV Sentinel site. Conditions in the laydown area are similar to project site in that natural vegetation is a mix of Sonoran creosote bush scrub and annual grassland. Temporary impacts associated with the proposed project are also similar to the permanent impacts described above. Therefore, implementation of Conditions of Certification **BIO-7,** which requires the applicant to install silt fencing and implement a capture and release program for small mammals, and **BIO-9** through **BIO-11,** which require the applicant to complete pre-construction surveys, would minimize potential impacts to sensitive species. In addition, **BIO-6** requires the development and implementation of a mitigation plan that addresses temporary impact areas, measures for re-contouring and replanting, monitoring and maintenance requirements, and success criteria for review and approval by the Energy Commission and appropriate regulatory agencies. **BIO-7** restricts the use of any invasive species in reseeding or replanting temporary impact areas or landscaped areas. Staff concludes that implementation of these Conditions of Certification would minimize direct impacts to habitat and wildlife and ensure that temporarily impacted areas are restored adequately such that impacts to biological resources are less than significant.

Gas Transmission Corridor, Potable Water Line, Recycled Water Line, and Access Road

The gas transmission line, potable water line, and access road follow the same corridor; therefore, impacts associated with these facilities are assessed together. The applicant would construct a 2.6-mile gas transmission line from the project site to the Indigo Energy Facility. Along the northern portion of this corridor, a 3,200-foot potable water line connecting to a MSWD municipal line at Dillon Road and a permanent access road would be constructed. The gas transmission corridor generally follows existing dirt roads, other gas pipelines corridors, and access roads for wind energy farms. As with the other project areas, the gas transmission corridor is bordered with disturbed

Sonoran creosote scrub and annual grassland. With the implementation of all the Conditions of Certification, particularly **BIO-6**, **BIO-7**, and **BIO-9** through **BIO-11**, staff concludes that there will not be a significant impact to biological resources associated with temporary impacts along the gas transmission potable water, and access road corridor.

The proposed recycled water pipeline would be constructed underground within an existing road and golf course. Sensitive biological resources are not expected to occur in the vicinity of this project component; however, common wildlife species may become entrapped in open trenches during construction activities. Condition of Certification **BIO-8** (Avoidance of Harassment and Harm) requires construction of escape ramps and inspection for entrapped wildlife; implementation of this condition would reduce potential impacts to wildlife to less than significant levels.

Construction Lighting

During periods when nighttime construction will take place, illumination that meets state and federal worker safety guidelines will be required. The project area is adjacent to the SCE Devers Substation, which is well lit. In addition, some less severe night lighting is also present from permanent marker lights on wind turbines and light from rural residences. Therefore, only a slight increase in light and glare is expected to occur during construction. No sensitive species were found in the project area, but under certain circumstances, lights can disorient migratory birds flying at night, or attract wildlife such as insects and insect-eaters. However, because the CPV Sentinel Project would be located adjacent to SCE Devers Substation and on land zoned as Public Facilities by the Riverside General Plan, staff concludes that there would be no significant impacts to sensitive species from the minimal amount of lighting associated with construction activities.

Construction Noise

As previously discussed, the CPV Sentinel site is zoned as Public Facilities pursuant to the Riverside County General Plan and is surrounded by other energy facilities including the SCE Devers Substation and numerous wind turbines, rural residences, and a network of dirt roads. The CPV Sentinel site is also 1.75 miles east of SR 62 and 2 miles north of I-10 and the Southern Pacific Railroad. Therefore, it is likely that animals in this area have become acclimated to this level of noise and that temporarily elevated noise levels due to construction would be insignificant. Because noise levels in the vicinity are already elevated and no sensitive species were found in the project area, staff concludes there will be no significant impacts to biological resources from construction noise.

Operation Impacts and Mitigation

Potential operation-related 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, and loss of sensitive habitat through long-term groundwater use.

Avian Collision and Electrocution

Birds are known to collide with transmission lines, exhaust stacks, and other structures, causing mortality to the birds. It is possible that birds could collide with the 2,300-foot transmission line or power plant structures. Bird collisions with power lines and transmission structures generally occur when a power line or other structure transects a daily flight path used by a concentration of birds and migrating birds are traveling at reduced altitudes and encounter tall structures in their path (Brown 1993). Collision rates generally increase in low light conditions, during inclement weather, during strong winds, and during panic flushes when birds are startled by a disturbance or are fleeing from danger. Collisions are more probable near wetlands, within valleys that are bisected by power lines, and within narrow passes where power lines run perpendicular to flight paths (APLIC 1996); these features are not present near the proposed project area. Therefore, staff concludes that the CPV Sentinel transmission structures would not pose a significant collision threat to resident or migratory bird populations.

Red-tailed hawk and other large aerial perching birds, including those offered state and/or federal protection, are susceptible to transmission line electrocution. Because raptors and other large birds often perch on tall structures that offer optimal views of potential prey, the design characteristics of transmission towers/poles are a major factor in raptor electrocutions (APLIC 1996). Electrocution occurs only when a bird simultaneously contacts two energized phase conductors or an energized conductor and grounded hardware. This happens most frequently when a bird attempts to perch on a transmission tower/pole with insufficient clearance between these elements. Raptor species that utilize the towers for nesting could be electrocuted while landing. Furthermore, nests may be built in areas that are susceptible to electrical charges, resulting in fire as well as an electrical outage. However, the majority of raptor electrocutions are caused by lines that are energized at voltage levels between 1-kV and 60-kV, and “the likelihood of electrocutions occurring at voltages greater than 60-kV is low” because phase-to-phase and phase-to-ground clearances for lines greater than 60-kV are typically sufficient to prevent bird electrocution (APLIC 2006). The proposed CPV Sentinel transmission lines would be 220-kV; therefore, phase-to-phase and phase-to-ground clearances are expected to be sufficient to minimize bird electrocutions. However, the following measure is proposed to ensure adequate spacing of phase conductors.

Potential impacts to wildlife resulting from electrocution by transmission lines may be mitigated by incorporating the construction design recommendations provided in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (see Condition of Certification **BIO-7**). Specifically, the phase conductors shall be separated by a minimum of 60 inches. In addition to the aforementioned separation requirements, Condition of Certification **BIO-7** requires that bird perch diverters and/or specifically designed avian protection materials should be used to cover electrical equipment where adequate separation is not feasible (APLIC 2006). With implementation of this mitigation, significant avian mortality due to electrocution by CPV Sentinel transmission structures is not expected to occur.

Operation Lighting

The proposed CPV Sentinel Project is surrounded by other energy facilities including the SCE Devers Substation and numerous wind turbines, rural residences, and a network of dirt roads. The SCE Devers Substation is well lit and some less severe night lighting is also present from permanent marker lights on wind turbines and ambient light from rural residences. A slight increase in light and glare is expected to occur during operation of the CPV Sentinel facility. Under certain circumstances, lights can disorient migratory birds flying at night or attract wildlife such as insects and insect-eaters. However, no sensitive species were found in the project area that would be impacted by operational lighting. Thus, staff concludes there will be no significant impacts to sensitive species from the minimal amount of lighting associated with operation of the new facility.

Operation Noise

The CPV Sentinel site is zoned as Public Facilities pursuant to the Riverside County General Plan and is surrounded by other energy facilities including the SCE Devers Substation and numerous wind turbines, rural residences, and a network of dirt roads. In addition, the project site is 1.75 miles east of State Highway 62 and 2 miles north of I-10 and the Southern Pacific Railroad. Therefore, it is likely that animals in this area have become habituated to this level of noise. Operation of the plant would produce elevated noise levels, but no sensitive species that could be impacted by additional noise are known to occur in the immediate vicinity. Staff concludes there would be no significant impacts to biological resources from operational noise.

Recycled Water Supply

The proposed recycled water pipeline would discharge treated water into a water feature on the Palm Springs National Golf Course. Sensitive biological resources are not expected to occur in the vicinity of this project component; however common wildlife species (e.g., bullfrog) may use the water feature. Because the water would be treated to tertiary levels, significant impacts to biological resources would not occur.

Groundwater Use

As described in the **SOIL & WATER RESOURCES** section of the Final Staff Assessment, the CPV Sentinel Project would utilize groundwater from the Mission Creek Groundwater Sub-basin for power plant cooling. Groundwater modeling results conducted by the applicant and verified by staff indicate that project-specific drawdowns at CVWD wells in the Mission Creek Groundwater Sub-basin could be on the order of 2 feet over the life of the project (CPVS 2008), depending both on the recharge schedule and the aquifer characteristics assumed in the modeling analysis. It is anticipated that the maximum project-specific drawdown of ground water in the Willow Hole Conservation Area could also be approximately 2 feet over the life of the project based on the proximity of the CVWD wells to the Willow Hole Conservation Area (Fio 2008). Based on modeling results for the entire Mission Creek Groundwater Sub-basin and accounting for projected pumpage and recharge rates as estimated by DWA, MSWD, and CVWD, the overall average drawdown would reach 82 feet by 2030, and 60-70 feet in the Willow Hole Conservation Area (Psomas 2007).

Groundwater use for power plant cooling without adequate recharge would contribute to the on-going problem of overdraft in the Mission Creek Groundwater Sub-basin. Groundwater use in the sub-basin has increased to support energy projects, residential development, and agricultural practices. Additional overdraft pumping in the sub-basin would cause further reductions in the groundwater table under the mesquite hummocks in the Willow Hole Conservation Area, causing severe degradation or loss (Avery 2005).

The majority of the mesquite root system occurs in the upper 3 feet of soil, but mesquite have one of the deepest tap roots known, extending 160 feet for some exceptional individuals. Even with this large taproot, relatively moderate groundwater decreases have been found to substantially stress or kill adult mesquite individuals (Stromberg et al. 1992). Both mesquite bosques and mesquite hummocks are generally restricted to soils no more than 50 feet above the groundwater table. However, continual and quantifiable reductions in mesquite stature have been documented when the groundwater table falls below 20 feet (Stromberg et al. 1993).

In short, when groundwater is within 20 feet of the ground surface, mesquite bosque and mesquite hummocks are expected to remain healthy; between 20 feet and 33 feet below ground surface there is a quantifiable decline in ecological function and signs of stress and senescence are observed; high mortality has been observed at levels greater than 33 feet below the ground surface (Avery 2005). The mesquite hummocks in the Willow Hole Conservation Area are currently degraded and at risk of future impacts associated with groundwater use (CVAG 2007, Avery 2005). Therefore, staff assumes that (at best) groundwater elevation in the mesquite hummock area currently ranges between 20 and 33 feet below the surface; however, no monitoring wells exist in the Willow Hole Conservation Area to precisely determine the current groundwater elevation.

Since the early 1950s, groundwater levels in the Mission Creek Groundwater Sub-basin have been steadily declining due to overdraft and the rate of decline is expected to increase due to increased pumping coupled with inconsistent and insufficient recharge (Avery 2005, CVAG 2007). Maintaining the mesquite hummocks and existing sand dunes at the Willow Hole Conservation Area will require maintaining relatively natural groundwater levels (Avery 2005). This can be accomplished by (1) reduced groundwater pumping, (2) groundwater recharge at the Mission Creek Spreading Grounds, and/or (3) localized groundwater recharge through “deep irrigation” in the Willow Hole Conservation Area. Groundwater recharge has been identified as the most technically feasible and effective option to avoid groundwater drawdown and the resultant impacts to mesquite hummocks.

If groundwater replenishment is not implemented in advance of construction and operation of the CPV Sentinel Project, significant and irreversible impacts to mesquite hummocks and the special-status species they support would occur. This is based on the expected annual and seasonal time lag between groundwater use and the time recharge occurs in the Mission Creek Groundwater Sub-basin and the Willow Hole Conservation Area specifically. Furthermore, there is a possibility for seasonal time lags because the period in which the CPV Sentinel Project is pumping groundwater may not overlap with the time period water is available for purchase to complete the groundwater replenishment program.

Using modeling, Staff determined that water must be recharged into the Mission Creek spreading grounds in advance of groundwater pumping by the CPV Sentinel Project to avoid groundwater drawdown and the resultant impacts to mesquite hummocks. This recharge schedule is detailed in Conditions of Certification **SOIL and WATER-8 through 11**. Also refer to the **SOIL & WATER RESOURCES** section of this Final Staff Assessment for additional information on the modeling assumptions, recharge schedule, and the Desert Water Agency water delivery agreement. With implementation of this condition, project-related impacts to the mesquite hummock vegetation community and the special-status species it supports would be reduced to less than significant. Based on recent conversations, staff understands that USFWS is in agreement with implementation of a water recharge schedule to avoid impacts to mesquite hummocks and that consultation under the federal Endangered Species Act is not required; a letter from USFWS documenting this position is expected soon after Final Staff Assessment publication (Avery 2008).

CUMULATIVE IMPACTS

"Cumulative" impacts refer to a proposed project's incremental effect viewed over time together with other closely related past and present projects and projects in the reasonably foreseeable future whose impacts may compound or increase the incremental effect of the proposed project (Public Resources Code Section 21083; California Code of Regulations., Title 14, Sections 15064[h], 15065[c], 15130, and 15355).

The CPV Sentinel Project is proposed on disturbed land that is generally isolated from undisturbed natural areas by the SCE Devers Substation, wind turbines, and a network of dirt roads. The CVMSHCP identified the project vicinity as a developed area with a wind energy overlay located outside of designated conservation areas. In addition, two years of protocol surveys were conducted in 2007 and 2008 for State and federally listed threatened or endangered species, species of special concern, and other sensitive species and habitats. No sensitive resources have been identified in the project area to date nor are they expected to occur due to the location and historic disturbances on the site. Potential project-related impacts to mesquite hummocks will be offset by implementation of a groundwater recharge schedule that requires recharge sufficiently in advance of pumping to avoid groundwater drawdown. Therefore, staff concludes that impacts related to the CPV Sentinel Project would not contribute significantly to cumulative effects on biological resources in the region.

COMPLIANCE WITH LORS

The proposed project is subject to several LORS including the Riverside County General Plan, the City of Palm Springs General Plan, and the CVMSHCP. The proposed CPV Sentinel Project is located within the County of Riverside and to a small degree within the City of Palm Springs. The proposed project complies with the County of Riverside General Plan and its Western Coachella Valley Area Plan Multipurpose Open Space policies, as well as the City of Palm Springs General Plan and its Recreation and Open Space and Conservation Elements. Among other things, these plans require protection of visual and biological resources, protection of the Whitewater River Watershed, protection of the fringe-toed lizard, and protection of alluvial fan areas near the Sana Rosa Mountains. These plans also require consistency with the CVMSHCP and protection of the biological resources within the CVMSHCP area.

The CVMSHCP satisfies the legal requirements under the State and federal Endangered Species Acts for the issuance of permits that will allow for take of species covered by the plan in the course of otherwise lawful activities. The plan, to the maximum extent practicable, provides measures to minimize and mitigate the impacts of take and provides for conservation of covered species. The CVMSHCP has been adopted by participating local agencies including the County of Riverside and the City of Palm Springs, but the CVMSHCP has not yet been permitted by State and federal regulatory agencies.

The Conditions of Certification have been developed assuming that the CVMSHCP may not be permitted before project initiation. As such, the Conditions of Certification presented herein are intended to eliminate impacts to sensitive species and habitats covered under the CVMSHCP.

It is staff's determination that implementation of the proposed Conditions of Certification, including **SOIL&WATER-7**, would ensure compliance with all applicable LORS.

RESPONSE TO AGENCY COMMENTS

Written comments were provided by the California Public Utilities Commission (CPUC) on the Biological Resources section of the Preliminary Staff Assessment. Comments are identified below and each comment is followed by a staff response.

CPUC comment: Has the CEC assessed the impact that additional transmission lines or movement of existing lines will have on the state and federally endangered Bell's vireo (*Vireo belli pusillus*) and the state species of concern, vermillion flycatcher (*Pyrocephalus rubinus*), which the CEC has assessed, frequent the mesquite bosque riparian forest in the area?

Staff response: Least Bell's vireo and vermillion flycatcher are considered in the overall analysis of avian collision and electrocution impacts. Please refer to the discussion of Operation Impacts and Mitigation within this Biological Resources staff assessment section. The nearest mesquite bosque vegetation community is approximately 3 miles to the northeast; as such, Least Bell's vireo and vermillion flycatcher are not expected to occur near the proposed transmission line. Further, collision impacts would not occur and potential electrocution impacts would be mitigated by adhering to APLIC transmission line guidelines, as described below.

CPUC comment: Will the mitigation measures to reduce bird electrocution threats (phase-to-phase and phase-to-ground clearances, etc.) also mitigate (i.e. – reduce to less than significant levels) the collision of the above-mentioned migratory birds?

Staff response: Bird collisions with power lines and transmission structures generally occur when a power line or structure transects a daily flight path used by a concentration of birds and are more probable near wetlands, within valleys that are bisected by power lines, and within narrow passes where power lines run perpendicular to flight paths. These features are not present in the project area and it is staff's determination that there would be no impact to resident or migratory birds from collision with the proposed transmission line or structures; as such, no mitigation is required. Avian impacts resulting from electrocution would be mitigated to less than significant levels by implementing Condition of Certification **BIO-7**, which requires the proposed transmission line to be designed and built to APLIC standards.

CONCLUSIONS

Staff agrees with the applicant's proposed mitigation measures to avoid significant construction-related impacts to sensitive biological resources. The applicant has avoided construction-related impacts to known sensitive biological resources by locating the proposed project adjacent to other energy facilities and in a previously disturbed area. In addition, the applicant has conducted two consecutive years of protocol-level surveys for sensitive biological resources. Nonetheless, to ensure that sensitive species known to occur in the region do not migrate into the project area prior to construction-related activities, staff has developed Conditions of Certification that require additional surveys prior to project construction activities.

Without mitigation, groundwater use by the proposed CPV Sentinel Project would contribute to the reduction of groundwater levels in the Willow Hole Conservation Area, which would result in impacts to the mesquite hummock plant community and the special-status species it supports. However, implementation of the recharge schedule required by **SOIL&WATER-7** would ensure an adequate amount of water is recharged into the Mission Creek spreading grounds sufficiently in advance of project groundwater pumping to avoid project-related groundwater drawdown and prevent impacts to mesquite hummocks. Based on recent conversations with staff, USFWS is in agreement with implementation of a water recharge schedule to avoid impacts to mesquite hummocks and consultation under the Endangered Species Act is not required; a letter from USFWS documenting this position is expected soon after Final Staff Assessment publication (Avery 2008).

Staff concludes that the proposed CPV Sentinel Project would not result in any significant unmitigated impacts to biological resources with implementation of the Conditions of Certification and compliance with applicable LORS, as presented in this analysis.

PROPOSED CONDITIONS OF CERTIFICATION

Staff proposes the following 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 3 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 10 working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.

Designated Biologist Duties

BIO-2 The project owner shall ensure that the Designated Biologist performs the following actions 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 special-status species or their habitat;

4. Clearly mark sensitive biological resource areas, if present 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 (i.e. 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 3 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 and the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), Worker Environmental Awareness Program (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 the 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 10 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 (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

BIO-5 The project owner shall develop and implement a CPM-approved Worker Environmental Awareness Program (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, if present;

3. Present the reasons for protecting these resources;

4. Present the meaning of various temporary and permanent habitat protection measures as necessary;

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 (for review and approval) 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 10 days prior to site and related facilities mobilization, two copies of the CPM-approved materials shall be submitted.

Training acknowledgement forms signed during construction shall be kept on file by the project owner for a period of 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 to CDFG and USFWS (for review and comment) if applicable 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 and State agency terms and conditions, such as those in a federal Endangered Species Act Section 10(a)(1)(B) Habitat Conservation Plan (HCP) from the USFWS or a California Endangered Species Act Section 2081 Incidental Take Permit from the CDFG, respectively;

4. All sensitive biological resources to be impacted, avoided, or mitigated by project construction and operation;

5. All temporary impact areas to be restored through surface recontouring, reseeding and/or replanting following construction-related activities;

6. All required mitigation measures for temporary impact areas and each sensitive biological resource;

7. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;

8. 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;

9. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities—one set prior to any site or related facilities mobilization disturbance and one set subsequent to completion of project construction. Planned timing of aerial photography and a description of why times were chosen shall also be included;

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

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

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

13. A preliminary discussion of biological resources related facility closure measures;

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

15. 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 5 days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition within 10 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 other appropriate agencies to ensure no conflicts exist.

Implementation of BRMIMP measures will be reported in the Monthly Compliance Reports by the Designated Biologist (i.e., survey results, construction activities that were monitored, species observed). 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.

Impact Avoidance Mitigation Features

BIO-7 Any time the project design is modified or finalized, all feasible measures that avoid or minimize impacts to the local biological resources shall be incorporated, including the following:

1. Design, install and maintain gas transmission lines, potable water lines, access roads, and storage and parking areas to avoid identified sensitive resources;

2. Design, install, and maintain the transmission line from CPV Sentinel to SCE Devers Substation and all other electrical components in accordance with the Avian Power Line Interaction Committee (APLIC), *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* to reduce the likelihood of electrocutions of large birds;

3. Design, install, and maintain structures and supports to prevent common raven (*Corvus corax*) nesting. Destroy nests that are established prior to egg laying and the modify the location to prevent future nest establishment (modified from applicant's Mitigation Measure Bio-9);

4. Install silt fencing buried 1-foot deep and attached to a chain-link fence around the project site prior to construction to keep burrowing animals from easily tunneling into the site. Examine the fencing at least once a week and repair when necessary. Maintain the fencing until construction is complete (modified from applicant's Mitigation Measure Bio-10);

5. Following installation of silt fence and prior to ground disturbance, conduct small mammal trapping for five nights in order to capture and relocate as many small mammals from within the project area as possible. Set traps near sign, burrows, or tracks at dusk each day and check at midnight or no later than dawn the next day to ensure no unnecessary deaths occur (modified from applicant's Mitigation Measure Bio-11);

6. Eliminate any California Exotic Pest Plants of Concern (CalEPPC) List A species or plant species identified on Table 4-113 (Prohibited Invasive Plant Species) of the CVMSHCP from reseeding areas following temporary disturbance or from landscaping plans (modified from applicant's Mitigation Measure Bio-8);

7. Prescribe a road sealant that is non-toxic to wildlife and plants; and

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

<u>Verification:</u> 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.

<u>Mitigation Management to Avoid Harassment or Harm</u>

BIO-8 The project owner shall implement the following measures to manage the construction site, and related facilities, in a manner to avoid or minimize impacts to the 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. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals by the Designated Biologist or Biological Monitor;

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

3. Prohibit feeding of wildlife by staff and subcontractors;

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

5. Prohibit pets from being brought to the site;

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

7. Minimize use of rodenticides in the project area; and

8. Prohibit vehicles and personnel from entering sensitive habitats.

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

Pre-construction Surveys for Desert Tortoise and Impact Avoidance

BIO-9 The project owner shall conduct follow-up surveys to augment the protocol-level surveys conducted in 2007 and 2008 by Xeric Specialties for the project and implement the appropriate measures to minimize impacts if detected:

1. Qualified (permitted or USFWS-approved) biologist(s) shall conduct additional surveys for desert tortoise in the project area, including the power plant site and the linear facilities (e.g. natural gas and potable water lines). The survey shall be conducted approximately 30 days prior to the start of initial ground disturbance activities and shall follow a modified Field Survey Protocol for any Federal Action that may Occur within the Range of the Desert Tortoise (USFWS 1992) including:

   A. Complete a Presence-Absence Survey in January 2008. This survey window encompasses the active period for juvenile desert tortoise throughout its range during a typical year.

   B. The survey should identify the number and location of all tortoises and tortoise sign that occur within a given project area and if any tortoises occur in adjacent areas whose home range may overlap into the project area and thus be lost or harassed by the proposed action.

   C. Surveys shall only be conducted during daylight hours and shall include the entire project area (100 percent coverage) using 10 meters wide (30 feet) belt transects.

   D. In addition, the “Zone of Influence” shall be surveyed using as a minimum, belt transects located at 100, 300, 600, 1200, and 2400-foot intervals from and parallel to the edge of the project boundaries. The Zone of Influence is defined as the area where tortoises on adjacent lands may be directly or indirectly affected by project exploration, construction, maintenance, operation, monitoring, dismantlement, enhancement, and project abandonment.

E. Map all tortoise sign (live tortoises, shell, bones, scutes, limbs, scats, burrows, pallets, tracks, egg shell fragments, courtship rings, drinking sites, mineral licks, etc.) within the project area and located on transects within the Zone of Influence.

F. All burrows shall be visually examined using a “burrow scope” to ensure there are no brumating or aestivating individuals. If determined vacant, burrows will be hand excavated to ensure the contents of the burrow are definitively identified.

2. If no evidence of desert tortoise use is detected during the survey, then it shall be assumed the site is unoccupied and no Incidental Take Permits from USFWS or CDFG shall be required for construction.

3. If evidence of the desert tortoise or another federally or State listed reptile species is detected in the project area then the project owner shall be required to show coverage under the CVMSHCP or obtain a Biological Opinion (ESA Section 10) and/or a CESA Section 2081 Letter of Concurrence to determine appropriate mitigation for impacts which may include the following:

   A. Capture and relocate animals to an approved location.

   B. Purchase of lands offsite and establishment of an endowment for management of the lands.

Verification: The project owner shall report to the CPM the results of the surveys and whether coverage under the CVMSHCP or a Biological Opinion (ESA Section 10) and/or a CESA Section 2081 Letter of Concurrence are required as soon as possible. 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 desert tortoise survey results to date and any necessary impact avoidance measures. Results for all surveys conducted after the final version of the BRMIMP is complete shall be submitted as a supplement to the CPM. All modifications to the approved BRMIMP shall be made only after consultation with the CPM and other appropriate agencies. The project owner shall notify the CPM five working days before implementing any modifications to the BRMIMP.

Pre-construction Surveys for Listed Plant Species and Impact Avoidance

BIO-10 The project owner shall conduct follow-up surveys to the protocol level surveys conducted in 2007 and 2008 by xeric Specialties to determine the presence of the Coachella Valley milk-vetch and the Triple-ribbed milk-vetch and implement the appropriate measures to minimize impacts if detected:

1. A qualified biologist shall conduct surveys for both Coachella Valley milk-vetch and triple-ribbed milk-vetch in the project area, including the power plant site and the linear facilities. The survey shall be conducted at least 30 days prior to the start of initial ground disturbance activities and shall follow the CNPS Botanical Survey Guidelines (1983), Guidelines for

Conducting and reporting Botanical inventories for Federally Listed, Proposed and Candidate Species (USFWS 2000), and Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities (CDFG 1983) including:

A. Conduct surveys at the appropriate times of year when the target species are present and identifiable. If milk-vetch are detected, but cannot be identified to species, follow-up surveys shall be conducted during the blooming season to confirm the species. Estimated blooming season for both species occurs between February and May (CNPS 2007).

B. If available, use a regional or local reference population to confirm that the plants are identifiable at the time of the survey as well as to obtain a visual image of target species and the associated habitat.

C. Compile a comprehensive list of plants observed on site, identified to the lowest taxonomic level applicable to allow for rarity to be determined.

D. Conduct surveys using systematic field techniques to ensure thorough coverage of the project area and any surrounding suitable habitat.

E. If a special status species is observed, including the two target species, a California Native Species Field Survey Form shall be completed, along with the appropriate 7.5 minute topographical map with the occurrence mapped. Accurate population boundaries shall be mapped along with an estimate of the number of individuals within the population. A copy of the completed form shall be included in the monthly compliance report.

F. Multiple visits are recommended during the growing season in particular due to the ongoing drought conditions in Southern California which may result in late or early emergent’s as well unsuccessful blooming.

2. If either target species or another federally or State listed plant species is detected in the project area then the project owner shall be required to show coverage under the CVMSHCP or obtain a Biological Opinion (ESA Section 10) and/or a CESA Section 2081 Letter of Concurrence to determine appropriate mitigation for impacts which may include the following:

   A. Complete avoidance of populations of sensitive plants through project modification.

   B. Complete avoidance by flagging and mapping the population prior to construction to avoid direct impacts.

C. Relocate plants and/or collect seeds from existing populations that would be impacted and then plant/seed these plants in adjacent suitable habitat that would not be affected by proposed project and then monitor for 5 years.

D. If available, purchase of in-kind habitat acreage in a mitigation bank at a ratio to be determined by the appropriate regulatory agency.

E. Off-site mitigation including restoration and enhancement as determined by the appropriate regulatory agency.

Verification: The project owner shall report to the CPM the results of the surveys and whether coverage under the CVMSHCP or a Biological Opinion (ESA Section 10) and/or a CESA Section 2081 Letter of Concurrence are required as soon as possible. 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 rare/listed plant survey results to date and any necessary impact avoidance measures. Results for all protocol surveys conducted after the final version of the BRMIMP is complete shall be submitted as a supplement to the CPM. All modifications to the approved BRMIMP shall 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.

Burrowing Owl and Nesting Bird Surveys and Impact Avoidance

BIO-11 The project owner shall conduct follow-up surveys to the surveys conducted in 2007 and 2008 by Xeric Specialties and URS to identify the presence and avoid or minimize impacts to burrowing owls and other nesting birds:

1. A qualified biologist shall conduct survey for burrowing owl activities in the project area, including the power plant site, the linear facilities (e.g. natural gas lines), and a 150 meter (approximately 500 feet) buffer (where possible and appropriate based on the habitat). The survey should follow the protocol outlined in the CDFG Staff Report on Burrowing Owl Mitigation (1995), as modified below, including:

   A. One (1) winter (December 1 to January 31) survey no less than 30 days prior to the start of initial ground disturbance activities.

   B. Conduct surveys from two hours before to one hour after sunset or from one hour before to two hours after sunrise.

   C. Identify all active and historical burrows (natural or artificial) as well as suitable habitat within the entire project area including the 150 meter buffer (accounts for impacts from noise and vibration impacts).

   D. Space transects to allow for 100 percent visual coverage (maximum 30 meters from centerline).

   E. Surveyors shall avoid owls and occupied burrows by a minimum 50 meters where practical.

2. If burrowing owls are present within 500 feet of the power plant site or linear facilities, then the project owner shall contact CDFG and implement the CDFG burrowing owl guidelines (1995) to include:

   A. Mitigation should consist of passive relocation with a one-way door to avoid direct impacts to the burrowing owls on site. Passive relocation shall be conducted during the non-breeding season (September 1–January 31) to ensure that active nests are not lost as a result of owl exclusion. The methodology for owl relocation shall follow the guidelines set forth in the CDFG Staff Report on Burrowing Owl Mitigation (CDFG 1995).

   B. Occupied burrows shall not be disturbed during the nesting season (February 1–August 31) unless a qualified biologist approved by CDFG verifies through noninvasive methods that either: (1) the birds have not begun egg laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

   C. If permanent impacts to breeding habitat are unavoidable, the project owner shall acquire, permanently protect and enhance a minimum of 6.5 acres of suitable habitat per pair of breeding burrowing owl, or submit evidence of coverage under the CVMSHCP to the CPM.

3. If initial ground disturbance is to occur during the breeding season, complete a pre-construction survey for nesting birds on the project site and/or linear facilities no less than 30 days prior to the start of ground disturbance activities. This survey can occur in conjunction with the burrowing owl surveys.

4. If active, occupied nests are found, schedule work during non-nesting periods or prohibit work within 500 feet of raptor nests or 200 feet of other species' nests. With CPM approval, visual barriers and sound buffers may be used to reduce these buffers around nests.

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 burrowing owl/nesting bird survey results to date and any necessary impact avoidance measures. Results for all protocol surveys conducted after the final version of the BRMIMP is complete shall be submitted as a supplement to the CPM. All modifications to the approved BRMIMP must be made only after consultation with the CPM and other appropriate agencies. The project owner shall notify the CPM five working days before implementing any modifications to the BRMIMP.

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CULTURAL RESOURCES

Testimony of Michael K. Lerch

SUMMARY OF CONCLUSIONS

Staff has determined that the CPV Sentinel project would not have a significant impact on known archaeological resources, historic structures, or ethnographic resources. With the adoption and implementation of the proposed Conditions of Certification, **CUL-1** through **CUL-8**, the CPV Sentinel project would not have a significant impact on potentially significant archaeological resources that may be discovered during construction.

INTRODUCTION

This cultural resources assessment identifies the potential impacts of the proposed CPV Sentinel Energy Project (CPV Sentinel) to 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 related 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 California, the prehistoric period extends to nearly 12,000 years ago and continues into the eighteenth century until 1769, the time when the first Spaniards settled in what is now the State of California.

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, travel routes, artifacts, or other evidence of human activity. Under federal and state requirements, historical cultural resources must be more 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, or European, Asian, or Latino immigrants and their descendants. They may include traditional resource-collecting areas, ceremonial sites, topographic features, cemeteries, shrines, ethnic neighborhoods, and structures.

For the proposed CPV Sentinel project, staff has provided 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 a less-than-significant level.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects licensed by the California Energy Commission (Energy Commission) are reviewed to ensure compliance with all applicable laws, ordinances, regulations, and standards (Table 1). For this project, in which there is no federal involvement with respect to cultural resources,[1] the applicable laws are primarily state laws.

[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, such as federal agency regulations and guidelines for implementation of the Antiquities Act.

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

Applicable Law	Description
State	
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	
Riverside County General Plan (Riverside County 2003)	The proposed CPV Sentinel project power plant, transmission lines, and portions of the natural gas pipeline are situated in unincorporated Riverside County. The Multipurpose Open Space Element of the Riverside County General Plan contains policies to review all proposed development for the possibility of archaeological sensitivity; employ procedures to protect the confidentiality and prevent inappropriate public exposure of sensitive archaeological resources when soliciting the assistance of public and volunteer organizations; and consult with Native American tribes as part of the environmental review process on development projects with identified prehistoric cultural resources. Policies that pertain to historical-period resources include evaluation of significant development proposals by the History Division of the Riverside County Regional Park and Open-Space District for projects that could result in the destruction and/or preservation of potential historical sites.
City of Palm Springs General Plan (Palms Springs 2007)	The proposed CPV Sentinel project power plant site is adjacent to the Palm Springs city limits. Portions of the laydown area and gas line would be located within City boundaries. The Recreation, Open Space & Conservation Element of the city's General Plan has preservation of significant archaeological and historical resources as a goal and contains policies and actions to promote protection and preservation of significant cultural resources, consult with the Agua Caliente Tribal Historic Preservation Office and Palms Springs Historic Society, and require professional site assessment for projects that could contain archaeological or historical resources.
City of Desert Hot Springs Compre-hensive General Plan (Desert Hot Springs 2000)	The proposed CPV Sentinel project area, although not within the city limits of Desert Hot Springs, is within its General Plan planning area. The Archaeological and Historic Resources Element of the General Plan has the goal to preserve and maintain cultural resources and policies to require survey and evaluation of cultural resources that could be affected by development or land use proposals.

REGIONAL SETTING

The CPV Sentinel project area is located within the northwestern extent of the Coachella Valley, east of San Gorgonio Pass, where the geomorphic provinces of the Transverse Ranges, the Peninsular Ranges, and the Colorado Desert converge (URS2007b, pp. 1-6–1-7). The site is situated on a large alluvial fan originating from the San Bernardino Mountains, which are five miles to the northwest (URS2007b, p. 1-8). The nearest seismic source is the Banning segment of the San Andreas Fault, located 0.25 mile southwest of the project site (CPVS2007a, p. 2-3). This area is within the Creosote Bush Scrub plant community (CPVS2007a, pp. 7.2-2–7.2-4; Munz 1974). The site is located next to an ephemeral wash that extends to the Garnet Wash, which eventually joins the Whitewater River flood plain.

PROJECT, SITE, AND VICINITY DESCRIPTION

The proposed CPV Sentinel would be a nominal 850-megawatt (MW) peaking facility consisting of eight General Electric (GE) Energy LMS 100 natural gas-fired combustion turbine generators and associated equipment (CPVS2007a, p. 1-1). The proposed facility would be located within the northwestern section of the Coachella Valley, approximately 1.3 miles east of State Route 62 (Twentynine Palms Highway), 1.7 miles north of Interstate 10, and 1.3 miles west of Indian Avenue, just outside the city of Palm Springs (CPVS2007a, p. 2-2). The 37-acre main power plant site would be located within unincorporated Riverside County, with other project components within the city of Palm Springs, Riverside County, California. Access to the site can be gained from State Route 62 by proceeding east on Dillon Road and north onto an access road that extends toward the main power plant. The project area is within a region that is primarily utilized for the development of industrial and electrical facilities.

The proposed CPV Sentinel project would consist of several construction activities. The main power plant would contain several areas and structures including a combustion turbine generator area; a switchyard area; a septic system; a water treatment area; and a 0.75-acre retention basin for storm water runoff (CPVS2007a, Fig. 2.4-1 and App. G, Section 300.2). The components outside of the main power plant include a 1,850-foot long, 220-kV transmission interconnection (T-Line) composed of a single circuit; a 2.6-mile-long natural gas line; five wells for purposes of water extraction, located within the main plant site; and the widening of the main access road. The currently proposed T-Line was modified from an earlier planned route to reduce its overall length from 3,250 to 2,300 feet including the 1,850-foot portion outside the main plant site (URS2008x, Attachment A, p. 1). In addition, the applicant has proposed a water supply plan that includes 900 feet of 12-inch pipeline extending to a service main located along South Murray Canyon Drive to the golf course. The water storage reservoir at the golf course serves as a storage reservoir for irrigation at the golf course (CPVS 2008a, p. 2; CPVS2007a, pp. 1-2, 2-1, 2-21; URS2007b, p. 1-3; URS2007f, p. 14-1).

The water supply plan would involve promoting the conservation of fresh water in a concerted effort with the Desert Water Agency (DWA) and the Palm Springs National Golf Course (LW2008a, p. 2). This golf course normally uses fresh water to irrigate its grounds; however, with this plan, the applicant would install a recycled water pipeline for the transfer of water from the DWA. According to the applicant, construction and use of this pipeline would offset the amount of groundwater extracted by the CPV Sentinel project, thereby conserving fresh groundwater resources (LW2008a, p. 15). The pipeline would be placed within the existing street right-of-way and within the golf course property.

The current elevation within the main power plant site ranges from 1,050 to 1,120 feet sloping from northwest to southeast (CPVS2007a, p. 2-22). Grading will consist of stripping 20 feet of soil within the north end of the site and then placing this fill downslope onto the south end of the site, thereby leveling the site and balancing the grade. Currently, the proposed CPV Sentinel project site is vacant (CPVS2007a, p. 2-1).

Prehistoric Setting

Regional Climatic and Environmental History

The CPV Sentinel project would be located in the Colorado Desert, in the northwestern corner of the Coachella Valley. It is located in the shadow of the San Jacinto Mountains of the Peninsular Range and therefore receives only a minimal amount of rain, most of which is received during the winter months, with an average of under 10 inches of rain (URS2007b, p. 1-7). It is approximately 25 miles northwest of the prehistoric shoreline of Lake Cahuilla. During prehistory, this fresh water lake went through a series of inundation and desiccation periods, with at least three of these periods occurring between A.D. 1200 and the late 1600s, according to radiocarbon, stratigraphic, and early historical evidence (Laylander 1997; Schaefer and Laylander 2007, p. 250; Wilke 1978). To completely fill the lake basin today with inflow from the Colorado River would take at least 18 years. Once filled, and with the inflow cut off, it would take a minimum of approximately 56 years for the lake to dry out, so that each cycle of lake inundation and desiccation was 75 years or more (Schaefer and Laylander 2007, p. 250). Little is known about the lake during the earlier part of the Holocene; however, it may be inferred that the lack of Early and Middle Holocene archaeological sites associated with the lake shorelines means the basin was dry during those times.

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Human Occupation of the Coachella Valley

Prior to the 1970s, few archaeological studies had been performed within this region. With the advent of cultural resource management investigations, more large-scale surveys and data recovery projects have brought about more archaeological inquiry, resulting in a better understanding of the regional prehistory (Schaefer and Laylander 2007, p. 247). Whether Lake Cahuilla was in a period of desiccation or inundation may have determined where and what kinds of sites were present in proximity to the lake. During periods of inundation, people may have been more dependent upon the lake's resources; however, during desiccation, they may have focused on nearby springs. There is also evidence to suggest that settlement and subsistence patterns varied even along different sections of the shoreline of the lake (Schaefer and Laylander 2007, p. 250).

Most of the sites within this area, particularly in the eastern Peninsular Range and desert foothills, represent late prehistoric occupational episodes. According to Wilke (1978), based on evidence from the Myoma Dunes, the large number of late prehistoric sites represents the habitation of large populations, which initially were dependent upon the lacustrine environment of the lake. These populations were forced to make major changes in their adaptive strategies once the last desiccation of the lake took place, resulting in increased exploitation of non-lacustrine resources. From 1,000 to 500 years B.P. (before present), the inhabitants were exploiting the lacustrine environments of Lake Cahuilla, and when it dried up for the last time between 500 and 420 B.P., there was a major shift from a lacustrine-focused subsistence strategy to one adapted to sites farther away from the basin floor. Another model, proposed by Weide (1974), suggests that there was not a substantial shift after the last desiccation of the lake. Rather, the lake had been only exploited as a supplemental resource during the inundation, and the shift in subsistence following its drying was only minor.

For the Coachella Valley, the chronological sequences are varied, with no regional synthesis. However, Bean et al. (1995) produced a chronological model adapted for Tahquitz Canyon, an ethnographic Cahuilla village located less than 10 miles south of the project area, and the model is likely to also be applicable to the Coachella Valley. Nevertheless, there still appear to be gaps within the archaeological record, as discussed below.

Paleo-Indian Period

There is very little evidence to support the presence of human occupation within the Coachella Valley during the late Pleistocene or early Holocene (Schaefer and Laylander 2007, p. 247). However, this absence may be a result of several factors, including a scarcity of archaeological studies performed in the region and the possibility that many of the sites were short-term occupations by small and highly mobile populations. Poor site visibility due to sedimentation and extensive agricultural development within the Salton Basin (the former location of ancient Lake Cahuilla) has also probably made it difficult to encounter such sites (Schaefer and Laylander 2007, p. 249).

Within the Colorado Desert, many of the earliest sites discovered have been attributed to the San Dieguito complex (Phases I–III), dating from 12,000 to 7,000 years B.P., with Phase III being the most frequent (Bean et al.1995, p. III-2). These sites tend to be represented as rock features, lithic assemblages with no ceramics, and cleared circles. Some of the lithics of this pre-ceramic culture include choppers that are bifacially and unifacially flaked and concave-edged scrapers, among others. The lithic technology includes flaking in the form of primary and secondary percussion, to fine pressure flaking occurring in the latest phase.

This complex has been primarily defined by surficial assemblages, with some subsurface data to support it (Bean et al. 1995, p. III-2; Rogers 1939, 1966). Even though Rogers defined the San Dieguito complex as being separated into three Phases, Bean et al. (1995, p. III-2) made no differentiation among the three, combining the Phases into one pattern due to the scarce evidence to support such a distinction. As such, they define the San Dieguito complex as small mobile bands oriented around a hunter-gatherer adaptation.

The settlement patterns of the San Dieguito complex were varied. The sites of this age are generally located in flat areas; however, the greatest concentrations tend to be along larger washes, atop the mesas and terraces overlooking them. Sites encountered near the lakes generally are located along the shorelines.

Archaic Period

The Archaic period has been divided into two independent chronological complexes: the Pinto-Gypsum complex, dating from 7,000 to 4,000 years B.P., and the Amargosa complex, from 4,000 to 1,000 years B.P. (Bean et al. 1995, p. III-3). These periods reflect a pattern that was derived from the Desert Culture, which was displayed throughout the Great Basin and Sonoran Desert. Archaeological assemblages of this period are represented by artifacts similar to the San Dieguito; however, notched and large-stemmed projectile points, along with an increase in manos and metates, are also observed. Some of the sites reflecting this period include Indian Hill Rockshelter (CA-SDI-2537), which represents an occupation period going back to more than 4,000 years (Schaefer and Laylander 2007, p. 247), and a rockshelter located in Tahquitz Canyon (CA-RIV-45), which may have represented logistical foraging by mobile groups (Bean et al. 1995; Schaefer and Laylander 2007, p. 247).

Sites from this period appear to be under-represented in this region. This is possibly due in part to the scarcity of diagnostic artifacts that can distinguish this particular period from others or because of unfavorable conditions of the area in the past as a result of intermittent flooding that occurred during periods of drought, thus possibly leading to short-term occupational episodes within the basin (Bean et al. 1995, p. III-3; Crabtree 1981, pp. 40–41). Also, various debris flows and flooding episodes throughout prehistory may have destroyed or buried many of the earlier sites, with mostly the later sites being represented.

Late Prehistoric Period

Very little is known of the transition from the Archaic to the late prehistoric period, including the introduction of the Takic speakers (Bean et al. 1995, p. III-3). It has been estimated that people speaking Takic languages arrived at the California coast by at least 1,000 to 1,500 years B.P., thus creating the Shoshonean Wedge, with Yumans (Kumeyaay) to the south and Chumash to the north (Kroeber 1925, pp. 578–580; Bean et al. 2007, p. III-3), and possibly considerably earlier. The archaeological pattern indicative of this period is the Patayan, which was displayed within the lower Colorado River and the Colorado Desert areas. For some time, ceramic technology has been generally accepted as being introduced or rarely used no earlier than radio carbon dated at A.D. 1000 (Schaefer and Laylander 2007, p. 252).

Late prehistoric sites that have been investigated in the project region include the ethnohistoric village (CA-RIV-45) in Tahquitz Canyon (Bean et al. 1995); the village of *Yamisevul* (CA-RIV-269) in Mission Creek (Altschul and Shelley 1987); and a village site (CA-RIV-1246) at Two Bunch Palms in Desert Hot Springs (Tang et al. 2006).

Ethnographic Setting

The project area was occupied ethnographically by the Cahuilla. The Cahuilla are of the Takic family of the Uto-Aztecan language stock, the same as some of the southern California coastal groups (Bean 1978, p. 575; Moratto 1984, p. 345). They occupied a large region that covered areas of the San Bernardino Mountains, south to the San Jacinto Range, down to the floor of the Salton Basin, and to the southeast towards the Chocolate Mountains. Devers Hill, located just outside of the project area to the east, may have been what the Cahuilla referred to as *Kaw wish mu* (Bean and Vane 1980, p. M-4), the boundary marker separating the Wanakik Cahuilla from the Palms Springs clans of the Pass Cahuilla.

The Cahuilla consisted of exogamous patrilineal clans, composed of two or more lineages (Bean et al. 1995, p. V-119). The Cahuilla divided these lineages into two moieties—the *tuktum* (Wildcats) and the *?istam* (Coyotes). These two moieties were related to *Mukat* and *Temayawut*, the creators of their inhabitants and world. The Cahuilla also had intermarriage ties and trade with the surrounding groups including the Gabrielino, the Halchidoma (Colorado River), the Diegueno, the Luiseno, the Serrano, the Chemehuevi, the Mojave, and the Yuma (Bean et al. 1991, p. 5).

Plants were exploited for use in a variety of ways in this region, and the Cahuilla were renowned for their immense knowledge of these plants within their region (Bean and Saubel 1972). As far as foodstuffs, some of the major plants harvested depended on the season. During the spring (April–May), yucca, wild onion, barrel cactus, tuna cactus, goosefoot, catclaw, and ocotillo were harvested (Bean and Saubel 1972, pp. 20–21). Summer was considered the busiest gathering season, with many of the same plants being harvested then as in the late spring (June–July), with the addition of honey mesquite and screwbean. During the fall, various plants were available, including saltbush seeds, chia, grass seeds, pinyon nuts, and juniper berry, among others. The late fall saw the arrival of the harvesting of acorn, during October and November.

The Cahuilla also exploited much of the game found throughout the basin and mountain regions. Depending on the ecological zone, some of the large faunal resources of the

Cahuilla included pronghorn sheep, mountain sheep, and mule deer (Bean et al. 1991, p. 8). For the project area, faunal resources most likely consisted of rabbit, antelope, deer, mice, quail, and mountain sheep, among others (Bean 1978, p. 576).

According to Bean and Saubel (1972, p. 20), a Cahuilla village was never beyond 16 miles of its food gathering places and was within five miles of 80 percent of its food resources. The villages of the Cahuilla were predominately located in a valley or within or near the mouth of a canyon (Bean et al. 1991, p. 7). These ethnographic villages were permanent, and, with the exception of extreme circumstances, there was generally never a time when the entire village moved: there were some instances of entire villages moving in the event of flash floods, faulting, fires, interlineage feuds, and epidemics (Bean 1974, p. 71). During the seasonal rounds, some groups from the main village would leave and gather within other ecological zones, displaying short-term occupation episodes during this period. Other instances of groups venturing away from the main village included those for the purposes of hunting, trading, ritual, or social visiting (Bean 1978, pp. 575–576).

Domestic structures included brush shelters or dome-shaped or rectangular houses (Bean 1978, p. 577). The ceremonial house was centrally located and was the largest structure within a village, generally located next to a permanent water source (Bean 1974, p. 72). The structures within the village were generally constructed of roofing material in the form of palm fronds, arrowweed, willow withes, and tules, among others. The dwellings varied and could be constructed with adobe mud or walled with sand. A sweathouse was also within every village and was also located next to a pond or stream (Bean 1974, p. 73). Granaries for storing seeds and foodstuffs, such as acorns and mesquite, were also present.

The Cahuilla were and still are renowned for their exquisite basketry. Bean and Saubel (1972, p. 23) noted that generally young girls and very old women created the baskets. The basketry was composed of different materials, depending on which component of the basket was being produced. The warp generally consisted of grass (*Epicampes rigens*); the weft was made of reed grass (*Juncus robustus*); and the black dye consisted of either elder or suede species (Bean 1978, p. 578). Cahuilla baskets were utilized in various ways such as for gathering and domestic utilitarian use, or for ceremonial or ritual purposes. It should also be noted that a specific, unique basket design attributed to an individual basketmaker was never to be re-created once that person passed away (Bean and Saubel 1972, p. 24). The Cahuilla also produced pottery in the form of decorated red wares, using them as cooking pots, dishes, open bowls, small-mouthed jars, and pipes (Bean 1978, p. 579). Some of the other items associated with Cahuilla material culture included mortars, pestles, and metates. Bows were fashioned out of willow or mesquite, with sinew or mescal fiber used for stringing them. Charmstones, rattles, feathered headdresses, and clappers were some of the ceremonial items that were incorporated into Cahuilla rituals.

Historic Setting

The first historic account within the Coachella Valley was in 1775 when Spanish Army Captain Juan Batista de Anza entered the valley en route to the San Francisco Bay for the establishment of a mission and presidio (Norton 1913, p. 55). This party proceeded west through the San Carlos Pass, traveling to the north through the Hemet Valley, arriving at San Gabriel Mission. Even with this early discovery, the Coachella Valley would not have any long-term settlement by Europeans until much later, due in part to substantial wind activity and the lack of sufficient water (JRP 2007, p. 5). More exploration of this area occurred much later, particularly with the historic discovery of the San Gorgonio Pass by the Romero expedition between 1823 and 1826 (Bean and Mason 1962, as referenced in Bean and Vane 1980, p. 4-2). This trail had also been utilized by the Cahuilla and other groups during prehistory.

With the introduction of the Mission Period, far fewer Cahuilla were taken to the missions than were the surrounding groups such as the Serrano, Kumeyaay, Gabrielino, Luiseño, and Juaneño (Bean et al. 1995, p. V-142). However, within 60 years of the introduction of the mission system, 5 to 10 percent of the Cahuilla population eventually became baptized within one of several missions established in Southern California, including Missions San Luis Rey, San Juan Capistrano, San Diego, San Fernando, and most significantly, the San Gabriel Mission. The Cahuilla appeared to have had less impact from the missions in comparison to the surrounding groups, most likely due to their location. Logistically, the Spanish may have been reluctant to venture into the desert regions of the Cahuilla due to the uninviting environment (Bean et al. 1995, p. V-143). However, the Cahuilla found within the Warner Valley and the San Gorgonio Pass area to Hemet Valley appeared to be subjected to the mission system earlier than the inland desert groups and the Cahuilla of the Santa Rosa Mountains (Bean et al. 1995, pp. V-144–145). From 1800 to 1809, some baptisms of Cahuilla took place; however, by 1810 to 1819, the number of baptisms increased dramatically, and many included whole communities. Also during this period, many rebellions ensued against the San Gabriel Mission, with refugee Christian Indians and non-Christian Serranos, Cahuilla, Mojaves, and Angaybas banding together. Many raids against the mission, along with their associated ranchos, ensued. Unfortunately, as a consequence, the Spanish seized many of the villages, including groups from as far as the Mojave Desert, and individuals were taken to the missions. Even with the introduction of the missions, the Cahuilla held onto their traditional ways more strongly than did some of the surrounding groups, particularly the Serrano, with whom they shared many ties, such as intermarriage. Unfortunately, once the revolts ended, the Serrano did not fair as well as their neighboring Cahuilla, and as such, their population declined more rapidly than their neighbors.

As noted, the Cahuilla within the more eastern desert reaches, including the study area, witnessed little contact with the Spanish. It was not until 1814 and thereafter that caballeros, with the aid of Native American guides en route to the Salton Sink to extract salt, exposed the Cahuilla to Spanish culture in the form of language, clothing, weapons, religion, and beasts of burden such as horses and possibly oxen (Bean et al. 1995, p. V-148).

Also of significance during this period, an earthquake occurred in this region in 1812 (Bean et al. 1995, p. V-147). This quake not only damaged many of the missions, but also may have re-routed spring channels. Thus, settlement patterns may have changed as a result of new springs being formed or the lack thereof.

During the 1820s, the Cahuilla were by now familiar with the mission system, with many Cahuilla having relatives within the missions themselves (Bean et al. 1995, p. V 149–150). Mission records from 1820 to 1827 indicate that there were individuals of the Wanakik Cahuilla, the group that is within the proposed project area, specifically from the San Gorgonio Pass, who were baptized into the Catholic church (Bean and Vane 1980, p. 4-10). The Cahuilla became more familiarized with the farming and ranching techniques of the Spanish; however, it should be noted that the Cahuilla had already used some forms of agriculture. Also, during the late 1820s, the Spanish had been known to herd cattle through the San Gorgonio Pass, possibly as far east as Agua Caliente (Bean and Vane 1980, p. 4-16).

With the Mission period nearly at an end in 1821, the Mexican Period prevailed from 1822 to 1846 (Bean and Vane 1980, p. 4-13). Unrest continued until 1822 (Bean et al. 1995, p. V-151). Some of the Cahuilla migrated to the Los Angeles-San Gabriel area. According to accounts, Cahuilla banded together with the Serrano to steal horses as a source of food and traded with the Colorado River groups. From 1834 to 1839, the secularization of the missions took place; and as a result, many of the missionized Indians sought work within the towns or ranchos (Bean and Vane 1980, p. 4-17).

For the next several years, the ranchos that sprang up throughout the majority of southern California, including nearby San Gorgonio Pass on to San Jacinto Valley, did not extend into the Coachella Valley. This area was seen as too marginal and not very advantageous to the non-Indians peoples as far as long-term settlement. During this time, raiding was prevalent among white outlaws and some of the Native Americans (Bean and Vane 1980, p. 4-20–21).

Throughout prehistory and into the historical record, there have been many trails noted within this region. A prehistoric trail, the Cocomaricopa Trail, once extended from the Colorado River at Blythe northwest to the Palm Springs area, continuing to the coast (Bureau of Reclamation 2006, p. 150). As a result of a gold strike in La Paz, Arizona, the historic Bradshaw Trail, developed in 1862, may have paralleled this same trail. The route extends between the San Bernardino Mountains to the north and the San Jacinto mountains to the south. In 1875, the Southern Pacific Railroad utilized this same trail as a southern route for connecting Los Angeles to New Orleans (JRP 2007, p. 5). As required for steam engines, a substantial amount of water was needed; and as a result, an artesian well was created at Walters station at the site of present day Mecca. Of note, according to a map provided by Bean et al. (1995, Fig. V.2), an east-west trending ancient trail may have extended near the project area. Though it is unnamed, this trail is not considered to be one of the aforementioned trails.

As discussed earlier, the Coachella Valley did not have any long-term settlement until much later in history. Palm Springs appeared to be the first area within the Northern Coachella Valley to have any long-term occupation from non-Indian peoples. With the inception of the Desert Land Act of 1877, more settlers were drawn to this area during the 1890s (JRP 2007, p. 6). One such individual, John McCallum, settled in Palm Springs in 1884 in response to his son’s tuberculosis, with the arid environment helping to alleviate his son’s ailment (JRP 2007, p. 7).

Closer to the project area, Desert Hot Springs was first settled by Cabot Yerxa in 1913 (JRP 2007, p. 8). Yerxa left to serve in World War I and came back in 1932. With the help of a developer, he was the first to lure visitors to this area with the promotion of its dry environment and mineral springs, with the town of Desert Hot Springs being established in 1940.

Settlement was now more feasible due to the creation of artesian wells to develop irrigation systems for the cultivation of agriculture (JRP 2007, p. 6). Unfortunately, adequate amounts of water were still not accessible. To accommodate the demand for water, the California Development Company built a new irrigation canal, channeled from the Colorado River. Eventually, the canal broke in 1905, leading the Colorado River off its course and channeling it into the Salton basin, thus creating the Salton Sea. The irrigation problem was not resolved until the Great Depression, with the inception of public works projects. After that time, the area received more visitors, including, throughout the 1920s and 30s, the elite from Hollywood, enticed by the health benefits of the hot mineral springs (JRP 2007, pp. 7–8).

A huge developing boom in the Coachella Valley occurred after World War II (JRP 2007, p. 8). Military bases, along with various military activities, sprang up within the valley. There was also a revitalization of the health benefits of the desert environment, along with the promotion of the mineral springs. This attracted more visitors and more long-term settlement to the area. According to Ringwald (1962, as referenced in JRP 2007, p. 8), there were 1,100 residents in Desert Hot Springs in 1950, with the population shooting up to 3,400 residents by 1962.

The addition of the All-American Canal as a major water source in 1948, coupled with the construction of major roads, dramatically increased the amount of tourism and settlement in the area (JRP 2007, p. 8). The development of Highway 111 in the 1920s, with an extension in the 1930s, along with Highways 60, 70, and 99, known today as Interstate 10, made the Coachella Valley more accessible to visitors outside the area, specifically those from Los Angeles.

The earliest development of electrical transmission within the Coachella Valley began with the Nevada Power Mining and Milling Company. A transmission line, supplied by hydroelectricity, was developed in 1905 to accommodate its mining activities (JRP 2007, p. 11). Eventually, this company merged with the Southern Sierras Power Company, which would later become Southern California Edison (SCE).

Devers Substation, adjacent to the proposed plant site to the west, was initially constructed in 1971 by SCE (JRP 2007, p. 14). In the 1980s, this substation was expanded with the additions of a yard and heliport. The substation was known for its association with experimental work with the early development of wind generation as a means of energy during the late 1970s through the 1980s. Such experiments included developing the largest wind turbine in the nation, measuring 165 feet high, with an output of approximately 3,100 kilowatts, depending on the speed of the wind (Myers 1983, p. 235). This work paved the way for future wind farms that would extend through the northern Coachella Valley into the San Gorgonio Pass.

Resources Inventory

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

On February 16, 2007, URS Corporation, of Oakland, California, authorized the staff at the California Historical Resources Information System (CHRIS), Eastern Information Center (EIC) at the Department of Anthropology, University of California, Riverside, to conduct a records search for the proposed CPV Sentinel project. The records search consisted of two separate search radii. The first search included a one-mile buffer zone encompassing the project site and the proposed laydown area, and the second search included a quarter-mile radius around the pipeline routes. According to information available in the CHRIS files, there have been 23 previous cultural resource studies conducted within these two records search radii, eight of which covered the same areas as the project's area of potential affects (APE). As a result of these previous surveys, a total of three cultural resources (one historic property and two prehistoric isolates), have been identified within the search radii. However, none of these previously recorded sites are within the CPV Sentinel project APE.

The water supply plan was revised and a subsequent record search was required (LW2008a, p. 8). The search was performed on February 13, 2008, covered a one-half-mile radius around the proposed recycled water pipeline, and identified previously conducted archaeological surveys and studies, including previously recorded archaeological sites. A total of three previously conducted surveys had been performed within this new search area. One previously recorded site was identified and is located within approximately 0.5 mile of the proposed recycled water pipeline.

Native American Contacts

The applicant contacted the Native American Heritage Commission (NAHC) by letter on February 13, 2007, to request information about traditional cultural properties (for example, cemeteries, sacred places) in and around the project area, as well as a list of Native American contacts with knowledge of cultural resources applicable to this project. The NAHC responded on February 14, 2007, with a list of Native Americans interested in consulting on development projects. The applicant sent a letter to each of these individuals/groups on February 16, 2007.

Staff also requested from the NAHC a list of Native Americans in the proposed project area. Staff sent letters to Native American groups and individuals on October 23, 2007, asking for information regarding Native American concerns in the proposed project area. The Morongo Band requested cultural resources information, and the applicant provided the information to the Band. The tribe concurred with the project's recommended mitigation measures and requested that state law be followed if human remains were discovered. The Agua Caliente Band of Cahuilla Indians also responded, stating that the project area was a traditional use area for the Band and that they had knowledge of cultural resources previously discovered in the vicinity of the project. The Agua Caliente Band also requested information about cultural resources activities conducted for the project. The project owner provided that information on January 22, 2008.

Methods: Field Survey

An initial cultural resources survey of the CPV Sentinel project area was conducted by URS archaeologists Ms. Christine Michalczuk and Mr. Leroy Laurie, from March 5 through 7, 2007 (URS2007b, p. 2-1). On May 15, 2007, a second survey was performed by URS archaeologists Mr. Brian Hatoff and Mr. Dustin Kay. The surveys included a 200-foot-wide buffer zone around the proposed laydown area and the power plant site and a 50-foot-wide buffer on both sides of the proposed linear components. Due to inaccessibility, URS did not survey portions of the buffer zones on some of the linear and non-linear components. Fencing was present along some of these sections; as a result, URS evaluated these areas visually, from behind these fences (URS2007a, p. 16-1). A supplemental survey of the revised T-Line route was performed by Mr. Leroy Laurie on July 19, 2008 (URS2008x, Attachment A, p.1).

The URS crew used 15-meter transect intervals and recorded site location data using a Garmin Global Positioning System unit. As a result of the 2007 surveys, URS identified four new historical-period archaeological sites and a single isolate. No additional resources were identified during the supplemental 2008 survey for the revised T-Line.

During the literature review of the water supply plan pipeline route, URS examined aerial photographs to determine if surveying would be required within the new corridor for the proposed recycled water pipeline (LW2008a, p. 8). Since the photographs revealed that the corridor had been impacted by development, URS concluded that no new survey was necessary. Staff reviewed the photos and agreed that there had been so much surface development that no cultural resources information would be revealed by a surface survey.

In addition, the applicant examined the project site in order to assess potential impacts to the historic built environment. On February 21 through 23, and March 8, 2007, JRP Historical Consulting LLC (JRP) documented and photographed all of the structures within one-half mile of the proposed project site (URS2007b, App. D).

Results: 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 one-mile radius around the proposed project site and laydown area and one-quarter mile around the pipeline routes. As noted above, according to data available in the CHRIS files, there have been 23 previous cultural resource studies within the two record search radii, eight of which covered the same areas as the current project's APE. According to the previous cultural resource studies, no previous recorded sites are located within the project APE. However, there were three sites identified within the one-mile radius of the project APE that will not be affected by the CPV Sentinel project. The following (URS2007b, p. 1-23) is a summary of these previously recorded sites:

- P-33-005722 (Historic Homestead): This site consists of a residential homestead cabin known as the "Warner Homestead." This structure is unique in that it has the first 360-degree dormer window on a geodesic dome. It is located approximately

1.10 miles to the southwest of the proposed main plant site. This site has been listed on a local listing of historical resources. It would not be affected by the project.

- P-33-013563 (Prehistoric): This is an isolate composed of a light lithic scatter consisting of one rhyolite flake and a fragment of a rhyolite biface. It is located approximately 0.5 mile from the proposed main plant site.
- P-33-013562 (Prehistoric): This is an isolate consisting of a quartzite flake. It is located within 1.5 miles of the proposed main plant site.

The additional search performed for the revised water supply plan identified one previously recorded site (LW2008a, p. 8). CA-RIV-55 is located within 0.5 mile of the proposed recycled water pipeline. The site was described as a temporary campsite with an associated lithic scatter and has since been obscured by development (Pallette 1992).

Archaeological Survey

The applicant’s 2007 archaeological surveys of the proposed CPV Sentinel project area identified four archaeological sites and one isolate. These cultural resources were discovered during the survey along the proposed pipeline routes and the proposed plant site. The four sites are all historic-period and include refuse scatters and one collapsed/demolished concrete building (Table 2). The isolate is composed of three brownware fragments (URS2008d). No other materials were found in association with the fragments. The following is a summary of the sites and isolate:

- **Site #1:** This site is composed of the remnants of a collapsed/demolished concrete building. Other items include an associated concrete stove and pad, historic-period refuse in the form of cans and building debris, and modern debris.
- **Site #2:** This site is composed of a low-density historic-period refuse scatter, consisting of more than 50 cans and glass fragments, with two discrete concentrations.
- **Site #3:** This site is composed of a low-density historic-period refuse scatter. The scatter consists of more than 20 can, glass, and ceramic fragments.
- **Site #4:** This site is composed of a moderate density historic-period refuse scatter, consisting of approximately 100-plus can and glass fragments.
- **ISO-1:** This isolate is composed of three brownware fragments.

Results: Historic Structures Identified and Evaluated for Historical Significance

The applicant identified 14 standing structures within one-half mile of the proposed CPV Sentinel project site, with 12 being more than 50 years of age (URS2007b, pp. 16–26, App. D). Of these 12 structures, most are dated to the 1950s, with the exception of one that dates from 1932. The 14 structures include a substation and houses. The Warner Homestead was identified slightly more than one mile from the project. It has been listed on a local list as a historical resource. The following (and Cultural Resources Table 2) summarizes the resources identified for the CPV Sentinel project:

- **Resource #1:** This structure is the Devers Substation, originally built in 1955. This site is located approximately 200 meters to the west of the western boundary of the proposed main plant site. Also, the northwest corner of the main plant is just adjacent to one of the northeast corners of the substation. The substation is located on approximately 140 acres, with the original portion sitting on approximately 40 acres. The original portion of the substation is separated into two halves—southern and northern—that are divided by a paved road and include concrete control buildings. The substation also displays metal transmission line supports with A-frame sides. The transmission lines enter and leave the substation to the south. The equipment within the yards is also sitting on concrete foundations. A smaller station and heliport was added at the substation location between 1981 and 1989.

- **Resource #2:** This two-story structure is a house located within the APE, inside the southeastern section of the main power plant. It is composed of a 1,416-square-foot residence on a 5-acre lot, displays an irregular T-plan design, and is composed of plywood and masonite materials. This resource also includes an associated garage and two corrugated metal sheds. The house is dated to 1959. The structures comprising Resource #2 were demolished by the landowner in January 2008 (URS2008x, p. 8).
- **Resource #3:** This structure is a single-story residence consisting of a rectangular structure and composed of stucco. This resource also includes a one-story outbuilding. The residence is dated to 1958.
- **Resource #4:** This residence is composed of a low side-gabled square or rectangular shape, located on a 5-acre lot and measuring 1,278 square feet. This structure is dated to 1954.
- **Resource #5:** This residence is a single-story structure measuring 1,149 square feet and is located on a 5-acre lot. It is a side-gabled rectangle shape. This structure is dated to 1955.
- **Resource #6:** The structure is located on a 5-acre lot and measures 1,385 square feet. The house displays irregularity in the form of its shape and cladding. This house is dated to 1957.
- **Resource #7:** This structure is located outside of the APE, approximately 0.3 mile to the east of the eastern border of the proposed main power plant site. This structure is sitting on a 20-acre lot and measures 1,569 square feet. It is a single-story house with an irregular plan. The property also includes an outbuilding located to the north. The structure is dated to 1932.
- **Resource #8:** This structure is located outside of the APE, approximately one-half mile to the southwest of the proposed main power plant. The structure is sitting on a 2.5-acre lot, with real estate records indicating that the property contains a 192-square-foot residence. However, the property now displays a much larger rectangular structure, with a wooden carport located to the west. This residence is dated to 1955.
- **Resource #9:** This structure is located outside of the APE, just over one-half mile to the southwest of the proposed main power plant. The structure is sitting on a 5-acre lot and measures 904 square feet. The home is composed of stucco and displays a low front-gabled roof. This residence is dated to 1959.

- **Resource #10:** This structure is located outside of the APE, just over one-half mile to the southwest of the proposed main power plant. The structure is sitting on a 1.97-acre lot and measures 566 square feet. The home is rectangular in shape and is clad with stucco. This home is dated to 1959.
- **Resource #11:** This structure is located outside of the APE, just over one-half miles to the southwest of the proposed main power plant. The structure is sitting on a 4.12-acre lot and measures 725 square feet. The home is clad with stucco and displays a low gavel roof. There is also a metal shed located to the north. This residence is dated to 1954.
- **Resource #12:** This structure is located outside the APE, north of the laydown area. The structure is sitting on 1.5-acre lot and measures 480 square feet. It is a single-story home and is rectangular in plan. The home is side-gabled and displays large siding shingles. The residence is dated to 1959.

Cultural Resources Table 2
Summary of Standing Historic Structures within Project Area from Current Survey

Resource #	Address	Construction Date	Inside APE ?
1	Devers Substation	1955-1971 (original)/1981-2007 (heliport)	No
2	62575 Powerline Road	1959	Yes, demolished in January 2008
3	-	1958	No
4	62700 16th Avenue	1954	No
5	62750 16th Avenue	1955	No
6	62800 16th Avenue	1957	No
7	15275 Karen Road	1932	No
8	-	1955	No
9	16365 Diablo Street	1959	No
10	16535 Diablo Street	1959	No
11	61948 Smoke Tree Road	1954	No
12	668-140-008 (parcel)	1959	No

Results: Ethnographic Resources Identified and Evaluated for Historical Significance

As noted above, the applicant contacted the Native American Heritage Commission (NAHC) by letter on February 13, 2007, to request information about traditional cultural properties or sacred lands in and around the project area (URS2007b, p. 1-23). Mr. Dave Singleton of the NAHC responded on February 14, 2007, indicating that there were no such properties within the project area. The records search conducted at the CHRIS also did not indicate the presence of Native American traditional cultural properties.

On February 16, 2007, the applicant sent letters (with a map of the project area) to 13 Native American individuals/organizations that the NAHC had identified as potentially having heritage concerns in the project area (URS2007b, App. C). Four responses had been received as of June 2007. Mr. Richard M. Begay of the Agua Caliente Band of Cahuilla Indians (Band) contacted Ms. Christine K. Michalczuk of URS on February 27, 2007, informing her that no known cultural resources were within the project area. However, the Band did have suggestions to URS in regard to permitting processes that it would like for URS to review, and the Band sent a letter to Ms. Michalczuk detailing these requests and concerns.

On March 28, 2007, Mr. Matthew Armstrong of URS made follow-up phone calls to the 13 individuals/organizations, asking if they had any additional comments, questions, or concerns. Mr. Armstrong spoke with the secretary for the chairperson of the Twenty-Nine Palms Band of Mission Indians. The secretary responded on March 28, 2007, and explained that a letter would be sent to URS stating that the tribal government believes that cultural resources are present within the project area. The secretary also asked URS to notify the tribe of any new resources identified for the duration of the project.

Mr. Armstrong also contacted Mr. John Gomez, the Cultural Resources Manager of the Ramona Band of Mission Indians, who stated that the Ramona Band of Mission Indians would defer to the Agua Caliente Band in regard to the letter. Mr. Gomez also requested a copy of the cultural resources report once it is completed. Mr. Armstrong also contacted Mr. John A. James, the chairperson for the Cabazon Band of Mission Indians. Mr. James deferred to Ms. Judy Stapp, the Cultural Affairs Director for the Cabazon Band of Mission Indians. She said that the Cabazon Band also would defer to the Agua Caliente Band since the project is located near Palm Springs. At this time no significant ethnographic sites have been identified.

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,[2] 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;
- 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

Generally, direct impacts to cultural resources are those associated with project development, construction, and coexistence. 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

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

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 that may result from increased erosion due to site clearance and preparation or from inadvertent damage or vandalism to exposed resource components due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction creates improved accessibility and vandalism and/or greater weather exposure become possible.

Ground disturbance accompanying construction at the proposed plant site and along the associated linear facilities has the potential to directly impact archaeological resources, unidentified at this time. The potential direct, physical impacts of the proposed construction on unknown archaeological resources are commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. Placing the proposed plant into this particular setting could have a direct impact on the integrity of association, setting, and feeling of nearby standing historic structures.

Construction Impacts and Mitigation

Direct Impacts on Previously Unknown Archaeological Resources and Proposed Mitigation

One identified and evaluated cultural resource was located on the surveyed portion of the main plant site. ISO-1 was discovered to the south of the main plant site, inside the buffer zone. It is unknown if the identified resource would be destroyed during site preparation for the construction of the CPV Sentinel project. However, it appears to be an isolate that is not significant.

The applicant's literature search and surveys identified a total of four archaeological sites and four isolates within 1.5 miles of the project. Only one isolate may be affected by project-related ground disturbance.

Under CEQA, staff must consider the extent of proposed ground disturbance related to the construction of the CPV Sentinel 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.

Direct Impacts on Historic Structures and Proposed Mitigation

A total of 12 standing structures over 50 years of age were identified within one-half mile of the proposed project. Only one of these structures would have been directly impacted by the construction activities of the proposed project. This building, unoccupied structure Resource #2, was located within the southeastern extremity of the main project site (URS2007f, p. 2-3). The building, along with the associated garage and appurtenances, was demolished by the owner of the dwelling in January 2008 (URS2008x, p. 9). This building was not assessed as significant by JRP, and staff concurs with that assessment.

No significant standing historic structures were identified in the area within one mile of the proposed project, so no impact to the integrity of setting, association, or feeling of any such resources in the area surrounding the proposed CPV Sentinel project would result from the proposed project. Due to the absence of historically significant standing structures within a mile of the project site and the absence of project-related impacts that would materially impair the significance of such historical resources, no mitigation measures would be required for this class of cultural resources.

Direct Impacts on Ethnographic Resources and Proposed Mitigation

No ethnographic resources, either previously recorded or newly disclosed in the communications with Native Americans initiated by the applicant or by the Energy Commission for the proposed project, were identified in the vicinity of the project. Unless there is a discovery of archaeological material of concern to Native Americans, it does not appear that any ethnographic resources would be impacted by this project.

Indirect Impacts

Neither the applicant nor staff identified any indirect impacts to cultural resources in the impact area of the proposed project; thus, no mitigation of indirect CPV Sentinel impacts would be required for any class of cultural resources.

The applicant has proposed the following measures to mitigate impacts to newly discovered significant cultural resources:

1. The applicant proposes that the project be located at the greatest possible distance from any known cultural resources. If there is a discovery of archaeological material, the material would be tested for significance in consultation with the CPM.

2. If cultural resources are present, the applicant recommends that fencing or some other type of physical demarcation be used to ensure that the cultural resource is avoided.

3. The applicant recommends a program of crew education.

4. The applicant recommends archaeological monitoring within 100 feet of any identified cultural resource. If cultural resources are discovered, the applicant recommends that construction be halted.

5. The applicant recommends that a Native American monitor be present to monitor any significance testing or data recovery efforts.

6. If a resource cannot be avoided the applicant recommends formal compliance with CEQA or National Environmental Policy Act (CPVS2007a, pp.7.3-12 to7.3-13).

Staff concurs with many of the applicant’s suggested mitigation measures and has added additional recommendations or expanded upon the applicant’s recommendations to ensure that all impacts to cultural resources are mitigated below a level of significance. The applicant's proposed mitigation measures and staff's additional recommendations are incorporated into the proposed Conditions of Certification **CUL-1** through **CUL-8**.

Operation Impacts and Mitigation

During operation of the proposed CPV Sentinel, 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 excavation. The measures proposed 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 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 (Public Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355). The construction of other projects in the same vicinity as the proposed project could also affect unknown subsurface archaeological deposits (both prehistoric and historic). Seven proposed projects have been identified in the vicinity of the project.

Two of those proposed projects will be within 0.5 mile of the project (CPVS2007a, p. 7.3-18). Proponents of current and 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 Public Resources Code section 5097.98. Since the impacts from the CPV Sentinel project would be mitigated to a level less than significant by the project's compliance with **CUL-1** through **CUL-8**, and since similar protocols can be applied to other current and future projects in the area, staff does not expect any incremental effects of CPV Sentinel to be cumulatively considerable when viewed in conjunction with other projects.

COMPLIANCE WITH APPLICABLE LORS

If staff's conditions of certification (see below) are properly implemented, the proposed project would result in a less-than-significant impact on newly found cultural resources or on any known resources that may be impacted in a previously unanticipated manner. These conditions would also ensure that the project would be in compliance with applicable state and local laws, ordinances, regulations, and standards.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The applicant commented that the current revised length of the T-Line, located outside the main power plant and referenced by staff on page 4.3-4 should be changed from 250 feet to 1,850. Staff corrected the reference.

The applicant also noted that a building and appurtenant structures identified as "Resource #2" on pages 4.3-4, 4.3-15, and 4.3-20, and also listed in Table 2, was demolished by the landowner in January 8 (URS2008x). This resource had been assessed previously as not significant by JRP (JRP 2007), and staff concurs with that assessment. Staff has updated the text and Table to reflect the demolition of this non-significant resource.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that CPV Sentinel would not have a significant impact on known significant archaeological resources, historic structures, or ethnographic resources. With the adoption and implementation of the proposed Conditions of Certification **CUL-1** through **CUL-8**, CPV Sentinel would not have a significant impact on potentially significant archaeological resources that may be discovered during construction.

Staff recommends that the Energy Commission adopt the following proposed cultural resources Conditions of Certification **CUL-1** through **CUL-8**. 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:

- The hiring of a Cultural Resources Specialist, Cultural Resources Monitors, and Cultural Resources Technical Specialists;
- Cultural resources awareness training for construction workers;
- The archaeological and Native American (if needed) monitoring of ground-disturbing activities;
- The recovery of significant data from discovered archaeological deposits;
- The writing of a technical archaeological report on monitoring activities and findings; and
- The curation of recovered artifacts and associated notes, records, and reports.

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 ground disturbance,[3] 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 Resources Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility to 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; and construction shall occur prior to Compliance Project Manager (CPM) approval of the CRS, unless specifically approved by the CPM.

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; and

2. Qualifications shall include at least three years of archaeological or historic, as appropriate, resource mitigation and field experience in California and;

3. Qualifications shall include 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 effectively implement the Conditions of Certification.

[3] Ground disturbance includes "preconstruction site mobilization"; "construction ground disturbance"; and "construction grading, boring and trenching," as defined in the General Conditions for this project.

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 of 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, for example, 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 approved new CRS the AFC and all cultural documents, field notes, photographs, and other cultural 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 ofthreedays 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 on-site 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 U.S. Geological Survey (USGS) quadrangles and a map at an appropriate scale (for example, 1:2000 or 1 inch = 200 feet) 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, and construction activities shall occur prior to CPM approval of maps and drawings, unless 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. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless specifically approved by the CPM.

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 resources 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 CPM shall provide the project owner with a model CRMMP to adapt for project use. 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 monitor, and the project owner's on-site construction manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless such activities are specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures:

1. 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 ground disturbance, construction, and post-construction analysis phases of the project.

4. Identification of the person(s) expected to perform each of the tasks, his/her 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 Department of Parks and Recreation (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 curation fees for artifacts recovered and related documentation produced during cultural resources investigations conducted for the project. The project owner shall identify three possible curation facilities that could accept cultural resources materials resulting from project activities.

9. A statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resources materials that are encountered during construction and cannot be treated prescriptively.

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

Verification:

1. At least 30 days prior to the start of ground disturbance, the project owner shall submit the CRMMP to the CPM for review and approval.

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 County of Riverside and to the Chairpersons of all Native American groups that requested additional information on the CVP Sentinel cultural resources, for review and comment. After the project owner has received comments from the County of Riverside and from the Native American Chairpersons, he/she shall submit the CRR and all received comments to the CPM for review and approval. The CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format, and shall conform to Riverside County's requirements for archaeological reports. 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.

If artifacts and documentation are to be curated, the project owner shall provide documentation for approval by the CPM.

Verification:

1. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the CRR to the Cultural Resources Specialist for the County of Riverside and the Chairpersons of all Native American groups that requested additional information on CPV Sentinel cultural resources. Sixty days thereafter, whether or not the county or Native Americans provide comments, the project owner shall submit the CRR and the and the comments, if any, 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 90 days after completion of ground disturbance (including landscaping), the project owner shall provide to the CPM a copy of an agreement with, or other written commitment from, a curation facility that meets the standards stated in the California State Historical Resources Commission's Guidelines for the curation of

Archaeological Collections, to accept cultural materials, if any, from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

3. 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.

4. 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. The training shall be prepared by the CRS, may be conducted by any member of the archaeological team, and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when ground disturbance is completed or suspended, but shall be resumed when ground disturbance, such as landscaping, resumes. The training shall include:

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

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

3. 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 he/she has received the training; and

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

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

Verification:

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, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of persons 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 shall monitor all ground disturbance at the project site and linear facilities routes, and ground disturbance at laydown or other ancillary areas, to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of 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 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 an additional monitor(s) shall be retained to monitor.

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 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 the situation, the CRS and/or the project owner shall notify the CPM by telephone or e-mail within 24 hours of any incidents of non-compliance with the Conditions and/or applicable LORS. 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.

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts may be discovered. Informational (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. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow ground disturbance to proceed without a Native American monitor.

If a Native American tribe (listed by the NAHC) requests information regarding discoveries of Native American material, that information shall be provided by the project owner to the chairperson of the requesting tribe.

Verification:

1. At least 30 days prior to the start of ground disturbance, the CPM will provide to the CRS reproducible copies of forms to be used as daily monitoring logs. While monitoring is ongoing, 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. Each day that no discoveries are made, 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, except during suspension of monitoring or when monitoring has concluded.

3. On a monthly basis, while monitoring is ongoing, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS. Copies of daily logs shall be retained by the project owner and made available for audit by the CPM.

4. 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.

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. Monitoring and daily reporting as provided in these conditions shall continue during all ground-disturbing activities wherever project construction is not halted. 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 a.m. on Friday and 8:00 a.m. 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 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.

<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 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 a.m. on Friday and 8:00 a.m. on Sunday morning.

2. Completed DPR 523 forms for resources newly discovered during ground disturbance shall be submitted to the CPM for review and approval no later than 24

hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever the CRS concludes is more appropriate for the subject cultural resource.

CUL-8 If fill soils must be acquired from a non-commercial borrow site or disposed of to a non-commercial disposal site, unless less-than-five-year-old surveys of these sites for archaeological resources are documented to and approved by the CPM, the CRS shall survey the borrow and/or disposal site(s) for cultural resources and record on DPR 523 forms any that are identified. When the survey is completed, the CRS shall convey the results and recommendations for further action to the project owner and the CPM, who will determine what, if any, further action is required. If the CPM determines that significant archaeological resources that cannot be avoided are present at the borrow site, all these conditions of certification shall apply. The CRS shall report on the methods and results of these surveys in the CRR.

Verification:

1. As soon as the project owner knows that a non-commercial borrow site and/or disposal site will be used, he/she shall notify the CRS and CPM and provide documentation of previous archaeological survey, if any, dating within the past five years, for CPM approval.

2. In the absence of documentation of recent archaeological survey, at least 30 days prior to any soil borrow or disposal activities on the non-commercial borrow and/or disposal sites, the CRS shall survey the site(s) for archaeological resources. The CRS shall notify the project owner and the CPM of the results of the cultural resources survey, with recommendations, if any, for further action.

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HAZARDOUS MATERIALS MANAGEMENT

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

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed CPV Sentinel Energy Project indicates that, with implementation of staff's proposed mitigation measures, hazardous materials use at the site would not present a significant impact to the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations, and standards. In response to Health and Safety Code, section 25531 et seq., CPV Sentinel, LLC (the applicant) would be required to develop a risk management plan prior to delivery of aqueous ammonia to the facility. To ensure the adequacy of this plan, staff's proposed conditions of certification require that the risk management plan be submitted for concurrent review by the Riverside County Department of Environmental Health and Energy Commission staff. In addition, staff's proposed conditions of certification require that both the Riverside Department of Environmental Health and staff would review the risk management plan prior to delivery of any hazardous materials to the CPV Sentinel site. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia.

INTRODUCTION

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

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

Aqueous ammonia (29 percent ammonia in aqueous solution) is the only acutely hazardous material proposed to be either used or stored at CPV Sentinel in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j) (CPVS 2007a). Aqueous ammonia would be used to control 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 the 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 high 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 result in high downwind concentrations. Spills associated with the aqueous form are much easier to contain than those associated with anhydrous ammonia, and emissions from such spills are limited by the slow mass transfer from the surface of the spilled material.

Other hazardous materials, such as mineral and lubricating oils, cleaning detergents, and welding gases, would be present at the proposed CPV Sentinel. Hazardous materials used during construction would include gasoline, diesel fuel, motor oil, hydraulic fluid, welding gases, lubricants, solvents, paint, and paint thinner. No acutely toxic hazardous materials would be used on site during construction. None of these materials pose significant potential for off-site impacts as a result of the quantities on site, their relative toxicity, their physical state, and/or their environmental mobility.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

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

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

Applicable Law	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 United States Code [USC] § 9601 et seq.)	Contains the Emergency Planning and Community Right to Know Act (also known as SARA Title III).
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Established a nationwide emergency planning and response program and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on risk management plans (42 USC § 112(r))	Requires states to implement a comprehensive system informing local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 Code of Federal Regulations (CFR) 172.800	Requires that suppliers of hazardous materials prepare and implement security plans, per the U.S. Department of Transportation (DOT).
49 CFR Part 1572, Subparts A and B	Requires suppliers of hazardous materials to ensure that all their hazardous materials drivers are in compliance with personnel background security checks.
The Clean Water	Aims to prevent the discharge or threat of discharge of oil into

Act (CWA) (40 CFR 112)	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	Provides U.S. Department of Transportation regulations regarding construction, maintenance, and operation of natural gas pipelines.
Title 49, Code of Federal Regulations, Part 191	Addresses in annual reports, incident reports, and safety-related condition reports, the transportation of natural and other gas by pipeline. Requires operators of pipeline systems to notify the DOT of any reportable incident by telephone and then submit a written report within 30 days.
Title 49, Code of Federal Regulations, Part 192	Addresses transportation of natural and other gas by pipeline and minimum federal safety standards; specifies minimum safety requirements for pipelines including 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 the requirements for preparing a pipeline integrity management program.
Federal Register (6 CFR Part 27) interim final rule	Presents the regulation of the U.S. Department of Homeland Security that requires facilities that use or store certain hazardous materials to submit information to the department so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
Title 8, California Code of Regulations, section 5189	Requires facility owners to develop and implement effective safety management plans that ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the Risk Management Plan (RMP) process.
Title 8, California Code of Regulations, section 458 and sections 500 to 515	Sets forth requirements for the design, construction, and operation of vessels and equipment used to store and transfer ammonia. These sections generally codify the requirements of several industry codes, including the American Society of Mechanical Engineers (ASME) Boiler and 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, sections 25531 to	The California Accidental Release Program (CalARP) requires the preparation of a Risk Management Plan (RMP) and off-site consequence analysis (OCA) and submittal to the local Certified

25543.4	Unified Program Agency for approval.
California Health and Safety Code, section 41700	Requires that “No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water.
California Public Utilities Commission General Order 112-E and 58-A	Contains standards for gas piping construction, inspection, maintenance, and operation.
Local	
Ordinance 651.2	Sets forth Riverside County’s hazardous materials disclosure ordinance requiring all facilities that handle hazardous materials to prepare a Hazardous Materials Business Plan. This is then enforced by the Riverside County Department of Environmental Health which is the Certified Unified Program Agency.

The Certified Unified Program Agency (CUPA) with the responsibility to review Risk Management Plans (RMPs) and Hazardous Materials Business Plans (HMBPs) is the Riverside County Department of Environmental Health. With regard to seismic safety issues, the site is located in Seismic Risk Zone 4. Construction and design of buildings and vessels storing hazardous materials will meet the seismic requirements of California Code of Regulations (CCR) Title 24 and 2007 California Building Code (CPVS 2007a).

SETTING

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

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

METEOROLOGICAL CONDITIONS

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

Recorded wind speeds and directions are described in the **Air Quality** section of the Application for Certification (AFC) (CPVS 2007a). Staff agrees that the applicant's use of F stability (stagnated air, very little mixing), wind speed of 1.5 meters per second, and a temperature of 117° F are very conservative for conducting the off-site consequence analysis (CPVS 2007a). Staff has conducted analysis of transient heat transfer to aqueous ammonia tanks and determined that during worst-case conditions (such as the July 2006 California heat wave) the aqueous ammonia in a tank like the one proposed would not reach the maximum 24-hour average temperature of 102° F.

TERRAIN CHARACTERISTICS

The location of elevated terrain is often an important factor in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The site topography is predominantly flat in the area surrounding the facility (CPVS 2007a).

LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a major bearing on health risk. Sensitive receptors in the project vicinity are described in Figure 7.6-1 of the Application for Certification (CPVS 2007a). The nearest receptor is a residence about 330 feet from the facility property line.

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 addresses the potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them sensitive to the adverse effects of hazardous materials. For this analysis, staff used the most current acute public health exposure levels established to protect the public from the effects of an accidental chemical release.

Transportation of Hazardous Materials

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

Handling of Hazardous Materials

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

Use of Hazardous Materials

Staff reviewed and evaluated the applicant's proposed use of hazardous materials as described by the applicant (CPVS 2007a). Staff's assessment followed the five steps listed below.

- Step 1: Staff reviewed the chemicals and the amounts proposed for on-site use as listed in Table 7.122-1of the AFC and determined the need and appropriateness of their use.
- Step 2: Those chemicals proposed for use in small amounts or whose physical state is such that it provides virtually no chance for a spill to migrate off site and impact the public were removed from further assessment.
- Step 3: Staff reviewed and evaluated measures proposed by the applicant to prevent spills. These included engineering controls, such as automatic shut-off valves and different-sized transfer-hose couplings, and administrative controls, such as worker training and safety management programs.
- Step 4: Staff reviewed and evaluated measures proposed by the applicant to respond to accidents. These measures also included engineering controls, such as catchment basins and methods to keep vapors from spreading, and administrative controls, such as training emergency response crews.
- Step 5: Staff analyzed the theoretical impacts on the public of a worst-case spill of hazardous materials, as reduced by the mitigation measures proposed by the applicant. When mitigation methods proposed by the applicant are sufficient, no further mitigation is recommended. If the proposed mitigation is not sufficient to reduce the potential for adverse impacts to an insignificant level, staff will propose

additional prevention and response controls until the potential for causing harm to the public is reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small Quantity Hazardous Materials

Hazardous chemicals such as mineral and lubricating oils, cleaning detergents, welding gases, and other various chemicals would be used and stored in relatively small amounts. (See **Hazardous Materials Appendix B** for a list of all chemicals proposed for use and storage at CPV Sentinel). In conducting the analysis, staff determined in Steps 1 and 2 that these materials, although present at the proposed facility, pose a minimal potential for off-site impacts since they would be stored in small quantities, have low mobility/volatility, or have low levels of toxicity. These hazardous materials are eliminated from further consideration.

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 and aqueous ammonia. However, the project would be limited to using, storing, and transporting only those hazardous materials listed in Appendix B of this document by staff's proposed condition **HAZ-1**.

Large Quantity Hazardous Materials

Natural Gas

Although no natural gas is stored, the project would also involve the handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. The proposed CPV Sentinel would connect on site to an existing natural gas pipeline and would require the installation of a 1.8-mile-long, 24-inch pipeline. This pipeline would be constructed, inspected, owned, and operated by Sothern California Gas Company. The pipeline would be constructed, maintained, and operated in accordance with all applicable U.S. Department of Transportation and California Public Utility Commission Regulations.

Natural gas poses a fire and/or possible explosion risk because of its flammability. Natural gas is composed mostly of methane, but also contains ethane, propane, nitrogen, butane, isobutene, and is pentane. It is colorless, odorless, and tasteless and is lighter than air. Natural gas can cause asphyxiation when methane is 90 percent in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or possible explosion if a release occurs 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 cause explosions than many other fuel gases such as propane or liquefied petroleum gas, but it can explode under certain conditions (as demonstrated by the recent natural gas detonation in Belgium in July 2004).

While natural gas would be used in significant quantities, it would not be stored on site. It would be delivered via a new 1.8-mile pipeline that taps into an existing pipeline owned by Sothern California Gas Company. The risk of a fire and/or explosion on site would 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) code 85A requires both the use of double-block and bleed valves for gas shut off and automated combustion controls. These measures would 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, thereby precluding the presence of an explosive mixture. The safety management plan proposed by the applicant would address the handling and use of natural gas and would significantly reduce the potential for equipment failure because of either improper maintenance or human error.

Aqueous Ammonia

Aqueous ammonia would be used to control the emission of oxides of nitrogen (NO_x) from the combustion of natural gas at the CPV Sentinel. The accidental release of aqueous ammonia without proper mitigation can result in significant downwind concentrations of ammonia gas. CPV Sentinel would store 29 percent aqueous ammonia solution in two aboveground ammonia tanks, each with a maximum capacity of 12,000 gallons (CPVS 2007a). The secondary containment basin is also above ground and capable of holding the full contents of the tank plus rainfall. CPV Sentinel has also proposed an underground sump that would hold the entire tank contents of one tank plus the maximum 24-hour rainfall. The secondary containment basin would serve to limit the surface area of any spilled aqueous ammonia. Limiting the surface area reduces the evaporation rate of ammonia vapors from the basin. The tanker truck transfer pad would be contained and would also drain into the subsurface sump.

Based on staff's analysis described above, aqueous ammonia is the only hazardous material that may pose a significant risk of off-site impact. The use of aqueous ammonia can result in the release of ammonia vapor in the event of a spill. This is a result of its moderate vapor pressure and the large amounts of aqueous ammonia that would be used and stored on site. However, the use of aqueous ammonia poses far less risk than the use of the more hazardous anhydrous ammonia (ammonia that is not diluted with water).

To assess the potential impacts associated with an accidental release of aqueous ammonia, staff used four benchmark exposure levels of ammonia gas occurring off-site. These include:

1. the lowest concentration posing a risk of lethality, 2,000 parts per million (ppm);

2. the concentration immediately dangerous to life and health, a level of 300 ppm;

3. the emergency response planning guideline level 2 of 150 ppm, which is also the RMP level 1 criterion used by U.S. Environmental Protection Agency (EPA) and California; and

4. the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm.

If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will also assess the probability of occurrence of the release, the severity of the consequences, and the nature of the potentially exposed population in determining whether 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, as well as their applicability to different populations and exposure-specific conditions, is provided in **Hazardous Materials Appendix A**.

Section 7.12 of the AFC (CPVS 2007a) describes the modeling parameters used for the worst-case accidental releases of aqueous ammonia in the applicant's off-site consequence analysis (OCA). Pursuant to the California Accidental Release Program (CalARP) regulations (federal risk management plan regulations do not apply to sources that store or use aqueous ammonia solutions below 20 percent), the OCA was performed for the worst-case release scenario, which involved the failure and complete discharge of the storage tank, as well as an alternative release scenario involving a spill during truck unloading. Ammonia emissions from two potential release scenarios were calculated following methods provided in the RMP off-site consequence analysis guidance provided by the U.S. EPA in April 1999. The default meteorological data necessary for emission and dispersion calculations were supplemented by daily temperature data as required by California Code of Regulations, Title 19, section 2750.2. The maximum temperature recorded in the area in the past three years (117° F), a wind speed of 1.5 meters per second, and atmospheric stability class F were used for emission and dispersion calculations for the worst-case scenario. Potential off-site ammonia concentrations were estimated using the SLAB numerical dispersion model.

The applicant's analysis demonstrated that the worst-case release would not result in ambient ammonia concentrations exceeding 75 PPM at the nearest public receptor that is located about 1,500 feet from the storage tank. Staff reviewed the applicant's analysis and concluded that it significantly overestimates the worst plausible potential for public exposure.

Mitigation

The potential for accidents resulting in the release of hazardous materials is greatly reduced through implementation of a safety management program that would include the use of both engineering and administrative controls. Elements of both facility controls and the safety management plan are summarized below.

Engineering Controls

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

- construction of secondary containment areas surrounding each of the hazardous materials storage areas (such as the secondary containment basin required by Condition of Certification **HAZ-4** for aqueous ammonia) and designed to contain accidental releases that might happen during storage or delivery plus the volume of fire suppression water associated with 20 minutes of operating;
- physical separation of stored chemicals in isolated containment areas separated by a noncombustible partition in order to prevent accidental mixing of incompatible materials, which could result in the evolution and release of toxic gases or fumes;
- installation of both an automatic sprinkler system and an exhaust system for indoor hazardous materials storage areas;
- construction of bermed containment areas surrounding the aqueous ammonia storage tank and the truck unloading area;
- process protective systems including continuous tank level monitors, automated leak detectors, temperature and pressure monitors, alarms, and emergency block valves.

Administrative Controls

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

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

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

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

The applicant would also prepare a risk management plan for aqueous ammonia, as required by both CalARP regulations and Condition of Certification **HAZ-2**. This condition also includes the requirement for a program for the prevention of accidental releases and responses to an accidental release of aqueous ammonia. A hazardous materials business plan would also be prepared by the applicant that would incorporate state requirements for the handling of hazardous materials (CPVS 2007a). Other administrative controls would be required in proposed Conditions of Certification **HAZ-1** (limitations on the use and storage of hazardous materials and their strength and volume) and **HAZ-3** (development of a safety management plan).

On-Site Spill Response

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

The Palm Springs Fire department would provide first response to an accidental hazardous materials release at CPV Sentinel. If additional capabilities were needed, Riverside Department of Environmental Health Accident Response Team would also respond. The Palm Springs Fire Department and the Riverside Department of Health are capable of handling any hazardous materials-related incident posed by the proposed facility.

Transportation of Hazardous Materials

Hazardous materials including aqueous ammonia would be transported to the facility by tanker truck. While many types of hazardous materials would be transported to the site, staff believes that transport of aqueous ammonia poses the predominant risk associated with hazardous materials transport.

Staff reviewed the applicant’s proposed transportation routes for hazardous materials delivery. Trucks would travel on Interstate10 to State Route 62 to Dillon Road to the facility access road (CPVS 2007a, Section 7.10). Staff has evaluated this route and agrees with the applicant that it is appropriate and acceptable for transport of hazardous materials to the facility.

Ammonia can be released during a transportation accident, and the extent of impact in the event of such a release would depend upon the location of the accident and the rate of dispersion of ammonia vapor from the surface of the aqueous ammonia 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 State Route 62. Staff believes it is appropriate to rely upon the extensive regulatory program that applies to the shipment of hazardous materials on California highways to ensure safe handling in general transportation (see Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, U. S. Department of Transportation [DOT] regulations 49 CFR subpart H, §§172–700, and California Department of Motor Vehicles [DMV] regulations on hazardous cargo). These regulations also address the issue of driver competence. See AFC section 5.12 for additional information on regulations governing the transport of hazardous materials.

To address the issue of tanker truck safety, aqueous ammonia would be delivered to the proposed facility in DOT-certified vehicles with design capacities of 6,500 gallons. These vehicles would be designed to DOT Code MC-307. These are high-integrity vehicles designed to haul caustic materials such as ammonia. Staff, therefore, proposes Condition of Certification **HAZ-5** to ensure that, regardless of which vendor supplies the aqueous ammonia, delivery would be made in a tanker that meets or exceeds the specifications described by 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 the United States and California. Staff relied on six references and three federal government databases to assess the risk of a hazardous materials transportation accident.

Staff used the data from the Davies and Lees (1992) article, which references both the 1990 Harwood et al. and 1993 Harwood studies, to determine that the frequency of release for the transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per 1,000,000 miles traveled on well-designed roads and highways. The maximum use of aqueous ammonia each year of the operation of the proposed CPV Sentinel would require about 56 tanker truck deliveries of aqueous ammonia per year (about one delivery every week [CPVS 2007]), with each truck delivering about 8,000 gallons. Each delivery would travel approximately 2.0 miles on Dillon Road.

This would result in about 112 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. Data from the U.S. DOT show that the actual risk of a fatality over the past five years from all modes of hazardous material transportation (rail, air, boat, and truck) is approximately 0.1 in 1,000,000 miles.

In addition, staff used a transportation risk assessment model (developed by staff) to calculate the probability of an accident resulting in a release of a hazardous material due to delivery from the freeway to the facility. Results show a risk of 11.2 in 1,000,000 per year. This risk was calculated using accident rates on various types of roads (in this case, urban, multilane, undivided) with distances traveled on each type of road computed separately. Although it is an extremely conservative model in that it includes risk of accidental release from all modes of hazardous materials transportation and does not distinguish between a high-integrity steel tanker truck and other less secure modes, the results still show that the risk of a transportation accident is insignificant.

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 that an accidental release of a sufficient quantity could be dangerous to the public. The transportation of similar volumes of hazardous materials on the nation's highways is neither unique nor infrequent. Staff's analysis of the transportation of aqueous ammonia to the proposed facility (along with data from the U.S. DOT) demonstrated that the risk of accident and exposure is less than significant.

To further ensure that the risk of an accident involving the transport of aqueous ammonia to the power plant is insignificant, staff proposes an additional administrative control in proposed Condition of Certification **HAZ-6** that would require the use of only one specific route to the site from Interstate 10 to State Route 62 to Dillon Road to the facility.

Based on the environmental mobility, toxicity, the quantities at the site, and frequency of delivery, it is staff's opinion that aqueous ammonia poses the predominate risk associated with both use and hazardous materials transportation. Staff concluded that the risk associated with the transportation of other hazardous materials to the proposed project does not significantly increase the risk of ammonia transportation.

Seismic Issues

It is possible that an earthquake of high magnitude could cause the failure of a hazardous materials storage tank. An earthquake could also cause failure of the secondary containment system (berms and dikes), as well as the failure of electrically controlled valves and pumps. The failure of all of these preventive control measures might then result in a vapor cloud of hazardous materials that could move off site and affect 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, have all heightened concerns about earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused both to several large storage tanks and to smaller tanks associated with the water treatment system of a cogeneration facility. The tanks with the greatest damage, including seam leakage, were older tanks, while the newer tanks sustained displacements and failures of attached lines. Therefore, staff conducted an analysis of the codes and standards that should be followed when designing and building storage tanks and containment areas to withstand a large earthquake. Staff also reviewed the impacts of the February 2001 Nisqually earthquake near Olympia, Washington, a state with seismic design codes similar to those of California. No hazardous materials storage tanks failed as a result of that earthquake. Referring to the sections on Geologic Hazards and Resources and Facility Safety Design in the AFC, staff noted that the proposed facility would be designed and constructed to the standards of the 2001 California Building Code for Seismic Zone 4 (CPVS 2007a). Therefore, on the basis of what occurred in 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 probable and do not represent a significant risk to the public.

Site Security

The applicant proposes to use hazardous materials identified by the U.S. EPA as requiring the development and implementation of special site security measures to prevent unauthorized access. The U.S. EPA published a Chemical Accident Prevention Alert regarding site security (EPA 2000a), the U.S. Department of Justice published a special report entitled *Chemical Facility Vulnerability Assessment Methodology* (U.S. DOJ 2002), the North American Electric Reliability Council published *Security Guidelines for the Electricity Sector* in 2002 (NERC 2002), and the U.S. Department of Energy (DOE) published the 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 that facilities that use or store certain hazardous materials 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 percent or greater and this proposed facility plans to use a 19 percent aqueous ammonia solution, 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.

The applicant has stated that a security plan will be prepared for the proposed facility and will include a description of perimeter security measures; procedures for evacuating, notifying authorities of a security breach, monitoring fire alarms, conducting site personnel background checks, and identifying site access; and a security plan and procedures for performing background checks for hazardous materials drivers. Perimeter security measures used for this facility may include security guards, security alarms, breach detectors, motion detectors, and video or camera systems (CPVS 2007a, section 5.5.4.2.5).

To ensure that neither this project nor a shipment of hazardous material is the target of unauthorized access, staff's proposed Conditions of Certification **HAZ-7** and **HAZ-8** address both construction security and operation security plans. These plans would require implementation of site security measures consistent with the above-referenced documents.

The goal of these conditions of certification is to provide for the minimum level of security for power plants necessary for the protection of California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for CPV Sentinel 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 the consequences of that event. The results of the off-site consequence analysis prepared as part of the RMP would be used, in part, to determine the severity of consequences of a catastrophic event.

To determine the level of security, the Energy Commission staff used an vulnerability assessment decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the North American Electric Reliability Council's (NERC) 2002 guidelines, the U.S. Department of Energy's VAM-CF model, and the U.S. Department of Homeland Security regulations published in the Federal Register (Interim Final Rule 6 CFR Part 27). Staff determined that this project would fall into the category of medium vulnerability due to the urban setting and close proximity to sensitive receptors. Staff therefore 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, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contacts in the event of a security breach. Site access for vendors would be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors would have to maintain their transport vehicle fleet and employ only properly licensed and trained drivers. The project owner would be required, through the use of contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. DOT requirements for hazardous materials vendors to prepare and implement security plans (as per 49 CFR 172.800) and to ensure that all hazardous materials drivers are in compliance through personnel background security checks (as 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. DOE, or the NERC, after consultation with both appropriate law enforcement agencies and the applicant.

CUMULATIVE IMPACTS AND MITIGATION

Staff analyzed the potential for the existence of cumulative impacts. A significant cumulative hazardous materials impact is defined as the simultaneous uncontrolled release of hazardous materials from multiple locations in a form (gas or liquid) that could cause a significant impact where the release of one hazardous material alone would not cause a significant impact. Existing locations that use or store gaseous or liquid hazardous materials, or locations where such facilities might likely be built, were both considered.

The applicant would develop and implement a hazardous materials handling program for CPV Sentinel independent of any other projects considered for potential cumulative impacts. Staff believes that the facility, as proposed by the applicant and with the additional mitigation measures proposed by staff, poses a minimal risk of accidental release that could result in off-site impacts. It is unlikely that an accidental release that has very low probability of occurrence (about one in one million per year) would independently occur at CPV Sentinel and another facility at the same time. Therefore, staff concluded that the facility would not contribute to a significant hazardous materials-related cumulative impact. Even though low-income and minority populations exist in the immediate project area, staff has not identified any significant unmitigated adverse hazardous materials impacts with the proposed project or cumulative impacts; therefore, no significant adverse impacts to minority or low-income populations are expected to occur.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concluded that construction and operation of the CPV Sentinel would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding 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 would pose no significant impact to the public. Staff's analysis also shows that there would be no significant cumulative impact. With adoption of the proposed conditions of certification, the proposed project would comply with all applicable 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 the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by the Riverside County Department of Environmental Health and by Energy Commission staff. In addition, staff's proposed conditions of certification require the review and approval of the RMP by staff prior to the delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia, in addition to site security matters.

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

Staff proposes eight conditions of certification mentioned throughout the text (above) and listed below. Condition of Certification **HAZ-1** ensures that no hazardous material would be used at the facility, except as listed in **Appendix B** of the staff assessment, unless there is prior approval by the Energy Commission compliance project manager. Condition of Certification **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** requiring 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 addressing the delivery of all liquid hazardous materials during construction, commissioning, and operations would further reduce the risk of any accidental release not addressed by the proposed spill-prevention mitigation measures and the required RMP. This plan would additionally prevent the mixing of incompatible materials that could result in toxic vapors. Conditions of Certification **HAZ-4** and **HAZ-5** require that the aqueous ammonia storage tank be designed to rigid specifications and that the present secondary containment basin be used. The transportation of hazardous materials is addressed in Conditions of Certification **HAZ-6** and **HAZ-7** Site security during both the construction and operations phases is addressed in Conditions of Certification **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 or strengths than those identified by chemical name in Appendix B, below, unless approved in advance by the Compliance Project Manager (CPM).

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

HAZ-2 The project owner shall concurrently provide a Business Plan and a Risk Management Plan (RMP) prepared pursuant to the California Accidental Release Program (CalARP) to the Riverside County Department of Environmental Health and the CPM for review. After receiving comments from the Riverside County 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 Riverside County Department of Environmental Health for review and to the CPM for approval.

Verification: At least 30 days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Business Plan to the CPM for approval. At least 30 days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the Certified Unified Program Agency 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 by tanker truck. The plan shall include procedures, protective equipment requirements, training, and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials including provisions to maintain lockout control by a power plant employee not involved in the delivery or transfer operation. This plan shall be applicable during construction, commissioning, and operation of the power plant.

Verification: At least 30 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 facility shall be designed to either the American Society for Material Engineering Pressure Vessel Code and American National Standards Institute K61.6 or to American Petroleum Institute 620. In either case, the storage tank shall be protected by a secondary containment basin capable of holding 125 percent of the storage volume or the storage volume plus the volume associated with 24 hours of rain assuming a 25-year storm. The final design drawings and specifications for the ammonia storage tank and secondary containment basins shall be submitted to the CPM for review and approval.

<u>Verification:</u> least 60 days prior to the first delivery of aqueous ammonia to the facility, the project owner shall submit final design drawings and specifications for the ammonia storage tank and secondary containment basin to the CPM for review and approval.

HAZ-5 The aqueous ammonia storage tank with secondary containment basin and the bermed tanker truck transfer pad that drains into a subsurface sump. The secondary containment basin shall be certified by the project owner as being capable of holding 125 percent of the storage volume or the storage volume plus the volume associated with 24 hours of rain assuming a 25-year storm.

<u>Verification:</u> At least 30 days prior to delivery of aqueous ammonia to the facility, the project owner shall submit the required certification to the CPM for approval.

HAZ-6 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 U.S. Department of Transportation Code MC-307.

<u>Verification:</u> At least 30 days prior to receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

HAZ-7 At least 30 days prior to receipt of any hazardous materials on site, the project owner shall direct all vendors delivering any hazardous material to the site will travel on Interstate 10 to State Route 62 to Dillon Road to the plant site. The project owner shall obtain approval of the CPM if an alternate route is desired.

<u>Verification:</u> At least 30 days prior to receipt of any hazardous materials on site, the project owner shall submit to the CPM for review and approval copies of notices to hazardous materials vendors describing the required transportation route.

HAZ-8 Prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the CPM for review and approval. The Construction Security Plan shall include the following:

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

5. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and

6. evacuation procedures.

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

HAZ-9 The project owner shall also prepare a site-specific Operation Security Plan for the commissioning and operational phases that will be available to the CPM for review and approval. The project owner shall implement site security measures that address physical site security and hazardous materials storage. The level of security to be implemented shall not be less than that described below (as per North American Electric Reliability Council 2002).

The Operation Security Plan shall include the following:

1. permanent full perimeter fence or wall, at least 8 feet high;

2. main entrance security gate, either hand-operated or motorized;

3. evacuation procedures;

4. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;

5. written standard procedures for employees, contractors, and vendors when encountering suspicious objects or packages on site or off site;

6. two statements, as follows:

   A. a statement (refer to sample, **Attachment A**), signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to determine the accuracy of employee identity and employment history and shall be conducted in accordance with state and federal laws regarding security and privacy;

   B. a statement(s) (refer to sample, **Attachment B**), signed by the contractor or authorized representative(s) for any permanent contractors or other technical contractors (as determined by the CPM after consultation with the project owner) that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractors who visit the 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 compliance with Title 49 Code of Federal Regulations 172.880 and that they have conducted employee background investigations in accordance with Title 49 Code of Federal Regulations 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) and 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(s) present 24 hours per day, 7 days per week;

    <u>Or</u>

    B. power plant personnel on site 24 hours per day, 7 days per week, and both of the following:

        i. the CCTV monitoring system required in item 9, above, that shall include cameras able to pan, tilt, and zoom; that have low-light capability; and that are able to view 100 percent 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**

        ii. 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 this security plan. The CPM may authorize modifications to these measures or may require additional measures such as protective barriers for critical power plant components—transformers, gas lines, and compressors—depending upon 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 both appropriate law enforcement agencies and the applicant.

<u>Verification:</u> At least 30 days prior to the initial receipt of hazardous materials on site, the project owner shall notify the CPM that a site-specific Operations Security Plan is available for review and approval. In the Annual Compliance Report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed and that updated certification statements have been appended to the operations security plan. In the Annual Compliance Report, the project owner shall include a statement that the Operations Security Plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

SAMPLE CERTIFICATION (Attachment A)

Affidavit of Compliance for Project Owners

I,

____

(Name of person signing affidavit)(Title)

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

____

(Company name)

for employment at

____

(Project name and location)

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

____

(Signature of officer or agent)

Dated this ____________________ day of ____________________, 20 _______.

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

SAMPLE CERTIFICATION (Attachment B)

Affidavit of Compliance for Contractors

I,

____

(Name of person signing affidavit)(Title)

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

____

(Company name)

for contract work at

____

(Project name and location)

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

____

(Signature of officer or agent)

Dated this ____________________ day of ____________________, 20 _______.

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

SAMPLE CERTIFICATION (Attachment C)

Affidavit of Compliance for Hazardous Materials Transport Vendors

I,

____

(Name of person signing affidavit)(Title)

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

____

(Company name)

for hazardous materials delivery to

____

(Project name and location)

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

____

(Signature of officer or agent)

Dated this ____________________ day of ____________________, 20 _______.

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

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HAZARDOUS MATERIALS
Appendix A

Basis for Staff's Use of 75 Parts Per Million Ammonia Exposure Criteria

BASIS FOR STAFF'S USE OF 75 PARTS PER MILLION AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 parts per million (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 the U.S. Environmental Protection Agency and the California Environmental Protection Agency 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 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. California Environmental Quality Act 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 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 minutes	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 minutes	Protects nearly all segments of general population from irreversible effects.
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 minutes, 4 times per 8-hour day	No toxicity, including avoidance of irritation.
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 minutes	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 minutes 30 minutes 10 minutes	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 hours	No toxicity or irritation on continuous exposure for repeated 8-hour 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 minutes	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 World Health Organization (1986) warned 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 FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1

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ABBREVIATIONS FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1

ACGIH, American Conference of Governmental and Industrial Hygienists
AIHA, American Industrial Hygienists Association
EEGL, Emergency Exposure Guidance Level
EPA, Environmental Protection Agency
ERPG, Emergency Response Planning Guidelines
IDLH, Immediately Dangerous to Life and Health Level
NIOSH, National Institute of Occupational Safety and Health
NRC, National Research Council
STEL, Short Term Exposure Limit
STPEL, Short Term Public Emergency Limit
TLV, Threshold Limit Value
WHO, World Health Organization

HAZARDOUS MATERIALS
Appendix B

Hazardous Materials Proposed for Use at the CPV Sentinel

Hazardous Material Usage and Storage (Page 1 of 3)

Hazardous Material	Primary Application	Estimated 30-Day Usage	Estimated Storage Quantity[1]	Storage Type
Acetylene	Welding	TBD	TBD	Cylinder
Paint	Painting	TBD	TBD	Can
Aqueous Ammonia (29 percent)	NO_x reduction in SCR	24,000 gallons	24,000 gallons	Aboveground Tank
Sodium Hypochlorite (12.5%, Trade)	Biocide/Biofilm Control (Raw Water Tank, Circulating Water, MF System)	3,100 gallons	4,000 gallons	Aboveground Tank
Sulfuric Acid (93%)	pH Control (Cooling Tower Makeup, MF System, RO System)	4,200 gallons	5,000 gallons	Aboveground Tank
Dispersant/Corrosion Inhibitor (neat)	Scale/Corrosion Control (Circulating Water)	350 gallons	400 gallons	Aboveground Container
Ferric Chloride (38%)	Coagulant (MF System)	150 gallons	200 gallons	Aboveground Container
Sodium Hydroxide (25%)	Alkalinity Control (MF System)	15,000 gallons	20,000 gallons	Carboy
Sodium Carbonate (99%, solid)	Alkalinity Control (MF System)	40,000 pounds	25 ton	Aboveground Container
Natural gas	Fuel for power plant	As needed	As needed	Pipeline
Mineral Oil	Transformers	123,500 gal, initial fill	123,500 gal	Steel Drum
Sulfur Hexafluoride	Switchyard breakers	600 lbs	600 lbs	Within Equipment
Turbine & Generator Lube Oil	Rotating equipment	50,000 gal	50,000 gal	Steel Drum
Hydraulic Oil	Rotating equipment	500 gallons	500 gallons	Steel Drum

Hazardous Material Usage and Storage (Page 2 of 3)

Hazardous Material	Primary Application	Estimated 30-Day Usage	Estimated Storage Quantity[1]	Storage Type
Hydraulic Fluid	Construction vehicles and equipment	10 gal/week	250 gallons	Drums inside secondary containment
Transmission Fluid	Construction vehicles and equipment	5 gal/week	250 gallons	Drums within secondary containment
Unleaded gasoline	Construction vehicles	300 gal/week	500 gallons	Tank with secondary containments
Motor Oil	Construction vehicles and equipment	5 gal/week	250 gallons	Drums inside secondary containment
Propane		200 lb/month	400 lbs	Cylinder
Propylene-glycol	Auxiliary cooling Closed cooling water system	As needed	60,000 gallons Initial fill	Closed cooling water system.
Non-oxidizing biocide	Biocide for cooling system	As needed	5 gallons	Manufacturer standard bucket/drum/tote inside secondary containment
Dryer Desiccant	Instrument air	600 lb/3-5 years	600 lb.	Instrument air dryer
Various detergents	Combustion turbine cleaning	1,000 lbs, before startup; Periodic short-term storage 500 lbs	1,000 lbs	Manufacturer Container
Dryer desiccant	Instrument air	600 lbs	600 lbs	Instrument air dryer
Diesel fuel	Fire water pump	180 gal, initial fill	Maintain full diesel tank	Tank
Diesel fuel	Black Start Generator	1,300 gal, initial fill	Maintain full diesel tank	Tank
Magnesium Sulfate (30%)	Silica Removal (MF System)	2,900 gallons	3,500 gallons	Tank

Hazardous Material Usage and Storage (Page 3 of 3)

Hazardous Material	Primary Application	Estimated 30-Day Usage	Estimated Storage Quantity[1]	Storage Type
Hydrochloric Acid (38%)	MF Membrane Cleaning	300 gallons	400 gallons	Tank
Antiscalant (neat)	RO System	20 gallons	25 gallons	Manufacturer standard bucket/drum/tote inside secondary containment
Sodium Bisulfite (38%)	Dechlorination (RO System)	310 gallons	400 gallons	Manufacturer standard tote inside secondary containment
Polymer Thickening Aid (neat)	Gravity Thickener (MF System)	2 gallons	5 gallons	Manufacturer standard bucket/drum/tote inside secondary containment
RO Membrane Cleaners (neat)	RO System	2 gallons	5 gallons	Manufacturer standard bucket/drum/tote inside secondary containment
	Waste	TBD	TBD	Steel Drum
	Waste	TBD	TBD	Steel Drum
	Waste	TBD	TBD	Steel Drum
	Waste	TBD	TBD	Steel Drum

Notes: 1. Expected based on 107° F operation condition. Usage and storage will be optimized during final design.

LAND USE

Testimony of Negar Vahidi

SUMMARY OF CONCLUSIONS

The proposed CPV Sentinel Energy Project (CPV Sentinel or “proposed project”), with the effective implementation of the recommended condition of certification, would be consistent with the applicable laws, ordinances, regulations, and standards (LORS) pertaining to land use planning and would not generate a significant impact under the California Environmental Quality Act (CEQA) guidelines with respect to CEQA Appendix G issues, “Land Use and Planning” and “Agriculture Resources.” Energy Commission staff (staff) believes that the proposed project is consistent with the current development pattern for the area established by the Riverside County (county) General Plan, and Municipal Code, and the City of Palm Springs General Plan and Municipal Code. In addition, the proposed CVP Sentinel project would not be incompatible with existing on-site or nearby uses, as it is consistent with the general character of these permitted uses and the planned development pattern for the area. Staff is proposing Condition of Certification **LAND-1** to ensure that the proposed project parcels are merged into one legal parcel, or that a parcel merger would not be necessary, prior to the start of construction.

INTRODUCTION

The land use analysis of the CPV Sentinel Application for Certification (AFC) focuses on the project’s consistency with land use plans, ordinances, regulations, and policies, and the project’s compatibility with existing and planned land uses. In general, a power plant and its related facilities could be incompatible with surrounding land uses if they cause unmitigated impacts in the areas of noise, dust, public health, traffic, and visual resources. These individual resource areas are discussed in detail in separate sections of this document. A power plant may also create a significant land use impact if it converts prime or unique farmland or farmland of statewide importance to non-agricultural uses.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Land use LORS directly applicable to the proposed project include the Riverside County Comprehensive General Plan, and the City of Palm Springs General Plan and Zoning Ordinance. Other Land Use LORS applicable to lands surrounding the CVP Sentinel site and associated facilities include the City of Desert Hot Springs General Plan and Zoning Ordinance and the Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Conservation Plan (MSHCP/NCP). **LAND USE Table 1** provides a general description of land use LORS applicable to the proposed project. The project’s consistency with these LORS is discussed in **LAND USE Table 2**.

LAND USE Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	None
State	None
Subdivision Map Act (Public Resources Code Section 66410-66499.58)	This section of the California Public Resources Code provides procedures and requirements regulating land division (subdivisions) and parcel legality. Regulation and control of the design and improvement of subdivisions have been vested in the legislative bodies of local agencies.
Local	
Riverside County Integrated Project - Comprehensive General Plan (Riverside County 2003)	Riverside County (county) is the fourth-largest county in the State, stretching nearly 200 miles across and comprising over 7,200 square miles of fertile river valleys, low deserts, mountains, foothills and rolling plains. Riverside County shares borders with Los Angeles, Imperial, Orange, San Diego, and San Bernardino Counties. The Riverside County Comprehensive General Plan was adopted in 2003 and provides direction for the county's development, land use, economic base, transportation system and preservation of natural and cultural resources. The county General Plan outlines policies, standards, and programs to guide appropriate choices for the future of Riverside County. The Land Use Element of the General Plan contains policies that guide the future of development in the county. These policies designate and discuss the patterns and distribution of development. This element captures and communicates the county's intentions for future use and development within the county (Riverside County 2003).
Western Coachella Valley Area Plan (Riverside County 2003)	There are several area plans that are an extension of the county of Riverside Comprehensive General Plan and Vision Statement. The area plans detail the specific physical, environmental, and economic characteristics for areas within the Riverside County 2003 Comprehensive General Plan area. Using the Riverside County 2003 Comprehensive General Plan as the primary foundation, the area plans establish policies for development and conservation within the identified area. The land use plan of this area plan "focuses on preserving the unique features in the Western Coachella Valley area and, at the same time, guides the accommodation of future growth." The land use plan for this specific area plan has the same land use designations as the county's General Plan. The area plans do not include specific policies for the development of utility corridors.
Riverside County Zoning Ordinance (Ordinance 348) (Riverside County 2008a)	The Riverside County Zoning Ordinance consists of all of the regulatory and penal ordinances of Riverside County. Ordinance 348 is the county's Land Use Ordinance, which provides the land use planning and zoning regulations and related functions for development in the county. Zoning classifies the immediate, permissible uses of land and is one of the primary means of implementing the General Plan. The Zoning Ordinance specifies what uses are permitted, conditionally permitted, or prohibited within each zone.
City of Palm Springs General	The General Plan provides a vision of the future, contains an evaluation of existing conditions, and provides long-term goals and policies to

Plan (Palm Springs 2007a)	guide growth and development for the next 20 years. The Palm Springs General Plan is implemented by the city through its zoning, subdivision ordinances, specific plans, growth management policies, planned development districts, development agreements, development review, code enforcement, land use database, capital improvement programs, environmental review procedures, building and housing codes, and redevelopment plans (Palm Springs 2007). The Land Use Element of the General Plan contains policies that guide the future of development in the city. This element illustrates the city's vision of future development and land use.
City of Palm Springs Zoning Ordinance (Palm Springs 2007b)	The city's Municipal Code and Zoning Ordinance are the primary tools used to implement the goals and policies of the General Plan. The Zoning Ordinance provides more detailed direction related to development standards; permitted, conditionally permitted, and prohibited uses; and other regulations such as parking standards and sign regulations. The land uses specified in the Zoning Ordinance are based upon and should be consistent with the land use policies set forth in this element.
City of Desert Hot Springs General Plan (Desert Hot Springs 2000a)	The Desert Hot Springs Comprehensive General Plan and associated Environmental Impact Report (EIR) have been developed to serve as a framework for decision-making regarding the appropriate types and intensities of land use, and conditions by which development is to be permitted in the city. The proposed project is not within the jurisdictional boundaries of the City of Desert Hot Springs, but is located in the city's Sphere-of-Influence[1] (SOI) in unincorporated Riverside County. The city's SOI includes county managed lands over which the city has an advisory role. Unincorporated city SOI lands are primarily located south of the incorporated city limits, with important and developable SOI lands also located to the east.
City of Desert Hot Springs Zoning Ordinance (Desert Hot Springs 2000b)	This Zoning Ordinance is the primary tool for implementing the goals, policies and programs of the Desert Hot Springs General Plan, pursuant to the mandated provisions of the State Planning and Zoning Law (Government Code Section 65000 et seq.), State Subdivision Map Act (Government Code Section 64410 et seq.) and California Environmental Quality Act (Public Resources Code 21000 et seq.), and other applicable State and local requirements. All development within the unincorporated area of the city's Sphere of Influence should be consistent and compatible with the Desert Hot Springs General Plan.
Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community	The Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Conservation Plan (MSHCP/NCP) is a comprehensive, multi-jurisdictional plan focusing on the conservation of federal and State-listed species, other rare and sensitive species, and their habitats. The plan balances environmental protection and economic development objectives in the plan area and simplifies

[1] A Sphere of Influence (SOI) is defined as the "…probable physical boundaries and service area…" (Government Code §56076) of an agency. An SOI includes territory not within the corporate limits of the agency but which is expected to be annexed at some time in the future. There may be communities or territory closely connected with a proposed incorporation area which are not ready to be included in the new city but need to be acknowledged for future planning (GOPR 2003).

Conservation Plan[2]	compliance with endangered species related laws. The MSHCP/NCP satisfies the legal requirements for the issuance of permits that will allow the take of species covered by the plan in the course of otherwise lawful activities. The plan, to the maximum extent practicable, provides measures to minimize and mitigate the impacts of the taking and provides for conservation of Covered Species. The MSHCP/NCP is regulated by the Coachella Valley Association of Governments in cooperation and coordination with the U.S. Fish and Wildlife Service (USFWS).

SETTING

PROPOSED PROJECT

The proposed project site is located approximately 1.3 miles east of State Route (SR) 62 (also referred to as Twentynine Palms Highway), 1.7 miles north of Interstate 10 (I-10), and 1.3 miles west of Indian Avenue. Powerline Road North and Powerline Road South run along the south side of the property. Access to the site will be available from Dillon Road north onto the proposed access road to the project site. Access to Dillon Road is from the Dillon Road exit off SR 62 and from the Indian Avenue exit off the I-10.

The proposed power plant site, electrical transmission line, and portions of the proposed construction laydown area, natural gas pipeline, potable water line, and access road corridor are located within unincorporated Riverside County and within the City of Desert Hot Springs Sphere-of-Influence (SOI); portions of the proposed construction laydown area, and natural gas pipeline lie within Palm Springs city limits. The recycled water pipeline will be within the City of Palm Springs, approximately 10 miles south of the proposed CPV Sentinel power plant site (LW 2008a). The power plant site is located just north of Palm Springs city limits. For a detailed description of the proposed project components and associated facilities, see the **Project Description** section.

Agricultural Land

There is no agricultural land within or near the proposed power plant site or project-related features and facilities (CPVS 2007a). The Farm Land Mapping and Monitoring Program (FMMP) of the California Department of Conservation (CDC) provides statistics on conversion of farmland to non-agricultural uses for Riverside County where the proposed CVP Sentinel site is located.

According to the FMMP "Important Farmlands" maps, the proposed power plant site and all associated linear facilities (except the recycled water pipeline) are located on land defined as "Other Land." Other Land is defined by the CDC as: "land not included in any other mapping category. Common examples include low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water bodies smaller than forty acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land."

[2] The **Biological Resources** section addresses the proposed project's consistency with the MSHCP/NCP.

No existing agricultural land uses are along the proposed recycled water pipeline route or within 0.25 miles of its right-of-way (LW 2008a). The recycled water pipeline route would be on land designated by the CDC as “Urban and Built-up Land.” Land within 0.25 miles of the pipeline right-of-way is designated as “Urban and Built-up Land” or “Other Land.” Urban and Built-up Land is defined by the CDC as: “land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately six structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.”

The proposed project and related facilities are not subject to an Agricultural Land Conservation (Williamson Act) contract. In addition, the proposed project and related facilities are located on land that is vacant and considered nonagricultural land by the CDC.

Power Plant Site

The proposed power plant site is 37 acres and is located within unincorporated Riverside County, within the City of Desert Hot Springs SOI. The 37-acre power plant site consists of three separate Assessor's Parcel Numbers (APNs): 668-130-005, 668-130-007, and 668-140-001. The first two parcels and the northern portion of the third parcel encompass most of the site and are currently undeveloped. The southeastern portion of the third parcel (APN 668-140-001) currently contains a domestic water well and a septic system.

Other Project-Related Features and Facilities

In addition to the proposed power plant site, there are other off-site features and facilities associated with the proposed project. These features and facilities include:

- A 14-acre construction laydown area;
- A 2.6-mile long natural gas pipeline extending north and east from the existing Indigo Energy Facility, which is located approximately 1.8 miles to the southeast of the proposed power plant site;
- A 2,300-foot long transmission line connecting the power plant site to Southern California Edison Company’s existing Devers Substation, which is approximately 700 feet to the west of the proposed power plant site;
- A 3,200-foot long road extending off Dillon Road to the proposed power plant site and associated intersection widening at Dillon Road and the site access road; and
- A 3,200-foot long potable water supply line extending off Dillon Road to the proposed power plant site.

Recycled Water Pipeline

The proposed recycled water pipeline would be within the City of Palm Springs, approximately 10 miles south of the proposed CPV Sentinel power plant site (LW 2008a). The new recycled water line would consist of approximately 900 feet of 12-inch pipeline extending from an existing service main located along South Murray Canyon

Drive in Palm Springs. This pipeline would be constructed within the South Murray Canyon Drive right-of-way and two parcels of Allotted Trust Land, within the golf course, held by the Agua Caliente Band of Cahuilla Indians (Tribe). The Assessor's Parcel Numbers (APNs) for these parcels are 512-08-0001 and 512-02-0014.

SURROUNDING AREA

Existing land uses immediately adjacent to, and nearby, the proposed power plant site and associated features/facilities are described below.

Power Plant Site

Land uses adjacent to the power plant site include:

- **North:** Undeveloped land, and wind energy generation to the northeast.
- **East:** Wind energy generation, and U.S. Bureau of Land Management (BLM) undeveloped property.
- **South:** Powerline Road North and Powerline Road South, which also serve as two transmission line corridors that connect to the Southern California Edison (SCE) Devers Substation.
- **West:** Undeveloped land and the SCE Devers Substation.

The surrounding area is primarily dominated by wind farms to the north, east, and south of the proposed power plant site, as well as the SCE Devers Substation to the west and transmission line corridors to the south. The closest residence is located approximately 330 feet to the east of the power plant site. The next closest residences are located 340 feet to the south and approximately 660 feet to the east of the power plant site. Residential properties are also located approximately 2,600 feet southwest of the power plant site. In addition, according to Riverside County, "…[s]ingle-family residential lots of five acres or less are located to the south of the project, and the community of Valley View Ranchos is less than one mile southwest" (Riverside County 2008b). No other sensitive receptors (childcare facilities, schools, hospitals, libraries, or churches) were identified within a 2-mile radius of the proposed power plant site.

Other Project-Related Features and Facilities

Existing land uses within one mile of the proposed power plant site and 0.25 miles of the proposed linear rights-of-way (natural gas pipeline, transmission line, potable water line, and access road) include: Rural to High-Density Residential, Commercial, Industrial, Public Facilities And Institutions, Transportation and Utilities, and Vacant Land. There are scattered rural residences located in the areas designated Estate Residential areas and Rural Desert. This information is based on Southern California Association of Governments (SCAG) database of existing land uses in the area; along with Energy Commission staff's October 2007 site reconnaissance observations.

Recycled Water Pipeline

Land within a 0.25-mile radius of the proposed recycled water pipeline is primarily used for residential uses and open space (golf courses and related facilities). The nearest sensitive receptors to the proposed recycled water pipeline are golf course patrons and residences located directly west of the proposed pipeline corridor (LW 2008a).

Agricultural Land

Agricultural lands/farmlands, as designated by the CDC, within the area surrounding the proposed project are shown on AFC **Figure 7.4-2** (CPVS 2007a)**.** The areas surrounding the CVP Sentinel site, construction laydown area, and within 0.25 miles of the project-related linear facilities (including the recycled water pipeline) predominantly consist of lands designated by the CDC as “Urban and Built-up Land” and “Other Land.”

GENERAL PLAN LAND USE AND ZONING DESIGNATIONS

AFC **Figure 7.4-3 (General Plan Land Uses)** and **Figure 7.4-4 (Zoning)** illustrate the land use and zoning designations of the proposed power plant site and the associated linear facilities, except the recycled water pipeline which is located 10 miles south of the site. In addition, these figures illustrate the land use and zoning designations of lands within a one-mile radius of the proposed power plant site and construction laydown area, and within 0.25 miles of the project-related linear facilities. The land use and zoning designations of the areas surrounding the proposed project do not directly apply to the proposed project, but are presented to help illustrate the affected local agencies’ existing and planned pattern of land use development in the project area.

Power Plant Site

The proposed power plant site and proposed transmission line have a Riverside County General Plan land use designation of PF (Public Facilities), and are zoned W-2 (Controlled Development Area). The PF land use designation provides for the development of various public, quasi-public, and private uses with similar characteristics, such as governmental facilities, utility facilities including public and private electric generating stations and corridors, landfills, airports, educational facilities, and maintenance yards (Riverside County 2003). Permitted uses within the W-2 zoning designation include structures and the pertinent facilities necessary and incidental to the development and transmission of electrical power (Riverside County 2008a).

Other Project-Related Features and Facilities

The temporary storage of vehicles, and construction equipment and materials is the proposed use for the construction laydown area. The majority of the eastern portion of the construction laydown area (approximately 2/3 of the site) has a Riverside County General Plan land use designation of RD (Rural Desert) and is zoned W-E (Wind Energy Resource). The RD land use designation allows for single family residences, and limited agriculture and animal keeping uses, with a maximum residential density of one dwelling unit per 10 acres. Limited recreational uses; renewable energy uses including solar, geothermal and wind energy uses, as well as associated uses required to develop and operate these renewable energy sources; compatible resource development (which may include the extraction of mineral resources with approval of a surface mining permit); governmental and utility uses are also allowed within this designation (Riverside County 2003). The RD land use designation is generally applied to remote desert areas characterized by poor access and a lack of water and other services. Public utility uses, such as transmission facilities for electricity and electrical substations are allowed within the W-E zone (Riverside County 2008a).

The western 1/3 portion of the construction laydown area is located within the boundaries of the City of Palm Springs, and has a Palm Springs General Plan land use designation of I (Industrial) with a "Wind Energy Overlay." Industrial uses typically include research and development parks, light manufacturing, laboratories, and industrial services (Palm Springs 2007a). Wind Energy Conversion Systems (WECS) are permitted in areas designated with the Wind Energy Overlay classification. These areas are predominantly located within areas designated as Desert, Industrial, or Open Space–Water on the Palm Springs General Plan Land Use map (Palm Springs 2007a).

The portion of the construction laydown located within the City of Palm Springs has a zoning designation of E-I (Energy Industrial). The E-I zone allows energy uses with a Land Use Permit (also referred to as a Conditional Use Permit) (Palm Springs 2007b).

The rights-of-way for the proposed access road and potable water line, as well as a portion of the proposed gas line are designated by the Riverside County General Plan as RD (Rural Desert) and PF (Public Facilities), and are zoned W-2 (Controlled Development Area) and W-E (Wind Energy Resource).

The remaining areas of the gas pipeline route (east of Melissa Lane) are adjacent to areas primarily designated by the Palm Springs General Plan as I (Industrial) with a Wind Energy Overlay, and are zoned E-I (Energy Industrial) and M-2 (Manufacturing). The E-I zone allows energy uses with a Conditional Use Permit and industrial uses are permitted in the M-2 zoning district (Palm Springs 2007b).

The areas of the gas pipeline route east of Melissa Lane are within unincorporated Riverside County. These areas have a Riverside County General Plan designation of RD (Rural Desert) with an "Industrial-Wind Farm Overlay", and L-I (Light Industrial). Riverside County zoning designations for these areas are W-E (Wind Energy Resource Zone) and W-2 (Controlled Development Area). One parcel adjacent to the east of the gas pipeline is zoned R-1 (One-Family Dwelling). Installation of a gas pipeline requires a Public Use Permit in the R-1 zoning district. On November 7, 2007, CPV Energy (applicant) submitted an application for a Public Use Permit to the County of Riverside Planning Department (CPVS 2007c).

Recycled Water Pipeline

The proposed recycled water pipeline right-of-way is designated Very Low Residential or Medium Density Residential by the Palm Springs General Plan, and is included in the R-1-C (Single Family Residential) or the R-2 (Limited Multiple) zoning districts. The Very Low Density Residential is the most prevalent land use designation within the city, representing typical single-family detached residential development (Palm Springs 2007a). The Medium Density Residential land use category accommodates a range of residential housing types, including single-family attached, single-family detached, patio homes, duplexes, townhomes, multiple-family, and mobile home projects. The golf course (Indian Canyons Golf Resort) on the south side of South Murray Canyon Drive has a Palm Springs General Plan designation of Open Space–Parks/Recreation and is zoned “Indian Land.” The Open Space–Parks/Recreation designation is used for regional, local, and neighborhood parks, community centers, public and private golf courses, and any recreational facility operated by a public or quasi-public agency. These areas are intended for “active” recreational uses (Palm Springs 2007a). The Palm Springs National Golf Course has site control through a long term lease from the Agua Caliente Development Authority through the year 2031, with an option to extend (LW 2008a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff has analyzed the information provided in the AFC and has acquired information from other sources to determine consistency of the proposed project with applicable land use LORS and the proposed project’s potential to create significant adverse land use-related impacts.

METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document are based on the CEQA Guidelines (CCR 2006) and performance standards or thresholds identified by Energy Commission staff, based on applicable LORS and utilized by other governmental regulatory agencies. An impact may be considered significant if the proposed project results in:

- Conversion of Farmland
  - Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
  - Conflict with existing zoning for agricultural use or a Williamson Act contract.
  - Other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses.
- Physical disruption or division of an established community.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.
- 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, redevelopment plan, or zoning ordinance.
- Individual environmental effects, which, when considered with other impacts from the same project or in conjunction with impacts from other closely related past, present, and reasonably foreseeable future projects, are considerable, compound, or increase other environmental impacts.

In general, a power plant and its related facilities may also be incompatible with existing or planned land uses, resulting in potentially significant impacts, if they create unmitigated noise, dust, or a public health or safety hazard or nuisance; result in adverse traffic or visual impacts; or precludes, interfere with, or unduly restrict existing or future uses. Please see other sections of this document, as noted, for a detailed discussion of any additional potential project impacts and recommended mitigation and conditions of certification.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Conversion of Farmland

According to the Farm Land Mapping and Monitoring Program (FMMP), the proposed project, including its associated linear facilities, are all located on lands designated as "Other Land" and "Urban and Built-Up Land." In addition, none of the lands affected by the proposed project are zoned for agricultural uses. Given the FMMP designations for lands affected by the proposed project, the proposed CVP Sentinel Project would not convert any Farmland (i.e., with FMMP designations of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) to non-agricultural use. Neither the construction nor operational activities of the proposed project would result in any impacts to existing agricultural operations or foreseeable future agricultural use. In addition, the project site is not located in an area that is under a Williamson Act contract. 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 Disruption or Division of an Existing Community

The proposed project (except the recycled water pipeline) is located in an area primarily dominated by utility and energy infrastructure such as wind farms, the SCE's Devers Substation, and several existing high-voltage transmission line rights-of-way connecting to the Devers Substation. Riverside County has confirmed that "… [t]he project is…in a relatively isolated rural area… (Riverside County 2008b). The county has indicated that single-family residential lots of five acres or less are located to the south of the project, and the community of Valley View Ranchos is located less than one mile southwest. In addition, a few scattered rural residences are located near the proposed power plant site, including a house located 330 feet to the east, a dwelling unit located 340 feet to the south, and a house located 660 feet to the east. The nearby residences are not located within any established residential communities or developments. Any potential relocation of these residences would not result in the division of an established community. The nearest residential community (Valley View Ranchos) is located approximately 2,600 feet southwest of the proposed power plant site. The implementation of the proposed project would not divide this established community.

The proposed power plant site and construction laydown area would be located entirely on private property. Access to the power plant site and the construction laydown area would be via existing public roadways. The applicant would be responsible for construction of a 3,200-foot long road extending off Dillon Road (existing paved public roadway) to the proposed power plant site and associated intersection widening at Dillon Road and the site access road. A 3,200-foot long potable water supply line would be extended to the project site from a current Mission Springs Water District (MSWD) municipal line existing along Dillon Road. The proposed potable water line would be placed within the proposed road extension. The proposed road extension would occur on lands which are currently vacant and designated and zoned for public facilities, and the proposed pipeline would be placed underground within the road. Therefore, there would not be the displacement or disturbance of any existing land uses, and an established community would not be divided.

In addition, electricity generated by the proposed project would be delivered to the existing SCE Devers Substation via a 2,300-foot long electric transmission line connecting the project station switchyard to the Devers Substation at the 220-kilovolt (kV) bus. It is currently anticipated that SCE will execute contracts with CPV Sentinel, LLC under which SCE will be responsible for final design, engineering, construction, ownership, operation, and maintenance of the transmission line to the Devers Substation. SCE will seek a Certificate of Public Convenience and Necessity (CPCN) from the California Public Utilities Commission (CPUC) for the transmission line. Pursuant to CEQA, the CPUC will need to consider the environmental impacts of the transmission line in deciding whether to grant the application for a CPCN. The CPUC will be able to rely on this FSA in considering those effects, as the transmission line is addressed in each technical area. The proposed transmission line right-of-way is located in an area dominated by similar utility infrastructure (i.e., multiple high-voltage transmission lines) and designated and zoned for public facilities. Therefore, implementation of the transmission line would not divide an established community.

Natural gas would be supplied to the project site via the extension of a 2.6-mile long, 24-inch diameter natural gas pipeline line extending from the Indigo Energy Facility to the proposed power plant site. From the Indigo Energy Facility, the proposed natural gas pipeline would be located within an existing unpaved road right-of-way north to Dillon Road (existing paved public roadway), would travel west within the Dillon Road right-of-way, and would then turn north into the proposed power plant site within the proposed access road right-of-way. Given that the proposed pipeline would be located underground within existing and proposed utility or road rights-of-way, it would not divide an established community.

Construction of the proposed recycled water pipeline would bring recycled water from an existing Desert Water Agency (DWA) service main along South Murray Canyon Drive to the existing water feature on the Palm Springs National Golf Course, which is used for golf course irrigation. The proposed recycled water pipeline would be placed underground, and is intended to reduce freshwater pumping by Palm Springs National Golf Course. Implementation of the proposed recycled water pipeline would not result in any permanent land use changes and would not conflict with existing land uses. Therefore, there would be no disruption or division of an established community.

The proposed project would not disrupt or divide an established community, nor would it conflict with the established uses of the area. The proposed project primarily involves the development of energy infrastructure in an area designated for public facilities and energy-related uses. The project is compatible with the existing uses in the project area (e.g., wind energy generation, SCE’s Devers Substation, and several high-voltage transmission lines).

Conflict with Any Applicable Habitat or Natural Community Conservation Plan

The **Biological Resources** section provides a detailed discussion of LORS applicable to wildlife and plants, including the proposed project's consistency with the Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Plan (MSHCP/NCP). As discussed in the **Biological Resources** section, the proposed project would be consistent with the MSHCP/NCP with implementation of Condition of Certification **BIO-13**.

Conflict with Any Applicable Land Use Plan, Policy, or Regulation

As required by California Code of Regulations, Title 20, Section 1744, Energy Commission staff evaluates the information provided by the project owner in the AFC (and any amendments), project design and operational components, and siting to determine if elements of the proposed project would conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, or that would normally have jurisdiction over the project except for the Energy Commission's exclusive authority (PRC 2005). As part of the licensing process, the Energy Commission must determine whether a proposed facility complies with all applicable state, regional, and local LORS (Public Resources Code § 25523[d] [1]). The Energy Commission must either find that a project conforms to all applicable LORS or make specific findings that a project's approval is justified even where the project is not in conformity with all applicable LORS (Public Resources Code § 25525). When determining LORS compliance, staff is permitted to rely on a local agency's assessment of whether a proposed project is consistent with that agency's zoning and general plan. On past projects, staff has requested that the affected local agency provide a discussion of the findings and conditions that the agency would make when determining whether a proposed project would comply with that agency's LORS, were they the permitting authority. Any conditions recommended by an agency are considered by Energy Commission staff for inclusion in the proposed conditions of certification for the project.

As part of staff's analysis of local LORS compliance, and specifically to determine the views of Riverside County and the City of Palm Springs on the project's consistency with their respective General Plans and zoning codes, staff sent letters to both agencies on September 13, 2007. Letters were sent to the planning departments of Riverside County and the City of Palm Springs, detailing the LORS compliance issues associated with the proposed project (CEC 2007b; CEC 2007c). Staff requested both agencies to provide the conditions for any Conditional Use Permit, Public Use Permit, and or variances that they would attach to the proposed project, were they the permitting agencies.

In the letter to Riverside County (CEC 2007c), staff pointed out that the project may have required a Riverside County Conditional Use Permit to allow for storage of equipment and vehicles at the construction laydown area if not for the exclusive siting authority of the Energy Commission (CEC 2007c). In addition, staff recognized that the proposed project's exhaust stacks would exceed the county's height limit of 75 feet within the W-2 zone, and that the proposed project would normally need a height variance from the county if not for the exclusive siting authority of the Energy Commission (CEC 2007c). Riverside County provided comments on the Preliminary

Staff Assessment on August 27, 2008 (Riverside County 2008b). In their comments, Riverside County confirms that "…[t]he land use designation for this project is Public Facilities within the W-2 'Controlled Development Area' zone, which allows structures and facilities necessary and incidental to the development and transmission of electrical power and gas" (Riverside County 2008b). Further, according to the county, [t]he applicant's project is consistent with the land use classification and zoning requirements for W-2" (Riverside County 2008b). In addition, since its original intent to merge the proposed project parcels, the applicant has stated that it "has learned that, due to complicated ownership structures, a parcel merger poses a number of difficulties including complex tax implications. The applicant would like to maintain separate parcels but record a lot tie agreement, or a Covenant and Agreement To Hold Property as One Parcel, among the parcels." Based on this request, Energy Commission staff contacted the Riverside County Planning Department to obtain their input regarding this issue (see **APPENDIX LU-1**). As such, staff has incorporated Condition of Certification **LAND-1** to ensure that the proposed project parcels are merged into one legal parcel, or that a parcel merger would not be required, prior to the start of construction.

In the letter to the City of Palm Springs (CEC 2007b), staff pointed out that, "…the E-I zone is intended to provide areas for alternative energy development and limited industrial uses..." and would normally require a Conditional Use Permit from the City of Palm Springs for the temporary storage uses associated with the construction laydown area if not for the exclusive siting authority of the Energy Commission (CEC 2007b). Similarly, portions of the natural gas pipeline right-of-way travel through the M-2 zone, which is intended to provide for the development of industrial uses, and also would require a Conditional Use Permit if not for the exclusive siting authority of the Energy Commission (CEC 2007b). As of the date of the writing of this analysis, the City of Palm Springs has not responded to the letter sent by Energy Commission staff.

Staff has conducted an evaluation of the proposed project's consistency with applicable local land use LORS. It should be noted that as of the writing of this analysis, the City of Palm Springs has not responded to staff's requests for input regarding LORS consistency. In addition, although Riverside County has provided comments on the PSA, their comments did not address all of the land use LORS applicable to the proposed project. Based on the LORS consistency analysis conducted by staff, the proposed project is consistent with applicable land use LORS (see **LAND USE Table 2**).

While portions of the proposed project are within the City of Desert Hot Springs Sphere-of-Influence (SOI), they remain outside of the city's jurisdiction, and in the jurisdiction of Riverside County. Staff recognizes the overlap between the city and the county. Due to the proximity of the project to the City of Desert Hot Springs, staff has reviewed the city's General Plan and zoning ordinance. However, an evaluation of these documents is not included in this LORS section or the Impacts section because the proposed power plant site and portions of its associated facilities are within Riverside County, and no annexation of these lands has occurred or is planned to occur in the near future. Therefore, Riverside County's jurisdiction takes precedence over the city's SOI. Riverside County would have jurisdiction over these portions of the proposed project, but for the Energy Commission's. This situation of the city's SOI overlapping the county's jurisdiction is illustrative of the challenge faced by rapidly growing cities, when addressing development projects proposed in unincorporated areas near the city boundaries. The land use character and pattern of development in an area are key factors for any discussion of land use compatibility. Given the existing energy uses in the area, and the pattern of energy infrastructure development in the portions of the SOI wherein the proposed project would occur, it is likely that the city would develop the area with similar compatible uses.

LAND USE Table 2 provides the consistency of the proposed CVP Sentinel project with the applicable land use LORS adopted by Riverside County and the City of Palm Springs, as identified in **LAND USE Table 1**. Staff has determined that the proposed project would comply with applicable land use LORS.LAND USE Table 2

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

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
Federal	None		
State			
Subdivision Map Act (Pub. Resources Code Section 66410-66499.58)	The Subdivision Map Act provides procedures and requirements regulating land divisions and the determination of parcel legality. Regulation and control of the design and improvement of subdivisions by the Map Act have been vested in the legislative bodies of local government. Section 66412.1 of the Subdivision Map Act exempts a project from state subdivision requirements provided that the project demonstrates compliance with local ordinances regulating design and improvements.	YES (Conditional upon applicant's compliance with Condition of Certification **LAND-1**)	As stated in the AFC, the 37-acre power plant site consists of three separate Assessor's Parcel Numbers (APNs): 668-130-005, 668-130-007, and 668-140-001, which the applicant had anticipated merging through an application for a Certificate of Parcel Merger with the Riverside County Planning Department. According to the applicant, "…the Riverside County Planning Department has indicated that a parcel merger is a ministerial process that is typically approved within approximately one month after an application is filed. It is not anticipated that the county would impose any conditions of approval in connection with a merger (Riverside County Land Division Ordinance No. 460.139, Section 18.7, Merging of Contiguous Parcels) (URS 2007f). In addition, Policy LU 17.5 (described below) of the Land Use Element of the Riverside County Comprehensive General Plan encourages parcel consolidation in rural areas of the county with the RD land use designation. Since its original intent to merge the proposed project parcels, the applicant has stated that it "has learned that, due to complicated ownership structures, a parcel merger poses a number of difficulties including complex tax implications. The applicant would like to maintain separate parcels but record a lot tie agreement, or a Covenant and Agreement To Hold Property as One Parcel, among the parcels. Such agreements, which typically are executed for the purpose of creating a single building site, require the parcel owners to covenant with the County that the real property at issue shall be held as one parcel and no portion shall be sold separately. The covenant runs with the land and is binding upon the current owners, future owners, encumbrances, successors, heirs or assignees, and continues in effect until released by the authority of the County upon request and evidence that the agreement is no longer required by law." Based on this request, Energy Commission staff contacted the Riverside County Planning Department to obtain their input regarding this issue. According to the Riverside County Planning Department, the county has indicated that Riverside County as a matter of practice requires a certificate of parcel merger (CPM) for projects with multiple parcels. In some cases, the county allows projects to be built on multiple lots. However, this places

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
			many constraints on the use of the properties. Specifically, if multiple parcels are not merged, then the project developer is required to comply with the specific setback requirements for the specific zone. As a result, no structures or facilities can be built on top of actual parcel boundaries, and lands that are within the setback areas cannot be used. The County requires CPMs as a matter of convenience for the project applicant so that they can make full use of their properties. In addition, the county has stated, "[b]ecause this matter involves a legal issue of the insufficiency of a certified parcel merger, which the applicant wants to resolve with a "lot tie agreement" and covenant agreement with the County of Riverside," they require additional time for the Planning Department management and the county legal counsel to review the matter (Riverside County 2008c). As such, staff has incorporated Condition of Certification **LAND-1** to ensure that the proposed project parcels are merged into one legal parcel, or that a parcel merger would not be required, prior to the start of construction (see **APPENDIX LU-1)**.
Local			
Riverside County Comprehensive General Plan – Chapter 3, Land Use Element (Riverside County 2003)	Infrastructure, Public Facilities & Service Provision LU 5.4 - Ensure that development and conservation land uses do not infringe upon existing public utility corridors, including fee owned rights-of-way and permanent easements, whose true land use is that of "public facilities." This policy will ensure that the "public facilities" designation governs over what otherwise may be inferred by the large-scale general plan maps.	YES	The proposed power plant site and transmission line have a land use designation of Public Facilities (PF) in the Riverside County General Plan. Allowed uses in the land use designation include utility facilities such as electric generating stations and corridors (Riverside County 2003). The majority of the eastern portion of the construction laydown area (approximately 2/3 of the site) has a Riverside County General Plan land use designation of RD (Rural Desert), which allows for the development of utility uses (Riverside County 2003). The rights-of-way for the proposed access road and potable water line, as well as a portion of the proposed gas line are designated by the Riverside County General Plan as RD (Rural Desert) and PF (Public Facilities). In addition, according to the Land Use Element, with the projected increase in population, demands on/for community facilities and infrastructure, such as roads, utilities, public safety and schools will increase. The challenge will be to correlate the provision of infrastructure, public facilities and services with these demands. In order to ensure the correlation between growth and service provisions as well as to minimize capital and service costs, the Riverside County Integrated Project (RCIP) Vision dictates that development should only occur where adequate public facilities and services are available or are planned for at the time of development (Riverside County 2003).

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
			The proposed project components in Riverside County would be located in areas designated for electric generation and utility uses, and are consistent with the intent of this policy to ensure adequate provision of infrastructure.
	Land Use Compatibility LU 6.1 - Require land uses to develop in accordance with the General Plan and area plans to ensure compatibility and minimize impacts.	YES	The intent of this policy is to provide guidance regarding compatibility, including reducing negative impacts on adjacent uses and the sensitive siting and design of uses (Riverside County 2003). As described above under Policy LU 5.4, the proposed project and its associated linear facilities that would be located in Riverside County would be sited in areas designated for the development of public facilities and utilities, such as such as electric generating stations and corridors (Riverside County 2003). In addition, as described above under the section entitled **Physical Division of an Existing Community,** the proposed project components located in Riverside County would be in an area primarily dominated by existing utility and energy infrastructure such as wind farms, the SCE's Devers Substation, and several existing high-voltage transmission line rights-of-way connecting to the Devers Substation. The development of the proposed project would be consistent with the General Plan land use designations for the area and would be compatible with the type of existing energy infrastructure in the surrounding area. Therefore, the proposed project would be consistent with this policy.
	Rural LU 17.3 - Ensure that development does not adversely impact the open space and rural character of the surrounding area.	YES	As described above for Policies LU 5.4 and 6.1, the portions of the proposed project and its associated linear facilities that would be located in Riverside County would be sited in areas designated for the development of public facilities and utilities, such as such as electric generating stations and corridors (Riverside County 2003). In addition, the proposed project components located in Riverside County would be in an area primarily dominated by existing utility and energy infrastructure such as wind farms, the SCE's Devers Substation, and several existing high-voltage transmission line rights-of-way connecting to the Devers Substation. Development of the proposed project would be consistent with the General Plan land use designations for the area and would be compatible with the type of existing energy infrastructure land uses in the surrounding area. Therefore, the proposed project would not adversely impact the open space and rural character of the surrounding area, and would be consistent with this policy.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	LU 17.5 – Encourage parcel consolidation	YES (Conditional upon applicant's compliance with Condition of Certification **LAND-1**)	This policy encourages parcel consolidation in rural areas of the county with the RD land use designation. This county policy is implemented by the Riverside County Ordinance 460, Section 18.7 (Merging of Contiguous Parcels), which regulates the division of land in the county. Please see the detailed discussion above under the Subdivision Map Act for a discussion of parcel merger issues related to the project. With implementation of **LAND-1**, the proposed project would be consistent with this policy. It is likely that even if a parcel merger does not occur, a lot tie agreement or a Covenant and Agreement To Hold Property as One Parcel would be in place. As discussed above, by encouraging parcel consolidation, the county's intent is to allow for full development of multiple parcels under one project (i.e., the intent of a parcel merger would be to allow structures to be built on lands where parcel boundaries and setbacks occur for projects with multiple parcels). **LAND-1** ensures that in the case that the county deems that a parcel merger is not required, a county-approved process will be undertaken to ensure that the proposed project lots are tied together and that development limitations are minimized.
	<u>Public Facility Area Plan Land Use Designation</u> LU 25.1 – Accommodate the development of public facilities in areas appropriately designated by the General Plan and area plan land use maps.	YES	Uses within the Public Facilities (PF) land use designation provide essential support services to the county. These uses include airports, landfills, flood control facilities, utilities, schools, and other such facilities. Due to the intense nature of many of these activities, potential conflicts with surrounding land uses can thus occur. The intent of this policy is to provide for adequate public facilities within the county and to ensure compatibility with surrounding land uses (Riverside County 2003). As described above for Policies LU 5.4, 6.1, and 17.3, the proposed project components located within Riverside County would be sited in an area that allows for the development of electric generating stations and corridors such as the proposed power plant and its linear facilities. Therefore, the proposed project is consistent with this policy.
	LU 25.6 – Ensure that development and conservation land uses do not infringe upon existing public utility corridors, including fee owned rights-of-way and permanent easements, whose true land use is that of "public facilities." This policy will ensure	YES	Please see the discussion above for Policy LU 5.4. The proposed project components in Riverside County would be located in areas designated for electric generation and utility uses. Therefore, the proposed project and its associated linear features are consistent with the intent of this policy to ensure adequate provision of public facilities infrastructure.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	that the "public facilities" designation governs over what otherwise may be inferred by the large-scale general plan maps (Note: this is the same policy as LU 5.4, above)		
Riverside County Comprehensive General Plan: Western Coachella Valley Area Plan (Riverside County 2003)	As described in **LAND USE Table 1**, the area plans are an extension of the County of Riverside Comprehensive General Plan and Vision Statement. The land use plan for this specific area plan has the same land use designations as the County's General Plan. The area plans do not include specific policies for the development of utility corridors.	YES	The proposed project falls under the jurisdiction of the Western Coachella Valley Area Plan of Riverside County. The land use plan of this area plan "focuses on preserving the unique features in the Western Coachella Valley area and, at the same time, guides the accommodation of future growth." The land use plan for this specific area plan has the same land use designations as the County's General Plan. See above for discussions of the proposed project's consistency with applicable land use policies of the Riverside County Comprehensive General Plan.
Riverside County Zoning Ordinance: Ordinance 348 (Riverside County 2008a) Article XV: W-2 Zone (Controlled Development Areas)	**Section 15.1 – Uses Permitted in W-2 Zone, Subsection e. Public Utilities Uses:** (2) Structures and the pertinent facilities necessary and incidental to the development and transmission of electrical power and gas such as hydroelectric power plants, booster or conversion plants, transmission lines, pipe lines and the like.	YES	The proposed power plant site and transmission line have a Riverside County zoning designation of W-2 (Controlled Development Area). In addition, portions of the rights-of-way for the proposed access road, potable water line, and gas transmission line are zoned W-2 (Controlled Development Area). Permitted uses within the W-2 zoning designation include structures and the pertinent facilities necessary and incidental to the development and transmission of electrical power (Riverside County 2008a). Therefore, as an electric generating facility, the proposed project and its associated linear features would be consistent with the requirements of the Riverside County Zoning Ordinance pertaining to the W-2 zone. Riverside County provided comments on the Preliminary Staff Assessment on August 27, 2008 (Riverside County 2008b). In their comments, Riverside County confirms that "… [t]he applicant's project is consistent with the land use classification and zoning requirements for W-2" (Riverside County 2008b).
	Section 15.2 - Development Standards, Subsection a. One family residences shall not exceed forty (40") feet in height. No other building or structure shall exceed	YES (Upon Riverside County's review of staff's interpretation of	As described in the **Project Description** section, each of the selective catalytic reduction (SCR) stacks associated with the proposed project's water-injected combustors would be 90 feet tall. In addition, the proposed transmission line structures (i.e., poles) associated with the propose project would range in height from 85 to 115 feet (URS 2007f). According to the

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	fifty (50") feet in height, unless a greater height is approved pursuant to Section 18.34 of this ordinance. In no event, however, shall a building exceed seventy-five (75") feet in height or any other structure exceed one hundred five (105") feet in height, unless a variance is approved pursuant to Section 18.27 of this ordinance.	the zoning code regarding height variances, and agreement with staff's conclusions presented herein, and Upon Riverside County's issuance of a Public Use Permit to CPV Sentinel for the proposed project)	development standards of the county's W-2 zone, "Building" is defined as a structure having a roof supported by columns or walls. "Structure" is defined as anything constructed or erected and the use of which requires more or less permanent location on the ground or attachment to something having a permanent location on the ground, such as awnings and patio covers, but not including walls and fences 6 feet or less in height. The stacks and transmission towers would not qualify as buildings as defined, but would qualify as structures. Therefore, the 105-foot height restriction is applicable rather than the 75-foot height restriction. Chapter 17.196 of the Zoning Ordinance describes the basis, application process, public hearing process, conditions, uses, and revocation of variances. Variances from the terms of Title 17 Zoning may be granted when, because of special circumstances applicable to a parcel of property, including size, shape, topography, location, or surroundings, the strict application of this title deprives such property of privileges enjoyed by other property in the vicinity that is under the same zoning classification (URS 2007b). It should be noted that the proposed transmission line would be sited in an area dominated by several high voltage transmission line corridors with structures taller than 115 feet in height. For example, the Devers-Palo Verde No. 1 500-kV transmission line and the Devers-Valley No. 1 500-kV transmission line structures range in heights from 185 to 250 feet. Both of these lines and numerous other 220-kV transmission lines connect to the adjacent SCE Devers Substation. Therefore, given the predominance of existing high-voltage transmission structures in the immediate vicinity of the proposed project, it is reasonable to assume that Riverside County would issue a variance to CPV Sentinel for siting of the transmission structures but for the Energy Commission's exclusive authority to permit the proposed project and its associated facilities. The applicant has indicated that it will obtain written confirmation from the county regarding this issue (URS 2007b). It should be noted that as of the writing of this analysis, Riverside County has not responded to the applicant's or Energy Commission staff's requests for information regarding this issue. In addition, on November 7, 2007, CPV Sentinel submitted an application for a Public Use Permit to the County of Riverside Planning Department (CPVS 2007c) in an effort to comply with the zoning designation requirements, including height limits. As of the writing of this analysis, Riverside County has not provided its findings related to the Public Use Permit application. Upon Riverside County's issuance of a Public Use Permit to CPV Sentinel for the proposed project), the proposed project would be consistent with this section of the zoning ordinance. In addition, the applicant has indicated that SCE will seek a Certificate of

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
			Public Convenience and Necessity (CPCN) from the CPUC for the proposed transmission line and its connection to SCE's Devers Substation (CPVS 2007a). Pursuant to CEQA, the CPUC will need to consider the environmental undergo environmental review pursuant to CEQA by the CPUC as the lead agency, wherein the impacts of the transmission line will be analyzed in deciding whether to grant the application for a CPCN. The CPUC will be able to rely on this FSA in considering those effects, as the transmission line is addressed in each technical area.
Article XVII: W-E Zone (Wind Energy Resource Zone)	**Section 17.2 – Uses Permitted, Subsection a. Public Utility Uses.** (1) Structures necessary to the conservation and development of water such as dams, pipelines, and pumping facilities; (2) Transmission facilities for gas; (3) Transmission facilities for electricity which are subject to the jurisdiction of the California Public Utilities Commission; (4) Electrical substations; (5) Railroads, including the necessary facilities in connection therewith; (6) Cable television transmission facilities.	YES	The majority of the eastern portion of the construction laydown area (approximately 2/3 of the site) is zoned W-E (Wind Energy Resource). In addition, portions of the rights-of-way for the proposed access road, potable water line, and proposed gas pipeline are zoned W-E (Wind Energy Resource). Public utility uses, such as transmission facilities for electricity and electrical substations are allowed within the W-E zone (Riverside County 2008a). Therefore, the proposed project would be consistent with the requirements of the Riverside County Zoning Ordinance pertaining to the W-E zone.
	Section 17.3 – Development Standards, Subsection a. Height Limits: (1) No commercial WECS shall exceed 500 feet in height. (2) No other building or structure shall exceed 20 feet in height unless a height up to 75 feet for buildings or 400 feet for other structures is specifically permitted under the provisions of Section 18.34 of this ordinance.	YES	There would be no project components (i.e., no stacks or transmission line structures) sited within the W-E zone that would exceed the stated height limits. Therefore, the proposed project would be consistent with development standards for the Riverside County W-E zone.
Article VI: R-1 Zone (One-Family	**Section 6.1. Uses Permitted.** (1) One-family dwellings; (2) Field	YES (Upon Riverside	Portions of the gas pipeline route east of Melissa Lane are within unincorporated Riverside County. One parcel adjacent to the east of the gas

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
Dwellings)	crops, flower and vegetable gardening,…; (3) The noncommercial keeping of horses…; (4) Home Occupations; (5) Keeping/raising of not more than four mature female crowing fowl…; (6) Planned residential developments…; (7) The noncommercial raising of not more than 1 pig…; (8) FFA or 4H projects…; (9) The outside storage of materials…	County's issuance of a Public Use Permit to CPV Energy for the proposed project)	pipeline is zoned R-1 (One-Family Dwelling). But for the Energy Commissions exclusive authority to permit the proposed project and its associated facilities, installation of a gas pipeline would require a Public Use Permit from Riverside County in the R-1 zoning district. On November 7, 2007, CPV Energy submitted an application for a Public Use Permit to the County of Riverside Planning Department (CPVS 2007c) in an effort to comply with the R-1 zoning designation requirements. As of the writing of this analysis, Riverside County has not provided its findings related to the applicant's Public Use Permit application for the proposed project.
City of Palm Springs General Plan – Land Use Element (Palm Springs 2007a)	LU1.1 Ensure that development meets or exceeds requirements and standards specified within each land use designation.	YES (Upon the City of Palm Spring's provision of conditions that would normally be included in the Conditional Use Permit to allow for development of energy uses such as the proposed project)	The western 1/3 portion of the construction laydown area is located within the boundaries of the City of Palm Springs. The temporary storage of vehicles, and construction equipment and materials is the proposed use for the construction laydown area. The western 1/3 portion of the construction laydown area has a Palm Springs General Plan land use designation of I (Industrial) with a "Wind Energy Overlay." Industrial uses typically include research and development parks, light manufacturing, laboratories, and industrial services (Palm Springs 2007a). Wind Energy Conversion Systems (WECS) are permitted in areas designated with the Wind Energy Overlay classification. These areas are predominantly located within areas designated as Desert, Industrial, or Open Space–Water on the Palm Springs General Plan Land Use map (Palm Springs 2007a). The portion of the construction laydown located within the City of Palm Springs has a zoning designation of E-I (Energy Industrial). Storage of materials, machinery, trucks, and other vehicles are permitted uses in this zoning district (see below for a discussion of consistency with the city's zoning code). Portions of the gas pipeline route (east of Melissa Lane) are adjacent to areas primarily designated by Palm Springs as Industrial (I) with Wind Energy Overlay and zoned Energy Industrial (E-I) and Manufacturing (M-2). The E-I zone allows energy uses with a Conditional Use Permit and industrial uses are permitted in the M-2 zoning district (Palm Springs 2007b). The proposed recycled water pipeline right-of-way is designated Very Low Residential or Medium Density Residential by the Palm Springs General Plan, and is included in the R-1-C (Single Family Residential) or the R-2 (Limited Multiple) zoning districts. Development of portions of the construction laydown area and portions of the gas pipeline in the E-I zone would normally require a Conditional Use Permit, if the city were the

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
			permitting authority for the project. However, given the Energy Commission's exclusive authority to permit the project and its associated facilities, Energy Commission staff requested that the City of Palm Springs provide the conditions that they would normally include into the Conditional Use Permit for incorporation into this Staff Assessment. However, as of the writing of this analysis, the city has not responded to staff's requests for conditions. It should be noted that the activities associated with the construction laydown area, the gas pipeline, and recycled water pipeline would be temporary construction-related activities. Upon completion of construction, the construction laydown area would not be used for project-related storage of construction equipment and materials. In addition, upon completion of the construction of the gas pipeline and recycled water pipeline, no permanent land use changes would occur, because both pipelines would be underground and therefore would not be incompatible with existing land uses. The proposed recycled water pipeline would be placed underground, and is intended to reduce freshwater pumping by Palm Springs National Golf Course. Therefore, given these factors it is reasonable to assume that the city would likely issue a Conditional Use Permit for development of the proposed project components within Palm Springs' boundaries.
	LU3.2 Promote opportunities for expansion and revitalization of industrial uses within the City.	YES	As an electrical generating station with associated linear features, the proposed project is an industrial, public facility/utility land use type. In addition, the permanent proposed project features within the city only include portions of the underground gas pipeline, and the recycled water pipeline. Neither of these components would be incompatible with existing uses in the area. Therefore, development of the proposed project would be consistent with this policy.
City of Palm Springs Zoning Ordinance, Chapter 92.00 Zoning Regulations (Palm Springs 2007b)	**Section 92.17.2.00, "E-I" energy industrial zone.** The "E-I" energy industrial zone is intended to provide areas for alternative energy development and limited industrial uses in those areas which by virtue of strong prevailing winds are ideally suited for large-scale development of wind energy. Alternative energy development is	YES (Upon the City of Palm Spring's provision of conditions that would normally be included in the Conditional Use Permit to allow for development	The portion of the construction laydown area located within the City of Palm Springs has a zoning designation of E-I (Energy Industrial). In addition, portions of the gas pipeline route (east of Melissa Lane) are adjacent to areas zoned E-I (Energy Industrial). The E-I zone allows energy uses with a Conditional Use Permit (Palm Springs 2007b). As discussed above under the city's General Plan Policy LU1.1, development of portions of the construction laydown area and portions of the gas pipeline in the E-I zone would normally require a Conditional Use Permit, if the city were the permitting authority for the project. However, given that Energy Commission's exclusive authority to permit the project

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	intended as the principal land use, with the permitted industrial uses serviced directly, and primarily, by alternative energy for electrical needs. The retention of open space is encouraged. No industrial use shall be permitted which, by the nature of its development or operation, will in any way adversely affect the resort environment of the city. (Ord. 1447 (part), 1993): • § 92.17.2.01 Uses permitted, Subsection C (Uses Permitted by Land Use Permit.). The following uses may be permitted subject to approval of a conditional use permit, as provided in Section 94.02.00: Acid and abrasives manufacturing; Animal hospitals, shelters or kennels; Brewery, distillery or winery; Chemical plating shop; Concrete batch plants and asphalt plants; Disposal service operations; Energy Use.	of energy uses such as the proposed project)	and its associated facilities, Energy Commission staff requested that the City of Palm Springs provide the conditions that they would normally include in the Conditional Use Permit for incorporation into this Staff Assessment. However, as of the writing of this analysis, the city has not responded to staff's requests for conditions. It should be noted that the activities associated with the construction laydown area and the gas pipeline would be temporary construction-related activities. Upon completion of construction, the construction laydown area would not be used for project-related storage of construction equipment and materials. In addition, upon completion of the construction of the gas pipeline, no permanent land use changes would occur, because the pipelines would be underground in existing road and utility rights-of-way, and therefore would not be incompatible with existing land uses. Therefore, absent input from the City of Palm Springs regarding specific conditions, it is reasonable to assume that the city would likely issue a Conditional Use Permit for development of the proposed project components within Palm Springs' boundaries.
	Section 92.17.1.00 "M-2" manufacturing zone. The "M-2" manufacturing zone is intended to provide for the development of industrial uses which include fabrication, manufacturing, assembly or processing which do not in their maintenance, assembly, manufacture or plant operation create by-products to any degree which will adversely	YES	Portions of the gas pipeline route (east of Melissa Lane) are adjacent to areas zoned M-2 (Manufacturing). Industrial uses are permitted in the M-2 zoning district (Palm Springs 2007b). An underground gas pipeline is considered an industrial public facility/utility. Therefore, development of the proposed gas pipeline would be consistent with the City of Palm Springs M-2 zone requirements. An underground pipeline would not adversely affect the resort-open space environment of the city, because upon completion of construction, it would not result in any permanent changes to existing land uses.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	affect the resort-open space environment of the city. (Ord. 1447 (part), 1993): • § 92.17.1.01 Uses permitted, Subsection D (Uses Permitted by Conditional Use Permit.). The following uses may be permitted subject to approval of a conditional use permit, as provided in Section 94.02.00: Uses permitted by conditional use permit in the "M-I-P" and "M-1" zones; Acid and abrasives manufacturing; Ambulance services, and accessory uses; Bail bond offices; Brewery, distillery or winery; Check cashing facilities; Concrete batch plants and asphalt plants; Disposal service operations; Energy Uses.		
	Section 92.03.00 "R-2" limited multiple-family residential zone. The R-2 zone is intended to provide for the development of medium-density multiple-family residential uses. (Ord. 1294 (part), 1988): • § 92.03.01 Uses permitted, Subsection B (Similar Uses Permitted by Commission Determination). The commission may, by resolution of record, permit any other uses which it may determine to be similar to those listed above and not more obnoxious or detrimental to the public health,	YES	As part of its water supply plan, the applicant has entered into Conservation Agreements with the Desert Water Agency (DWA). The details of the water supply plan are provided in the **Project Description** section. In the case of the freshwater Conservation Agreement, the applicant would fund the installation of a recycled water pipeline to serve the Palm Springs National Golf Course which currently uses fresh water from private groundwater wells for irrigation purposes. The new recycled water pipeline would consist of approximately 900 feet of 12-inch pipeline extending from an existing DWA service main located along South Murray Canyon Drive in Palm Springs. The recycled water pipeline would connect to an existing water feature at the golf course, which serves as a storage reservoir for the irrigation system at the golf course property. The new pipeline would be constructed within the existing street right-of-way and the golf course property (LW 2008a). The recycled water pipeline would be constructed within the South Murray Canyon Drive right-of-way and two parcels of Alloted Trust Land, within the golf course, held by the Agua Caliente Band of Cahuilla Indians (Tribe). The golf course has site control over these parcels through a long-term lease

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
	safety and welfare or to other uses permitted in the zone, as provided in Section 94.01.00. All uses shall be subject to the standards in Section 92.03.03. **Section 92.01.00 "R-1" single-family residential zones.** Five (5) single-family residential zones (R-1-AH, R-1-A, R-1-B, R-1-C, R-1-D) have been established to provide a variety of low-density housing types and neighborhoods. Development standards are designed to provide protection and enhancement of the natural and urban setting consistent with the goals of the general plan. (Ord. 1294 (part), 1988): Subsection B (Similar Uses Permitted by Commission Determination). The commission may, by resolution of record, permit any other uses which it may determine to be similar to those listed above and not more obnoxious or detrimental to the public health, safety and welfare or to other uses permitted in the zone, as provided in Section 94.01.00. All uses shall be subject to the standards in Section 92.03.03.		from the Agua Caliente Development Authority through the year 2031, with an option to extend. The Tribe and the City of Palm Springs came to an agreement in the 1970s specifying that the city's land use regulations would be imposed over Indian Trust Lands. The City of Palm Springs has zoned the two Palm Springs National Golf Course parcels as "Indian Land" and has included them within the Open Space–Parks/Recreation designation on the General Plan land use map. It should be noted that the city's zoning code does not provide a specific definition for permitted uses within "Indian Land" zones. Land designated as Open Space–Parks/Recreation is intended to be used for active recreational uses such as regional, local, and neighborhood parks, community centers, public and private golf courses, and any recreational facility operated by a public or quasi-public agency. The proposed recycled water pipeline right-of-way traverses areas included in the R-1-C (Single Family Residential) or the R-2 (Limited Multiple) zoning districts. It should be noted that the intent of recycled water pipeline is to reduce freshwater pumping by Palm Springs National Golf Course, which is a community recreational resource. Therefore, the recycled water pipeline would be consistent with land use and zoning designations of the golf course. In addition the pipeline would be located within existing road rights-of-way. Therefore, once the pipeline is constructed, it would not result in any permanent changes to or conflicts with the existing land uses, City of Palm Springs zoning district provisions, or City of Palm Springs General Plan land use designations. The project would not require a conditional use permit from the City of Palm Springs. Required permit approvals would be limited to an encroachment permit from City of Palm Springs for construction (LW 2008a).
City of Desert Hot Springs[3]	The proposed project is not within the jurisdictional boundaries of the City of Desert Hot Springs, but is	YES (The city of Desert Hot	While the proposed project site and portions of associated facilities are within the City of Desert Hot Springs Sphere-of-Influence (SOI), they remain outside of the city's jurisdiction, and in the jurisdiction of Riverside County.

[3] The proposed power plant site, and portions of the construction laydown area and project-related linear features are located within the boundaries of unincorporated Riverside County and are not subject to land use LORS of the City of Desert Hot Springs.

Applicable LORS	Description of Applicable LORS	Consistent?	Basis for Consistency
General Plan and Zoning Ordinance (Desert Hot Springs (2000a and 2000b)	located in the city's Sphere-of-Influence (SOI) in unincorporated Riverside County. The city's SOI includes County managed lands over which the city has an advisory role.	Springs does not have jurisdiction in SOI areas until they are annexed)	Staff recognizes the overlap between the city and the county. Due to the proximity of the project to the City of Desert Hot Springs, Energy Commission staff has reviewed the city's General Plan. However, the proposed project has not been analyzed for LORS consistency with the city's General plan, because the site is located in Riverside County, and the county's jurisdiction therefore takes precedence over the city's SOI. While the proposed power plant site and portions of the construction laydown area are within the city's SOI, since no annexation has occurred, these areas are currently within the county's jurisdiction. The proposed power plant site and portions of the construction laydown area are within Riverside County, and the project would be in the county's jurisdiction but for the Energy Commission's lead agency status.
Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Plan[4]	The Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Plan (MSHCP/NCP) is a comprehensive, multi-jurisdictional plan focusing on the conservation of federal and State-listed species, other rare and sensitive species, and their habitats. The MSHCP/NCP satisfies the legal requirements for the issuance of permits that will allow the take of species covered by the plan in the course of otherwise lawful activities.	YES	The LORS consistency analysis in the **Biological Resources** section provides a detailed discussion of the proposed CVP Sentinel's compliance with the MSHCP/NCP. The proposed project would be in compliance with the MSHCP/NCP requirements with implementation of Condition of Certification **BIO-13**.

[4] The **Biological Resources** section addresses consistency with the MSHCP/NCP.

Land Use Compatibility

Land use compatibility refers to the physical compatibility of planned and existing land uses. Administrative or conditional use permitting requirements (see detailed discussion in **LAND USE Table 2** above) and project reviews under CEQA are in place to evaluate the compatibility of projects that are not a permitted use or that have elements that may adversely impact public safety, the environment, or that could interfere with or unduly restrict existing and/or future permitted uses. As noted in the discussions above under the section entitled **Physical Disruption or Division of an Established Community** and in **LAND USE Table 2**, development of the proposed project and its linear facilities are compatible with existing surrounding land uses, because the proposed project (except the recycled water pipeline) is located in an area primarily dominated by utility and energy infrastructure such as wind farms, the SCE's Devers Substation, and several existing high-voltage transmission line rights-of-way connecting to the Devers Substation. In addition, the intent of recycled water pipeline is to reduce freshwater pumping by Palm Springs National Golf Course, which is a community recreational resource. Therefore, the recycled water pipeline would be consistent with land use and zoning designations of the golf course. The recycled water pipeline would be located within existing road rights-of-way, and once constructed, would not result in any permanent changes to, or conflicts with, the existing land uses, City of Palm Springs zoning district provisions, or City of Palm Springs General Plan land use designations.

Sensitive Receptors

A proposed siting location may be considered inappropriate if a new source of pollution or hazard is located within close proximity to a sensitive receptor. From a land use perspective, sensitive receptor sites are those locations where people who would be more adversely affected by pollutants, toxins, noise, dust, or other project-related consequence or activity are likely to live or gather. Children, those who are ill or immune-compromised, and the elderly are generally considered more at risk from environmental pollutants. Therefore, schools, along with day-care facilities, hospitals, nursing homes, and residential areas, are considered to be sensitive receptor sites for the purposes of determining a potentially significant environmental impact. Depending on the applicable code, close proximity is defined as "within 1000 feet" of a school (California Health & Safety Code §§42301.6–9) or within 0.25 miles of a sensitive receptor. Proximity is not necessarily the deciding factor for a potentially significant impact, but is the threshold generally used to require further evaluation.

The area surrounding the power plant is primarily dominated by wind farms to the north, east, and south of the proposed power plant site, as well as the SCE Devers Substation to the west and transmission line corridors to the south. The closest residence is located approximately 330 feet to the east of the power plant site. The next closest residences are located 340 feet to the south and approximately 660 feet to the east of the power plant site. Residential properties are also located approximately 2,600 feet southwest of the power plant site. No other sensitive receptors (childcare facilities, schools, hospitals, libraries, or churches) were identified within a two-mile radius of the proposed power plant site. Existing land uses within one mile of the proposed project site and 0.25 miles of the proposed linear rights-of-way (natural gas pipeline, transmission line, potable water line, and access road) include: Rural to High-Density Residential, Commercial, Industrial, Public Facilities And Institutions, Transportation and Utilities, and Vacant

Land. There are scattered rural residences located in the areas designated Estate Residential areas and Rural Desert. Land within a 0.25-mile radius of the proposed recycled water pipeline is primarily used for residential uses and open space (golf courses and related facilities). The nearest sensitive receptors to the proposed recycled water pipeline are golf course patrons and residences located directly west of the proposed pipeline corridor (LW 2008a).

Given the existing permitted uses surrounding the proposed project, and the fact that the proposed project and its associated facilities are consistent with local LORS (which are developed by local jurisdictions to mitigate impacts of planned development), the proposed project would not be considered an incompatible land use with the surrounding and nearby uses, including sensitive receptors.

Although from a land use perspective, the siting of the power plant at the proposed location is not incompatible with nearby surrounding sensitive receptors, these sensitive receptors may experience project-related nuisance impacts such as construction-generated noise, dust, and traffic and operation-related public health impacts. The **Air Quality, Hazardous Materials Management, Noise, Public Health, Traffic and Transportation,** and **Visual Resources** sections provide detailed analyses of the noise, dust, public health hazards or nuisance, and adverse traffic or visual impacts on surrounding sensitive receptors such as residential uses.

Based on analyses cited in **LAND USE Table 2** (above) and other sections of this document, and considering the zoning and land use designations for the proposed project site, linear facilities, and surrounding locations, the proposed project would not result in a significant project-related impact at any sensitive receptor location.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CCR 2006, §15065[A][3]).

Plans and projections, such as those found in General Plans and other planning documents, provide insight into longer-term expectations regarding development. These are informative to the cumulative analysis even though specific projects are not necessarily identified. Due to the ongoing and intense level of development in the region (i.e., Riverside County), General Plans and their projections provide a particularly useful method of analyzing the cumulative impacts of a project because these types of planning documents provide the general outlook for development in a particular jurisdiction. This approach is the preferred method of Riverside County (Riverside County 2007). According to the Riverside County General Plan, the population of Riverside County is expected to nearly double between the years 2000 and 2020, growing by 1.4 million people.

As noted in the AFC Appendix L (Discretionary Reviews Performed Within the Past 18 Months), within a 10-mile radius of the proposed CVP Sentinel site, there are hundreds of planned and approved projects, along with projects pending application approval or that are currently under construction. These are mostly residential development projects, with some commercial, light industrial, and institutional developments.

Projects listed in AFC Appendix L that are under construction or that have been approved by the planning agency responsible for their jurisdiction have, by nature of their approval, complied with the land use plans, policies and regulations applicable to the project. Projects listed that have not been approved have the potential to conflict with applicable plans, policies, and regulations. However, in order for these projects to be approved, they would need to conform to these plans, policies, and regulations. The proposed project, similarly, would comply with all applicable land use plans, policies, and regulations and so would not contribute to any cumulative conflicts.

The area in the vicinity of the proposed power plant site is essentially dominated by similar utility development such as the SCE Devers Substation, numerous transmission lines, and wind farm development. The proposed CVP Sentinel project would represent a similar land use type to adjacent uses. The proposed project would not require a General Plan amendment, zoning amendment, or other changes or concessions that would alter the development standards, availability of permits, or use of the project site or surrounding properties.

The proposed project would not make a significant contribution to regional impacts related to new development and growth. The project is planned to serve the existing and anticipated electrical needs of the growing population in the project area by connecting to existing electric system and other utility infrastructure. The land use effects of the proposed project in combination with past, present, and reasonably foreseeable projects in the area would not be cumulatively considerable. Therefore, the project’s contribution to cumulative land use impacts would not be cumulatively considerable. Even though low-income and minority populations exist in the immediate project area, staff has not identified any significant unmitigated adverse land use impacts with the proposed project or cumulative impacts; therefore, no significant adverse impacts to minority or low-income populations are expected to occur.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comments were provided in writing on the contents of the PSA by agencies and the applicant. Comments related to issues presented in the **Land Use** section of the PSA are summarized below. Each comment is followed by a response.

AGENCY COMMENTS ON THE PSA

County of Riverside, Planning Department

On August 27, 2008, the County of Riverside Planning Department provided written comments on the Preliminary Staff Assessment (Riverside County 2008b). In their comments, the county confirms staff’s conclusions in the **Land Use** section. According to the county, “…[t]he land use designation for this project is Public Facilities within the W-2 "Controlled Development Area" zone, which allows structures and facilities necessary and incidental to the development and transmission of electrical power and gas. The applicant's project is consistent with the land use classification and zoning requirements for W-2" (Riverside County 2008b).

Response: Text has been added to appropriate portions of the **Land Use** Section of the FSA to reflect Riverside County's confirmation of staff's analysis of land use impacts.

California Public Utilities Commission

On September 23, 2008, the California Public Utilities Commission (CPUC) provided comments on the Land Use PSA in tabular format. The CPUC's comments on PSA Section 4.5 (Land Use) included the following two questions:

- Is the relocation of the two transmission lines included in the project impact assessment on land use? It is not included on the list on 4.5-5 of the PSA.
- Has the right-of-way been secured for the project-associated relocation of the two transmission lines?

Response: The Land Use analysis is based on project-related information (i.e., project description and components as proposed by the applicant) provided by CPV Sentinel in the AFC (and its supplements) filed with the California Energy Commission. The project-related electrical transmission line is described several times in the **SETTING** section as follows:

- On PSA Page 4.5-4;
- Page 4.5-5 under the section entitled Power Plant Site; and
- As the third item on the list of Other Project-Related Features and Facilities section. In addition, relevant discussions of the project-related transmission lines are provided on pages 4.5-6.

In addition, as discussed in detail under the PSA **Land Use** section entitled **ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION,** it is currently anticipated that SCE will execute contracts with CPV Sentinel, LLC under which SCE will be responsible for final design, engineering, construction, ownership, operation, and maintenance of the transmission line connections to the Devers Substation. SCE will seek a Certificate of Public Convenience and Necessity (CPCN) from the California Public Utilities Commission (CPUC) for the transmission line. SCE's CPCN application to the CPUC will be subject to environmental review pursuant to CEQA, although the CPUC will rely on the analysis provided in this FSA.

As described in the **Transmission System Engineering** section, to accommodate termination of the proposed interconnecting transmission line at the SCE Devers Substation 230 kV bus, the existing SCE Devers-Coachella 230 kV Transmission Line and Devers-Vista #1 Transmission Line outlets and their terminations would be relocated to adjacent switch bays located at the Devers Substation. All activities associated with relocation of these two SCE transmission lines would occur within the boundaries of the existing Devers Substation on lands owned by SCE, and no transmission line rights-of-way or poles associated with these two existing SCE lines outside of the Devers Substation would be altered as a result of the proposed project.

Therefore, there would be no land use impacts, given the industrial nature of the Devers Substation and similar existing on-site uses associated with electric transmission lines and associated connections. In addition, given that all activities would occur within SCE-owned lands, no new rights-of-way would need to be secured for the project-associated relocation of the two transmission lines, and no impacts would occur.

APPLICANT COMMENTS ON THE PSA

On August 21, 2008, the applicant (CPV Energy, LLC) provided minor written comments on PSA Section 4.5 (Land Use) in tabular format. These comments were limited to a correction to the length of the proposed transmission line from 3,250 feet (as described in the AFC) to 2,300 feet. In addition, the applicant has indicated that the vacant dwelling unit and detached garage that were described as being located on the project site in the AFC, were both demolished in January 2008.

Response: Text in the **Land Use** Section of the FSA has been revised as appropriate to reflect the applicant's comments and corrections.

On September 16, 2008, Latham & Watkins, LLP, legal counsel to the applicant, provided additional information regarding the proposed project. In the **Land Use** section of the PSA, staff stated that the proposed project would be compliant with the Subdivision Map Act and Riverside County General Plan policy LU 17.5 upon Riverside County's approval of CPV Sentinel's parcel merger application. This conclusion was based on information received from the applicant throughout the staff assessment process wherein the applicant indicated its intention to merge the three parcels that make up the proposed project site. In the September 16, 2008 letter, the applicant's legal counsel stated the following:

> The CPV Sentinel Energy Project site consists of three separate Assessor's Parcel Numbers (APNs) (668-130-005,668-130-007, and 668-140-001). As indicated in the Application for Certification, Applicant had anticipated merging the parcels by obtaining a Certificate of Parcel Merger with the Riverside County Planning Department. The Preliminary Staff Assessment concluded that the proposed CPV Sentinel Project would be in compliance with the Subdivision Map Act after recording the merger with the County Recorder.
>
> Applicant subsequently has learned that, due to complicated ownership structures, a parcel merger poses a number of difficulties including complex tax implications. Applicant would like to maintain separate parcels but record a lot tie agreement, or a Covenant and Agreement To Hold Property as One Parcel, among the parcels. Such agreements, which typically are executed for the purpose of creating a single building site, require the parcel owners to covenant with the County that the real property at issue shall be held as one parcel and no portion shall be sold separately. The covenant runs with the land and is binding upon the current owners, future owners, encumbrances, successors, heirs or assignees, and continues in effect until released by the authority of the County upon request and evidence that the agreement is no longer required by law.

Response: Subsequent to receipt of this letter, Energy Commission staff contacted the Riverside County Planning Department to obtain their input regarding the applicant's request stated above. Based on verbal conversations with the Riverside County Planning Department, the county has indicated that the Riverside County as a matter of practice requires a certificate of parcel merger for projects with multiple parcels. In some cases, the county allows projects to be built on multiple lots. However, this places many constraints on the use of the properties. Specifically, if multiple parcels are not merged, then the project developer is required to comply with the specific setback requirements for the specific zone. This means that no structures or facilities can be built on top of actual parcel boundaries, and lands that are within the setback areas cannot be used. The County requires a certificate of parcel merger as a matter of convenience for the project applicant so that they can make full use of their properties. In addition, the county has stated, "[b]ecause this matter involves a legal issue of the insufficiency of a certified parcel merger, which the applicant wants to resolve with a "lot tie agreement" and covenant agreement with the County of Riverside," they require additional time for the Planning Department management and the county legal counsel to review the matter (Riverside County 2008c).

As such, staff has incorporated Condition of Certification **LAND-1** to ensure that the proposed project parcels are merged into one legal parcel, or that a parcel merger is not required, prior to the start of construction (see **APPENDIX LU-1**).

Staff has revised text in the **Land Use** section (see discussion in **LAND USE Table 2)**, as appropriate, to address the incorporation of **LAND-1.**

CONCLUSIONS AND RECOMMENDATIONS

- The proposed project would not result in conversion of any Farmland (as classified by the FMMP) to non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts.
- The proposed project would not disrupt or divide the physical arrangement of an established community.
- As discussed in the **Biological Resources** section, the proposed project is consistent with the Coachella Valley Multiple Species MSHCP/NCP with implementation of Condition of Certification **BIO-13**.
- In general, Energy Commission staff believes that the project is consistent with the current development pattern for the area established by the Riverside County General Plan and Zoning Code, and the City of Palm Springs General Plan and Zoning Code. Certain project components would require Riverside County and the City of Palm Springs to issue a Public Use Permit or Conditional Use Permit (see discussion in **LAND USE Table 2**) for compliance with local LORS, but for the Energy Commission's exclusive authority to permit the proposed project. As part of staff's analysis of local LORS compliance, and specifically to determine the views of Riverside County and the City of Palm Springs on the project's consistency with their respective General Plans and zoning codes, staff sent letters to both agencies on September 13, 2007. Letters were sent to the planning departments of Riverside County and the City of Palm Springs, detailing the LORS compliance issues

associated with the proposed CVP Sentinel (CEC 2007b; CEC 2007c). Staff requested both agencies to provide the conditions for any Conditional Use Permit, Public Use Permits, and or variances that they would attach to the proposed project, were they the permitting agencies. As of the writing of this analysis, the City of Palm Springs has not provided input regarding conditions that they would place on the project or their findings. Riverside County has provided comments on the PSA, and concurs with staff that the proposed project is consistent with county land use and zoning requirements (Riverside County 2008b). In addition, staff is proposing Condition of Certification **LAND-1** to ensure that the proposed project parcels are merged into one legal parcel, or that a parcel merger is not required, prior to the start of construction. The applicant is in coordination with both affected local agencies, and staff believes that project-related issues will be resolved prior to project approval by the Energy Commission.

- The proposed project would not be incompatible with existing on-site or nearby uses, as it is consistent with the general character of these permitted uses and the planned development pattern for the area.
- The proposed project's cumulative land use impacts would be less than significant.

PROPOSED CONDITION OF CERTIFICATION

LAND-1 The project owner shall comply with the Subdivision Map Act (Pub. Resources Code Section 66410-66499.58) by either adjusting the boundaries of all parcels or portions of parcels that constitute the CPV Sentinel Energy project site (as necessary) to merge all properties into a single legal parcel, within the County of Riverside jurisdiction, in accordance with provisions and procedures set forth in the County of Riverside Ordinance 460 (Regulating the Division of Land of the County of Riverside), Section 18.7 (Merging of Contiguous Parcels), or by obtaining the County of Riverside's written approval that its proposal to record a lot-tie agreement is acceptable.

Verification: At least 30 days prior to construction of the CPV Sentinel Energy Project, the project owner shall submit evidence to the CPM, indicating approval of the merger of parcels by the County of Riverside, or written the written approval of the County of Riverside documenting another process to tie project lots together and that is acceptable to the county. 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 county. 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. A copy of the recorded deed shall be submitted to the CPM, as part of the compliance package.

REFERENCES

CCR 2006. California Code of Regulations, Title 14, Chapter 3 (CEQA Guidelines), §§15000-15387, as amended July 11, 2006.

CCR 2008. California Code of Regulations, Health & Safety Code, §§42301.6-42301.9. Site accessed at: http://www.leginfo.ca.gov/cgibin/displaycode?section=hsc&group=42001-43000&file=42300-42316. February 7, 2008.

CEC 2007b. California Energy Commission / P. Richins (tn: 42277). CEC Letter to City of Palm Springs Planning Department Director. Dated on 9/13/2007. Submitted to CEC/Docket Unit on 9/13/2007.

CEC 2007c. California Energy Commission / P. Richins (tn: 42278). CEC Letter to Principal Planner of the Riverside County Office of Planning. Dated on 9/13/2007. Submitted to CEC/Docket Unit on 9/13/2007.

CPVS 2007a. CPV Sentinel, LLC / D. Shileikis (tn: 41166). CPV Sentinel Application for Certification – Volume 1, 2, & 3. Dated June25, 2007. Submitted to CEC/Docket Unit on June 25, 2007.

CPVS 2007c. CPV Sentinel, LLC / Public Use Permit Application for the CPV Sentinel Energy Project, submitted to Riverside County Transportation and Land Management Agency, Planning Department on November 7, 2007.

Desert Hot Springs 2000a. City of Desert Hot Springs Comprehensive General Plan. Adopted September 5, 2000.

Desert Hot Springs 2000b. City of Desert Hot Zoning Ordinance: Design Guidelines and Subdivision Ordinance. October 3, 2000.

GOPR 2003. State of California, Governor's Office of Planning and Research. A Guide To The LAFCO Process For Incorporations. October, 2003.

LW 2008a. Latham & Watkins LLP / P. Kihm (tn: 45406). AFC Supplement: Revised Water Supply Plan. Dated on February 19, 2008. Submitted to CEC/Docket Unit on February 19, 2008.

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.

Palm Springs 2007a. City of Palm Springs General Plan. Adopted October 2007.

Palm Springs 2007b. City of Palm Springs Municipal Code: Zoning Ordinance, Title 9, Planning. Current through Ordinance 1727 and the December 2007 code supplement.

Riverside County 2003. Riverside County Integrated Project 2002 General Plan. Approved and adopted by the Board of Supervisors of the County of Riverside; October 2003.

Riverside County 2008a. Ordinance 348: Land Use Ordinance (Article I) of Riverside County, Amended through Ordinance No. 348.4481; March 26, 2008.

Riverside County 2008b. *Riverside County Planning Department - Response to Request for Agency Comments on the Preliminary Staff Assessment for the CPV Sentinel Energy Project (07-AFC-3). dated August 11, 2008; also reference Public Use Permit No. 897 (County of Riverside).* August 27, 2008.

Riverside County 2008c. E-mail communication between staff Land Use Specialist, Negar Vahidi, and Riverside County Planner, Judith Deertrack re: PUP897- CPV Sentinel Energy (i.e., applicant's request for a lot-tie). Dated 09/25/2008, 11:29 a.m.

Riverside County. 2007. Personal communication via telephone and email between Adam Rush, Principal Planner, Riverside County Planning Department, and Jennifer Lancaster of Aspen Environmental Group. August 27.

URS 2007f. URS / D. Shileikis (tn: 43227). Responses to Data Requests. Dated on 11/5/2007. Submitted to CEC/Docket Unit on 11/5/2007.

APPENDIX LU-1

STAFF'S REPORT OF CONVERSATION WITH RIVERSIDE COUNTY RE: PROPOSED PROJECT SITE PARCEL MERGER ISSUES

ATTACHED

Energy Facilities Siting and Environmental Protection Division

			FILE: 07-AFC-3		
			PROJECT TITLE: CPV Sentinel Energy Project		
☒ **Telephone**	760-863-8277		☐ **Meeting Location:**		
NAME:	Paul Clark, Planning Director, Riverside County	**DATE:**	10-01-08	**TIME:**	9:45 a.m.
WITH:	Negar Vahidi, Land Use Technical Specialist, Aspen Environmental Group				
SUBJECT:	Parcel merger issues related to proposed project site				

COMMENTS:

Paul Clark returned my phone call regarding our inquiry about the Sentinel parcel merger issue and the Latham & Watkins (L&W) letter sent to the CEC regarding the applicant's request to not merge the parcels. Paul had the following points to make:

- It must first be determined whether, or not, the three parcels in and of themselves are each legal recorded lots. This is the simplest thing to determine for the applicant and can be done by pulling the title records for each parcel/lot or checking with the County.
- Regarding the applicant's request in the L&W letter, in his 30 years in planning he's never seen such a request. He considers the applicants request highly irregular.
- If the project lots/parcels are not legal, they must first be legalized. Then, it can be decided by the County if a Certificate of Parcel Merger is necessary or some other procedure can be implemented to help with development restrictions such as lot boundaries and setbacks.
- There are other ways of tying lots together (e.g., lot line adjustment, etc.). But, first, their legality must be determined.
- He recommends a Condition of Certification to make sure the applicant complies with the Subdivision Map Act and County Regulations on parcel mergers. He agrees with our approach to the way we have the CoC right now.
- He highly recommends the applicant to contact him directly ASAP and set up and appointment to discuss this issue and begin the process of trying to resolve this issue prior to start of project construction.

cc: John Kessler, CEC Siting PM Caryn Holmes, CEC Legal Counsel Dale Edwards/Paula David, Env Prot Off.	**Signed:** **Name**: Negar Vahidi

NOISE AND VIBRATION

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

California Energy Commission staff concludes that the CPV Sentinel Energy Project can be built and operated in compliance with all applicable noise and vibration laws, ordinances, regulations, and standards and, if built in accordance with the conditions of certification proposed below, would produce no significant adverse noise impacts on sensitive receptors, either direct, indirect, or cumulative.

INTRODUCTION

The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices, such as blasting or pile driving. The groundborne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the CPV Sentinel Energy Project (CPV Sentinel) and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable laws, ordinances, regulations, and standards (LORS) and to avoid creation of significant adverse noise or vibration impacts. For an explanation of technical terms and acronyms employed in this section, please refer to **NOISE Appendix A** immediately following.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

NOISE Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure.
State (Cal/OSHA): Cal. Code Regs., tit. 8, §§ 5095–5099	Protects workers from the effects of occupational noise exposure.
Local Riverside County General Plan Noise Element	Establishes residential noise exposure levels of 60 dBA L_{dn} or CNEL as normally acceptable and 65 dBA L_{dn} or CNEL as conditionally acceptable. Limits residential noise exposure to 65 dBA L_{eq} daytime, 45 dBA L_{eq} nighttime.
Riverside County Code, §§ 9.52.020H, 9.52.020I	Limits the hours of construction within one-quarter mile of any inhabited dwelling.
Riverside County Code, § 9.52.040	Limits noise at property lines of occupied property to 65 dB L_{max} daytime, 45 dB L_{max} nighttime.

FEDERAL

Under the Occupational Safety and Health Act of 1970 (29 USC § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure (29 CFR § 1910.95). These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **NOISE Appendix A, Table A4** immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

There are no federal laws governing off-site (community) noise.

The only guidance available for evaluation of power plant vibration is guidelines published by the Federal Transit Administration (FTA) for assessing the impacts of groundborne vibration associated with construction of rail projects. These guidelines have been applied by other jurisdictions to assess groundborne vibration of other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from groundborne vibration. The FTA measure of the threshold of perception is 65 VdB,[1] which correlates to a peak particle velocity of about 0.002 inches per second (in/sec).

[1] VdB is the common measure of vibration energy.

The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

STATE

California Government Code section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its General Plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure.

The California Occupational Safety and Health Administration (Cal/OSHA) has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, §§ 5095–5099) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards (see the **Worker Safety and Fire Protection** section of this document, and **NOISE Appendix A, Table A4**).

LOCAL

Riverside County General Plan Noise Element

Chapter 7 of the Riverside County General Plan is the Noise Element. Table N-1, entitled "Land Use Compatibility for Community Noise Exposure," establishes community noise exposure levels for different land use categories. Where the noise receptor consists of single-family homes, duplexes or mobile homes, the level designated as normally acceptable is 60 dBA L_{dn} or CNEL, and the level designated as conditionally acceptable is 65 dBA L_{dn} or CNEL. Where the noise receptor is multiple family dwellings, transient lodging or motels and hotels, these levels are 65 dBA and 70 dBA L_{dn} and CNEL, respectively (Riverside 2003).

Table N-2 of the Noise Element, entitled "Stationary Source Land Use Noise Standards," establishes limits on the noise that can be caused at residential receptors by a stationary source such as a power plant. These limits are 65 dBA L_{eq} daytime (from 7:00 a.m. to 10:00 p.m.) and 45 dBA L_{eq} nighttime (from 10:00 p.m. to 7:00 a.m.). These limits are repeated in Policy N 4.1.

Riverside County Code

Section 9.52.020 H of the Riverside County Code exempts from limitation construction noise that is created one-quarter mile or more from any inhabited dwelling. Section 9.52.020 I exempts from limitation construction noise that is created within one-quarter mile of any inhabited dwelling provided the noise is limited to the hours from 6:00 a.m. to 6:00 p.m. during the months of June through September, and the hours from 7:00 a.m. to 6:00 p.m. during the months of October through May. Section 15.04.020 F repeats this exemption.

Section 9.52.040 of the Riverside County Code prohibits the creation of noise that causes the exterior noise level on any occupied property to exceed the levels in TABLE 1: Sound Level Standards. TABLE 1 limits this noise on land designated PF –

Public Facility (the designation of the CPV Sentinel project site) to 65 dB L_{max} during daytime (7:00 a.m. to 10:00 p.m.) and 45 dB L_{max} during the nighttime (10:00 p.m. to 7:00 a.m.).

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, §§ 15000 et seq., App. G) sets forth some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or noise ordinance or applicable standards of other agencies;

2. exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;

3. substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

4. substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying item 3 above to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by 5 dBA or more at the nearest sensitive receptor.

Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA is considered significant. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant, depending on the particular circumstances of the case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting combined noise level;[2]

[2] 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.

2. the duration and frequency of the noise;

3. the number of people affected; and

4. the land use designation of the affected receptor sites.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary;
- use of heavy equipment and noisy activities are limited to daytime hours; and
- all industry-standard noise abatement measures are implemented for noise-producing equipment.

Staff uses the above method and threshold to protect the most sensitive populations, including the minority population.

SETTING

The CPV Sentinel project would be constructed on a 37 acre site in unincorporated Riverside County approximately 8 miles northwest of the center of the City of Palm Springs. The site lies in an area designated “PF - Public Facilities” in the General Plan and zoned W-2 “Controlled Development Area.” Large-scale power plants and transmission corridors are a permitted use; the Southern California Edison Devers substation lies approximately 700 feet to the west, and surrounding lands are extensively developed for wind energy (CPVS 2007a, AFC §§ 1.1, 1.3, 2.1, 7.5.2.1).

The applicant had secured power purchase agreements for 5 gas turbine generator units, and has subsequently arranged agreements for 3 additional units (CPVS 2007a, AFC §§ 1.1, 1.2, 1.4, 1.5, 2.1, 2.7.1.1). The project would be constructed in two phases, the first encompassing 5 units and their auxiliary equipment, the second adding 3 additional units and their auxiliary equipment.

The ambient noise regime in the project vicinity is relatively homogeneous, with wind turbines and roads and a freeway surrounding the site (CPVS 2007a, AFC §§ 1.1, 2.2, 7.5.2.1, 7.5.2.3). Nearby sensitive noise receptors consist of four residences (see **NOISE and VIBRATION Figure 1**, below). Residence A, 340 feet south of the project site, would be vacated before construction commences. The applicant has an option to purchase Residence B, 330 feet east of the site.

Ambient Noise Monitoring

In order to establish a baseline for comparison of predicted project noise to existing ambient noise, the applicant has presented the results of an ambient noise survey (CPVS 2007a, AFC § 7.5.2.2, 7.5.2.3, 7.5.2.4, 7.5.2.5; Tables 7.5-2 through 7.5-4;

Figure 7.5-1; Appendix M). The survey was conducted May 9 through 10, 2007, and monitored existing noise levels at the following locations, shown on **NOISE AND VIBRATION Figure 1**:

1. Measuring Location LT-1: Near Residence C, approximately 1,000 feet east of the CPV Sentinel site boundary. This represents the nearest sensitive receptor. Long-term (25-hour) monitoring showed that ambient noise consisted chiefly of wind noise, with some noise from rustling leaves, nearby wind turbines, birds and aircraft overflights.

2. Measuring Location ST-1: At the same location as LT-1. Short-term (five-minute) measurements were taken at midday.

3. Measuring Location ST-2: At a group of residences approximately 2,450 feet southwest of the site boundary. Short-term (five-minute) monitoring taken at midday showed ambient noise similar to that at ST-1.

4. Measuring Location ST-3: Near Residence D, approximately 1,300 feet east of the site boundary. Short-term (five-minute) monitoring taken around 2:30 p.m. showed ambient noise similar to that at ST-1. Two more residences lie further to the east of this location.

Subsequently, questions arose regarding the lack of long-term (25-hour) monitoring at ST-2, the residential neighborhood to the southwest of the site. At the request of staff, the applicant performed supplemental noise monitoring at ST-2 (referred to now as LT-2) (LW 2008k, Table 1).

NOISE Table 2 summarizes the ambient noise measurements (CPVS 2007a, AFC Tables 7.5-2 and 7.5-3; LW 2008k, Table 1):

NOISE Table 2
Summary of Measured Ambient Noise Levels

Measurement Location	Measured Noise Levels, dBA		
	L_{eq} – Daytime	L_{eq} – Nighttime	L_{90}
LT-1: Near Residence C, 1,000 feet east*	55.4[1]	55.7[2]	49.3[3]
ST-1: Near Residence C, 1,000 feet east*	49	—	46.5[4]
LT-2: Near residences 2,450 feet southwest	47.1[1]	47.0[2]	43.6[3]
ST-2: Near residences 2,450 feet southwest	43	—	40[4]
ST-3: Near Residence D, 1,300 feet east	50	—	48[4]

Source: CPVS 2007a, AFC Tables 7.5-2 and 7.5-3; LW 2008k, Table 1
[1] Staff calculations of average of 15 daytime hours
[2] Staff calculations of average of 9 nighttime hours
[3] Staff calculations of average of 4 consecutive quietest hours of the nighttime
[4] Daytime
*Represents nearest sensitive receptor

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term construction activities and by normal long-term operation of the power plant.

Construction Impacts and Mitigation

Construction noise is usually considered a temporary phenomenon. Construction of CPV Sentinel is expected to last 18 months (CPVS 2007a, AFC §§ 1.1, 1.5, 2.1, 2.6.1).

Compliance with LORS

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances. The Riverside County Code exempts construction noise from numerical noise limits, but requires that noisy work conducted within one-quarter mile of an inhabited dwelling be limited to the hours between 6:00 a.m. and 6:00 p.m. during the months of June through September, and 7:00 a.m. and 6:00 p.m. during the months of October through May. The applicant offers to restrict noisy construction work to the hours specified in the applicable LORS (CPVS 2007a, AFC § 7.5.5.2) Staff proposes Condition of Certification **NOISE-6**, below, to ensure that noisy construction is limited to these hours.

CEQA Impacts

Power Plant Site

To evaluate construction noise impacts, staff compares the projected noise levels to the ambient levels. Since construction noise typically varies continually with time, it is most appropriately measured by, and compared to, the L_{eq} (energy average) metric.

Construction noise may be expected to reach levels as high as 60 dBA L_{eq} at the residence at LT-1, the nearest sensitive noise receptor (CPVS 2007a, Table 7.5-6), and 52 dBA L_{eq} at the residences at LT-2, southwest of the site (LW 2008k, Table 1, and staff calculations). Comparing projected noise levels to the ambient noise levels (see **NOISE Table 3**, below) shows an increase at LT-1 of 6 dBA during daytime and 5 dBA during nighttime, and at LT-2 of 6 dBA during both daytime and nighttime. Such an increase is commonly noticeable, but would not be expected to result in complaints. Furthermore, these projected noise levels are conservative, based on surveys of construction equipment taken over 20 years ago. Modern construction equipment is quieter, so actual noise levels should be less than predicted. Since noisy construction work would be restricted to daytime hours, staff believes it would be barely noticeable, and would not constitute a significant adverse impact.

NOISE Table 3
Predicted Power Plant Construction Noise Impacts

Receptor	Highest Construction Noise Level[1] (dBA L_{eq})	Measured Existing Ambient (dBA L_{eq})	Cumulative (dBA L_{eq})	Change (dBA)
LT-1: Near Residence C, 1,000 feet east	60	55 daytime[2]	61 daytime	+6 daytime
		56 nighttime[2]	61 nighttime	+5 nighttime
LT-2: Near residences 2,450 feet southwest	52	47 daytime[3]	53 daytime	+6 daytime
		47 nighttime[3]	53 nighttime	+6 nighttime

1 Source: CPVS 2007a, AFC Table 7.5-6
2 Source: CPVS 2007a, AFC Table 7.5-2
3 Source: LW 2008k, Table 1, and staff calculations

In the event that actual construction noise should annoy nearby residents, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a Notification Process to make nearby residents aware of the project, and a Noise Complaint Process that requires the applicant to resolve any problems caused by noise from the project.

Linear Facilities

Linear facilities include a 2.6-mile long pipeline for natural gas, a 3,200-foot long potable water line, a 900-foot long reclaimed water line carrying water from the existing Desert

Water Agency reclaimed water system to the Palm Springs National Golf Course, and a 2,300-foot long transmission interconnection to the Devers substation (CPVS 2007a, AFC §§ 1.3, 1.8, 2.1, 2.2, 5.0; LW2008a). Construction of linears typically moves along rapidly; no noise receptor is exposed to the work for more than a few days. Limiting noisy construction to daytime hours should provide adequate mitigation of impacts. To ensure compliance with this restriction, staff proposes Condition of Certification **NOISE-6**, below.

Pile Driving

The applicant does not address the need for pile driving; it is discussed here in the event that this work should prove necessary. Information from other projects examined by Energy Commission staff shows the noise from pile driving could be expected to reach 104 dBA at a distance of 50 feet. Pile driving noise would thus be projected to reach a level of 78 dBA at LT-1, the nearest residential receptor (staff calculation). Assuming daytime noise levels at LT-1 of 55 dBA, adding pile driving noise to the daytime ambient levels would produce an increase of 23 dBA at LT-1 (see **NOISE Table 4** below). Similarly, pile driving noise levels would be projected to reacy 70 dBA at LT-2, producing an increase in daytime noise levels of 23 dBA. This represents more than a quadrupling in noise level, and would likely constitute an annoyance. However, since pile driving is only a temporary operation lasting a couple weeks or so, staff believes that limiting pile driving to daytime hours should result in impacts that are tolerable to residents. Staff proposes Condition of Certification **NOISE-6**, below, to limit this operation to daytime hours.

NOISE 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)
LT-1: Near Residence C	78	55	78	+23
LT-2: Near residences 2,450 feet southwest	70	47	70	+23

Source: CPVS 2007a, AFC Table 7.5-2; LW 2008k, Table 1; and staff calculations

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 likely that no 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 those applicable LORS that would protect construction workers (CPVS 2007a, AFC § 7.5.3.7). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**, below.

Operation Impacts and Mitigation

The primary noise sources of CPV Sentinel include the gas turbine generators, gas turbine air inlets, selective catalytic reduction units and their exhaust stacks, cooling towers and their fans, electrical transformers, fuel gas compressors and metering equipment, and various pumps and fans (CPVS 2007a, AFC §§ 1.1, 1.3, 2.4, 2.4.1, 2.4.2.1, 2.9.5, 5.1, 5.2, 7.5.3.2). Staff compares the projected noise with applicable LORS. In addition, staff evaluates any increase in noise levels due to the project at sensitive receptors in order to identify any significant adverse impacts.

The applicant included the following noise mitigation measures in performing computer modeling of noise impacts from project operation (CPVS 2007a, AFC §§ 1.10.5, 2.3, 2.4.1, 2.5.3, 2.5.3.5, 7.5.3.2):

- natural gas compressors located in two sound-attenuated buildings;
- gas turbine exhaust stack silencers; and
- evacuation and/or removal of Residences A and B, the two residences nearest the project site.

Compliance with LORS

The applicant performed noise modeling to predict the project's noise impacts on sensitive receptors based on the full project consisting of 8 units (CPVS 2007a, AFC § 7.5.3.2; Table 7.5-5). At this point, the applicant had arranged to purchase and evacuate the residences at locations A and B, south and east of the project site, respectively, and intended to purchase the residences at locations C and D, east of the site. With these nearby residences no longer existing as sensitive receptors, the applicant believed the project's noise emissions to be acceptable. When negotiations with the owners of the property at C and D broke down, the applicant now was forced to consider another approach.

Consequently, the applicant submitted Comments on the Preliminary Staff Assessment (LW 2008g) that included Attachment B, Comments on CEC Condition of Certification NOISE-7. In this attachment, the applicant explained how power plant noise impacts are commonly modeled with very conservative assumptions. For example, the loudest noise source in CPV Sentinel, and the one contributing the most to total project noise emissions, is the gas turbine exhaust stacks (LW 2008g, Attachment B, p. 4). The applicant noted that the equipment manufacturers' noise data upon which the applicant's noise modeling was based is presented in terms of 3δ ("three sigma") sound power level data. While 3δ data guarantees that the actual noise emitted by the exhaust stacks will not exceed these values, this certainty is achieved via extreme conservatism. The applicant repeated its noise modeling using revised, less conservative sound power level figures, and arrived at the projections included in its comments (LW 2008g).

The inherent conservativeness in projections based on 3δ data results in figures that overstate actual power plant noise by 7 dBA or more. Staff has noticed this conservativeness in project noise modeling; only twice in the past 16 years has staff dealt with power plants that proved to be noisier than expected.[3] Typically, noise monitoring performed after the plant has begun operation shows it to be markedly quieter than was projected. Therefore, staff agrees with the applicant's revision to the project's modeled noise levels, and incorporates these revised figures in its analysis.

With this 7 dBA correction included, project operating noise at LT-1 (Residence C, 1,000 feet east of the project site, the nearest noise-sensitive residence after purchase of Residences A and B) is predicted not to exceed 49 dBA L_{eq}; operating noise at LT-2 (the residences 2,450 feet southwest of the project site) is predicted not to exceed 38 dBA L_{eq}; and operating noise at ST-3 (near Residence D, 1,300 feet east of the site) is predicted not to exceed 46 dBA L_{eq}. The Riverside County General Plan Noise Element, Table N-1 establishes a conditionally acceptable guideline for residential land uses of 65 dBA L_{dn} or CNEL. For a steady, continuous noise source such as a power plant, this is equivalent to 59 or 58 dBA L_{eq} respectively; see **NOISE Table 5** below. Table N-2 of the Noise Element establishes a limit at residential receptors of 45 dBA L_{eq} nighttime and 65 dBA L_{eq} daytime. The Riverside County Code, § 9.52.040 Table 1 limits project noise to 45 dBA L_{max} nighttime and 65 dBA L_{max} daytime. For a steady noise source such as a power plant, L_{max} can be assumed to equate to L_{eq}.

As shown in **NOISE Table 5** below, project noise at all three sensitive receptors is predicted to comply with Table N-1 of the Noise Element. Further, project noise at LT-2/ST-2, the residences to the southwest of the project site, would comply with all three LORS. However, project noise at LT-1(Residence C) and ST-3 (Residence D) would comply with Table N-2 of the Noise Element, and with Table 1 of the County Code, only during the daytime. At night, both these LORS would be violated at LT-1 and ST-3. (Staff assumes that the applicant desires the option to operate the plant at night, if dispatch so demands.)

Note, however, that the existing nighttime ambient noise levels already exceed the nighttime limits in Table N-2 and Table 1 (see **NOISE Table 2** above). At LT-1, the ambient value of 55.7 dBA L_{eq} exceeds the 45 dBA L_{eq} LORS limit by almost 11 dBA, more than double the loudness; it exceeds the projected power plant noise level by nearly 7 dBA. At ST-3, the ambient value of 50 dBA L_{eq} exceeds the 45 dBA L_{eq} LORS limit by 5 dBA; it exceeds the projected power plant noise level by 4 dBA. Power plant noise at these locations would range from unnoticeable to inaudible. While the Riverside County LORS do not address the circumstance in which actual ambient noise already exceeds the LORS limit, many jurisdictions do so. Commonly, where the ambient value exceeds the LORS limit, the ambient value is taken to be the new limit. Staff believes that, to be fair, this approach should be assumed here, and the existing ambient levels assumed to be the new limits. Therefore, staff concludes that power plant operating noise will, in fact, comply with LORS at both these locations.

The two dwellings that lie east of Residence D (see **NOISE AND VIBRATION Figure 1**) appear to be as distant from the noise-producing portions of the project as the

[3] In both cases, the Sutter Energy Center (97-AFC-2) and the SMUD Cosumnes Power Plant (01-AFC-19), unacceptable noise levels were due to unexpected factors, and not the result of lack of conservativeness in modeling.

residences at ST-2 (CPVS 2007a, AFC Figure 7.5-1); project noise at these residences would therefore be expected to be similar to that at ST-2, and thus in compliance with LORS.

NOISE Table 5
Plant Operating Noise LORS Compliance

LORS	LORS Limit	Receptor	Projected Noise Level	In Compliance
Riverside County General Plan Noise Element, Table N-1	65 dBA CNEL (58 dBA L_{eq})	Residence C (LT-1) (1,000 feet E)	49 dBA L_{eq}	Yes
		LT-2 (2,450 feet SW)	38 dBA L_{eq}	Yes
		Residence D (ST-3) (1,300 feet E)	46 dBA L_{eq}	Yes
Riverside County General Plan Noise Element, Table N-2	45 dBA L_{eq} nighttime, 65 dBA L_{eq} daytime	Residence C (LT-1) (1,000 feet E)	49 dBA L_{eq}	Yes[2]
		LT-2 (2,450 feet SW)	38 dBA L_{eq}	Yes
		Residence D (ST-3) (1,300 feet E)	46 dBA L_{eq}	Yes[2]
Riverside County Code, Table 1	45 dBA L_{max} nighttime, 65 dBA L_{max} daytime[1]	Residence C (LT-1) (1,000 feet E)	49 dBA L_{eq}	Yes[2]
		LT-2 (2,450 feet SW)	38 dBA L_{eq}	Yes
		Residence D (ST-3) (1,300 feet E)	46 dBA L_{eq}	Yes[2]

Source: CPVS 2007a, AFC Table 7.5-5
[1] For a steady noise source such as a power plant, L_{max} can be assumed to equate to L_{eq}.
[2] See discussion, above.

CEQA Impacts

Power plant noise is unique. Essentially, a power plant operates as a steady, continuous, broadband noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, staff compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at the affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated in the project to reduce or remove the impact.

In many cases, a power plant will be intended to operate around the clock for much of the year. CPV Sentinel is likely to be called upon to run late into the night, particularly during the summer when air conditioning loads remain high (CPVS 2007a, AFC §§ 1.1, 1.2, 1.4, 2.1, 2.4, 2.7.1, 2.7.1.1, 2.9.3, 2.9.3.2, 8.5, 8.5.1). Staff typically evaluates project noise emissions by comparing them to the nighttime ambient background level; this assumes the potential for annoyance due to power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than the daytime levels; differences of 5 to 10 dBA are common. Staff believes it is prudent to average the lowest nighttime hourly background noise level values to arrive at a reasonable baseline for comparison with the project's predicted noise level. At LT-1, this is the span from 3:00 a.m. to 7:00 a.m. (see CPVS 2007a, AFC Table 7.5-2). This value is 49 dBA L_{90}.

Staff also evaluated projected noise impacts on the residences at LT-2/ST-2, 2,450 feet to the southwest of the site, as the applicant has not proposed to purchase these dwellings as mitigation for project noise impacts. The quietest span here is from 3:00 a.m. to 7:00 a.m. (LW 2008k, Table 1; and staff calculations). This value is 44 dBA L_{90}.

Power plant noise levels at LT-1, the nearest sensitive receptor, are predicted to reach 49 dBA L_{eq}, and at LT-2, 38 dBA L_{eq}; see **NOISE Table 6**.

NOISE Table 6
Power Plant Noise Impacts at Nearest Sensitive Receptors

Receptor	Power Plant Noise Level, dBA L_{eq}[1]	Nighttime Ambient Background Level, dBA L_{90}	Cumulative Noise Level, dBA	Change from Ambient Background Level
LT-1: Near Residence C	49	49[2]	52	+3
LT-2	38	44[3]	45	+1

[1] Source: LW 2008k, Table 1
[2] Source: CPVS 2007a, AFC Table 7.5-2 and staff calculations of average of four quietest consecutive nighttime hours
[3] Source: LW 2008k, Table 1 and staff calculations of average of four quietest consecutive nighttime hours

When projected plant noise at LT-1 is added to the nighttime ambient value (as calculated by staff), the cumulative level is 3 dBA above the ambient value (see **NOISE Table 6**).This is generally considered a barely noticeable increase, and not significant. Adding projected plant noise to the nighttime ambient at LT-2 yields 45 dBA, an increase of 1 dBA, an unnoticeable increase.

As discussed above, the two residences east of LT-1 are approximately the same distance from the project site as those at LT-2, and would likely see impacts similar to those at LT-2. Consequently, staff considers noise impacts at these two residences to be less than significant, that is, unnoticeable. To ensure this noise level is not further exceeded, staff proposes Condition of Certification **NOISE-4**, below.

Tonal Noises

One possible source of annoyance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant plans to avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design (CPVS 2007a, AFC § 7.5.3.3). To ensure that tonal noises do not cause annoyance, staff proposes Condition of Certification **NOISE-4**, below.

Linear Facilities

All water and gas piping lie underground and would 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 thus be inaudible to any receptors (CPVS 2007a, AFC § 7.5.3.5).

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 simple cycle power plant consist of high-speed gas turbine generators, compressors, and various pumps and fans. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors are attached to the turbines and generators. Based on experience with numerous previous projects employing similar equipment, Energy Commission staff believes that groundborne vibration from CPV Sentinel would be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves and can rattle the walls of lightweight structures. In staff's experience, airborne vibration impacts from a plant such as CPV Sentinel are typically imperceptible at any significant distance from the plant. CPV Sentinel's chief source of airborne vibration would be the gas turbines' exhaust. In a power plant such as CPV Sentinel, however, the exhaust must pass through the selective catalytic reduction units before it reaches the atmosphere. These units act as very efficient mufflers; this makes it highly unlikely that CPV Sentinel would cause perceptible airborne vibration effects.

Worker Effects

The applicant has acknowledged the need to protect plant operating and maintenance workers from noise hazards and has committed to comply with applicable LORS (CPVS 2007a, AFC § 7.5.3.4). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required. To ensure that plant operation and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**, below.

CUMULATIVE IMPACTS AND MITIGATION

Section 15130 of the CEQA Guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, are considerable or that compound or increase other environmental impacts. The CEQA Guidelines require that the discussion reflect the severity of the impacts and the likelihood of their occurrence, but need not provide as much detail as the discussion of the impacts attributable to the project alone.

The applicant has identified several projects in the vicinity of CPV Sentinel (CPVS 2007a, AFC § 7.5.4). These all lie considerable distances from the CPV Sentinel site. It is highly unlikely that any of these projects could contribute to a significant cumulative noise impact. Even though low-income and minority populations exist in the immediate project area, staff has not identified any significant unmitigated adverse noise impacts with the proposed project or cumulative impacts; therefore, no significant adverse impacts to minority or low-income populations are expected to occur.

FACILITY CLOSURE

In the future, upon closure of CPV Sentinel, all operational noise from the project would cease, and no further adverse noise impacts from operation of CPV Sentinel would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it can be treated similarly. That is, noisy work could be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS that were in existence at that time would apply. Applicable conditions of certification included in the Energy Commission decision would also apply unless modified.

CONCLUSIONS AND RECOMMENDATIONS

CPV Sentinel, if built and operated in conformance with the proposed conditions of certification listed below, would comply with all applicable noise and vibration LORS for both operation and construction and would produce no significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within three-quarter mile of the site, 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 CPV Sentinel project, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- Take all feasible measures to reduce the noise at its source if the noise is project related; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts, and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form with the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a three-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program and a statement, signed by the project owner's project manager, verifying that the noise control program will be implemented throughout construction of the project. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal/OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program and the project owner's project manager's signed statement. The project owner shall make the program available to Cal/OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that operation of the project will not cause noise levels due solely to plant operation to exceed an average of 48 dBA L_{eq} measured at monitoring location LT-1, the residence referred to as Residence C on **NOISE and VIBRATION Figure 1**. No new pure-tone components may be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

The measurement of power plant noise for the purposes of demonstrating compliance with this condition of certification may alternatively be made at a location, acceptable to the CPM, closer to the plant (e.g., 400 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected residential locations to determine the presence of pure tones or other dominant sources of plant noise.

A. When each phase of the project[4] first achieves a sustained output of 90 percent or greater of rated capacity, the project owner shall conduct a community noise survey at monitoring location LT-1 or at closer locations acceptable to the CPM. This survey shall be performed during power plant operation and shall also include measurement of one-third octave band sound pressure levels to determine whether new pure-tone noise components have been caused by the project.

B. If the results from either noise survey indicate that the power plant average noise level (L_{eq}) at LT-1 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 either noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: Each survey shall take place within 30 days of each phase of the project first achieving a sustained output of 90 percent or greater of rated capacity. Within 15 days after completing each survey, the project owner shall submit a summary report of the survey to the CPM. Included in each 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 each phase of the project first achieving a sustained output of 90 percent 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.

[4] Phase 1 encompasses 5 gas turbine generator units and their auxiliary equipment; Phase 2 adds 3 additional units and their auxiliary equipment.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing each 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 Noisy construction work relating to any project features shall be restricted to the times of day delineated below:

June through September	6:00 a.m. to 6:00 p.m.
October through May	7:00 a.m. to 6:00 p.m.

Haul trucks and other engine-powered equipment shall be equipped with mufflers that meet all applicable regulations. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

For purposes of this condition, “noisy construction work” shall be defined as any project-related work that draws a legitimate noise complaint. A legitimate noise complaint refers to a noise caused by the construction of the CPV Sentinel 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 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 mitigation.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

CPV Sentinel Energy Project
(07-AFC-3)

NOISE COMPLAINT LOG NUMBER ________________________

Complainant's name and address:

Phone number: ________________________

Date complaint received: ________________________
Time complaint received: ________________________

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: ________________________

Initial noise levels at 3 feet from noise source _________ dBA Date: _____________

Initial noise levels at complainant's property: __________ dBA Date: _____________

Final noise levels at 3 feet from noise source: ________ dBA Date: _____________

Final noise levels at complainant's property: __________ dBA Date: _____________

Description of corrective measures taken:

Complainant's signature: ________________________ Date: ____________

Approximate installed cost of corrective measures: $ ____________
Date installation completed: ____________
Date first letter sent to complainant: ____________ (copy attached)
Date final letter sent to complainant: ____________ (copy attached)

This information is certified to be correct:

Plant Manager's Signature: ________________________

(Attach additional pages and supporting documentation, as required).

REFERENCES

CPVS 2007a – CPV Sentinel, LLC / D. Shileikis (tn: 41166). CPV Sentinel Application for Certification – Volume 1, 2 & 3. Dated 6/25/2007. Submitted to CEC/Docket Unit on 6/25/2007.

LW 2008a – Latham & Watkins LLP / P. Kihm (tn:45406). AFC Supplement: Revised Water Supply Plan. Dated 2/19/2008. Submitted to CEC/Docket Unit on 2/19/2008.

LW2008g – Latham & Watkins LLP / P. Kihm (tn: 47682). Applicant's Comments on PSA. Dated 8/22/2008. Submitted to CEC/Docket Unit on 8/22/2008.

LW2008k – Latham & Watkins LLP / P. Kihm (tn:_____). Applicant's Supplemental Noise Survey Data. Dated 9/25/2008. Submitted to CEC/Docket Unit on 9/25/2008.

Riverside 2003 – Riverside County Comprehensive General Plan. Adopted October 7, 2003.

Riverside 2008 – Riverside County Code. Updated February 5, 2008.

NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that “A-weighting” of sound intensities best reflects the human ear’s reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **NOISE Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, those higher levels nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about 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 (U.S. Environmental Protection Agency, Effects of Noise on People, December 31, 1971).

To help the reader understand the concept of noise in decibels (dBA), **NOISE Table A2** illustrates common noises and their associated sound levels, in dBA.

NOISE Table A1
Definition of Some Technical Terms Related to Noise

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the noise level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

NOISE Table A2
Typical Environmental and Industry Sound Levels

Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of 1 dB cannot be perceived.

2. Outside of the laboratory, a 3-dB change is considered a barely noticeable difference.

3. A change in level of at least 5 dB is required before any noticeable change in community response would be expected.

4. A 10-dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response (Kryter, Karl D., The Effects of Noise on Man, 1970).

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a 3-dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). **NOISE Table A3** indicates the rules for decibel addition used in community noise prediction.

NOISE Table A3
Addition of Decibel Values

When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Architectural Acoustics, M. David Egan, 1988.

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by 6 dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

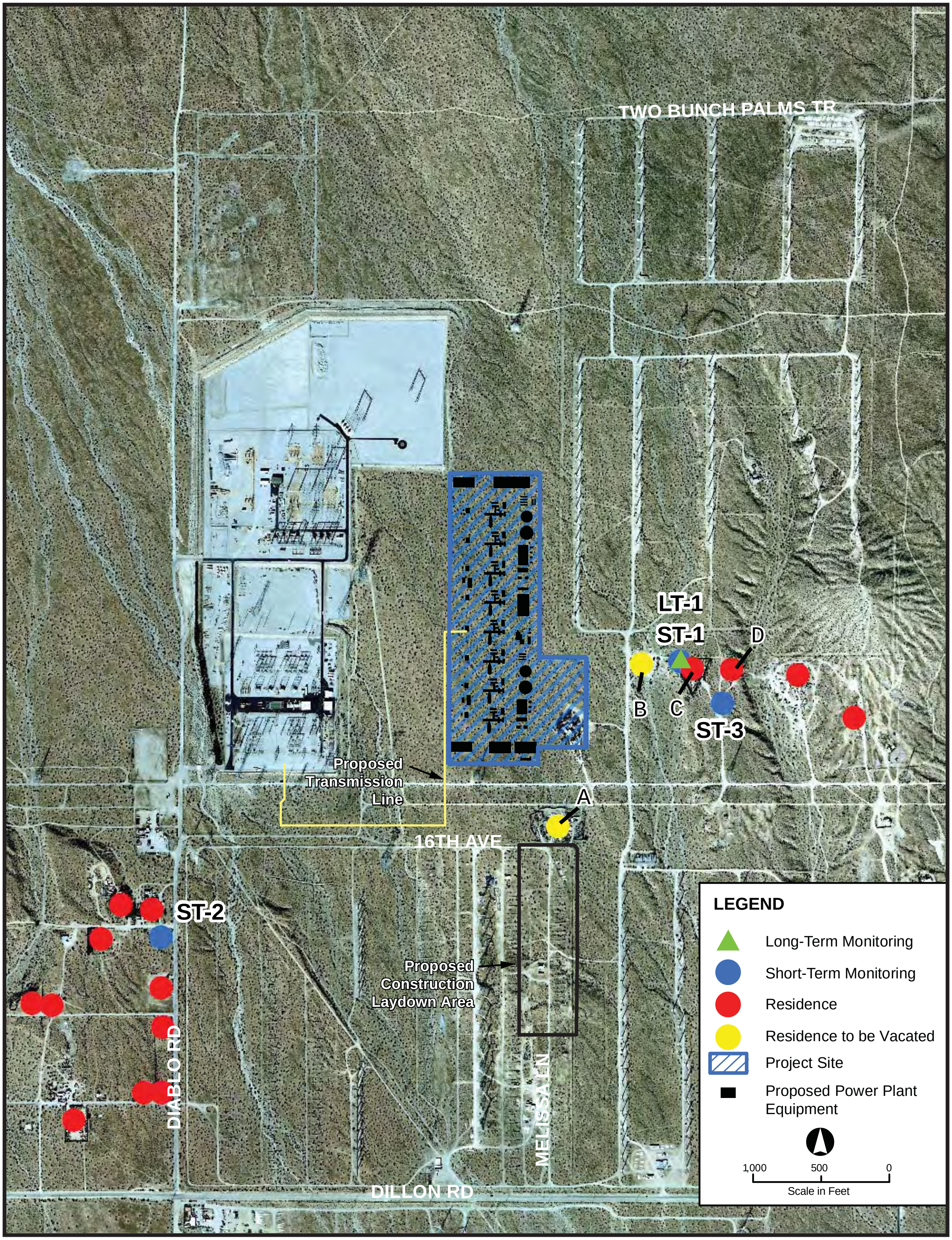
OSHA noise regulations are designed to protect workers against the effects of noise exposure and list permissible noise level exposure as a function of the amount of time to which the worker is exposed, as shown in **NOISE Table A4**.

NOISE Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 CFR § 1910.95.

NOISE AND VIBRATION - FIGURE 1
CPV Sentinel Energy Project - Proposed Project Site and Vicinity



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008
SOURCE: AFC Figure 7.5-1

PUBLIC HEALTH

Testimony of 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 CPV Sentinel Energy Project (CPV Sentinel) and does not expect there to be any significant cancer or short- or long-term noncancer health effects. The toxic (noncriteria) 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.

INTRODUCTION

The purpose of this **Public Health** analysis is to determine if toxic emissions from the proposed CVP Sentinel project could potentially cause significant adverse public health impacts or violate standards for public health protection in the project area. Toxic pollutants for which there are no specific air quality standards are known as *noncriteria pollutants*. 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 noncriteria 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 criteria pollutants' respective health effects. The discussion in the A**ir Quality** section mainly focuses on the potential for exposure at levels above ambient air quality standards and the regulatory measures necessary to mitigate that exposure, with particular emphasis on ozone and particulate matter where area levels exceed their respective air quality standards. Staff considers it necessary to mitigate the impacts of these and noncriteria 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	
South Coast Air Quality Management (SCAQMD) District Rules 212 and 1401.	Requires safe exposure limits for Toxic Air Pollutants (TACs), use of best available control technology and new source 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 a project would expose members of the public to these pollutants 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 in 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 safety standards that are based on known health effects.

For CPV Sentinel and other sources, a screening-level risk assessment is initially performed using simplified assumptions intentionally biased toward protecting 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 would 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 those conditions in the study. The 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 that an individual's exposure to cancer-causing agents would occur over a 70-year lifetime.

A screening-level risk assessment would 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). 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) health effects, and cancer risk (also long-term). Acute health effects result from short-term (one-hour) exposure to relatively high concentrations of pollutants. These 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 being from approximately from 10 to 100 percent of a lifetime (from 7 to 70 years). Chronic health effects include reduced lung function and heart disease.

The analysis for noncancer health effects includes a comparison of maximum project contaminant exposure levels to safe levels called *reference exposure levels* (RELs). These are amounts of toxic substances to which even sensitive people could be exposed without suffering adverse health effects (CAPCOA 1993, p. III-36). This means that exposure limits serve to protect sensitive individuals including infants, children, the aged, and people suffering from illnesses or diseases that 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. Margins of safety 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 exposure 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 would be 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 (that is where the effects are greater than the sum), this approach may underestimate the health impact in question. Where the action is antagonistic, the approach may overestimate the impacts.

For carcinogenic substances, the health assessment estimates the risk of developing cancer and conservatively includes the assumption that the individual would be continuously exposed to the substances 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 estimate 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, OEHHA), 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 would likely to be considerably lower than these 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

California Energy Commission staff (Energy Commission) assesses the health effects of exposure to toxic emissions by first considering their impacts on the maximally exposed individual. This individual is a hypothetical person exposed to project emissions at a location where the highest ambient impacts were calculated, using the worst-case assumptions 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, noncriteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer health effects, as well as for cancer (long-term) health effects. The potential significance of project-related health impacts is determined separately for each of the three categories of health effects.

Acute and Chronic Noncancer Health Effects

Staff assesses the significance of noncancer 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 1 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 1 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 noncancer 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 cancer risks. Title 22, California Code of Regulations, section 12703(b) states that "the toxic exposure which represents no significant health hazard shall be one calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure." This hazard reflects 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 the provisions of Proposition 65.

As noted earlier, the initial risk analysis for a project is normally performed at a 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.

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, CPV Sentinel LLC, (2007a, pp. 1-2, 1-2, 2-7.1-2 and 7.6-1), the proposed project site is on a 37-acre parcel 8 miles northwest of downtown Palm Springs in Riverside County, California, approximately 100 miles east of Los Angeles. The area immediately around the proposed site is extensively developed for wind energy and electric transmission infrastructure. The rest of the area within a 1.9-mile radius is essentially desert land with few scattered residences. The nearest populations are found in the city of Palm Springs approximately 8 miles to the southeast and the city of Desert Hot Springs approximately 4.5 miles to the northwest.

The closest residence is the Mundhenk house approximately 330 feet to the east of the project's property line. The applicant provided specific information identifying three sensitive receptor locations within a three-mile radius of the site, along with their respective directions and distances from the site (CPV Sentinel 2007a Figure 7.6-1) . Sensitive receptor locations are those that house sensitive individuals including the elderly, children, and people suffering from illnesses or diseases that make them more susceptible to the effects of toxic substance exposure than members of the general public. In most cases, these locations include schools, pre-schools, daycare centers, nursing homes, medical centers, hospitals, and colleges. Sensitive receptors in this case include adult and child care centers, parks, and schools.

As noted in the **Socioeconomics** section, information from Census 2000 shows the area's minority population to vary from 20-60% within a six-mile radius of the proposed site. The percentage of the low-income was shown to vary from 16-29%.

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 project area is largely separated from the coastal regions by the San Jacinto and Santa Rosa mountain ranges leading to large temperature differences between this area and the coastal region beyond these mountain ranges. The site has relatively high temperatures and low precipitation (about five 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 helps block 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 while the winter temperatures are more moderate with a mean of 70 degrees. 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 even though there generally are no local emission sources. The site and the immediate vicinity are largely flat and windy, hence the development of wind energy facilities.

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

By examining average toxic concentration levels from representative air monitoring sites with cancer risk factors specific to each contaminant, a 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 American is about 1 in 3, or 330,000 in 1,000,000

The nearest toxic air monitoring station to the project site is Rubidoux in Riverside County, about 50 miles to the west of the project site. Based on levels of toxic air contaminants measured at this monitoring station in 2000, the background cancer risk for this location is 268 in 1,000,000 (ARB 2002). The pollutants 1, 3-butadiene, and benzene emitted primarily from mobile sources were the two highest contributors to the risk and together accounted for over half of the total. The risk from 1, 3-butadiene was about 72 in 1,000, 000 while the risk from benzene was 79 in 1,000, 000. Formaldehyde accounts for about 9 percent of the ambient cancer risk of 23 in 1,000,000 estimated for Riverside County. Formaldehyde is emitted directly from vehicles and other combustion sources such as the proposed CPV Sentinel project. Hexavalent chromium accounts for 19 percent of the ambient risk, with a risk contribution of 52 in 1,000,000. 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.

The toxic pollutant-related background risk estimates can be compared with the normal background lifetime cancer risk (from all cancer causes) of 1 in 3, or 330,000 in 1,000,000. The potential risk from CPV Sentinel and similar sources should be assessed within the context of their potential additions to these background risk levels.

The criteria pollutant impacts for the project area are assessed in the **Air Quality** section by adding existing levels (as measured at area monitoring stations), to the project-related emissions, then comparing the results with applicable air quality standards. Protection from exposure to criteria pollutants is achieved through imposition of specific technical and administrative measures ensuring that the project does not create or contribute to violations of air quality standards when the project is being constructed or 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 project's non-criteria pollutant emissions can be assessed separately for construction-phase impacts or operational-phase impacts.

Construction Phase Impacts

Possible construction-phase health impacts, as noted by the applicant (CPV Sentinel 2007a, pp. 7.1-7 and 7.1-8, and Appendix I), are from human exposure to wind-blown dust from site excavation and grading, and emissions from construction equipment. These dust-related impacts may result from either exposure to the dust itself as particulate matter of less than 10 microns in diameter (PM10) or particulate matter of less than 2.5 microns in diameter (PM 2.5), or exposure to any toxic contaminants that might be adsorbed on to the dust particle. As more fully discussed in the **Waste Management** section, the applicant's site contamination assessments (CPV Sentinel 2007a, pp 7.13-1 through 7.13-3, and Appendix Q) found no toxic pollutants at levels constituting a health hazard to humans, meaning that construction activities would not create exposure to toxic contaminants that would pose a significant risk to human health.

The applicant has specified the mitigation measures necessary to minimize construction-related fugitive dust as required by SQAQMD Rules 403 and 403.1(CPV Sentinel 2007a, p 7.1-34). 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 18-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 mitigation measures are presented as specific conditions of certification. The general aim is to ensure emissions at levels not violating the applicable air standard.

The exhaust from diesel-fueled construction equipment has been established as a potent human carcinogen which could induce cancer from chronic exposure. Thus, the carcinogenic faction of the construction-related diesel emission could add to the carcinogenic risk in this analysis. The non-carcinogenic faction could add to the risk of acute or chronic health impacts. The Air Resources Board has relied on the health risk assessment by OEHHA in establishing emission specifications for diesel-fueled construction equipment to ensure that the cancer and noncancer risks from normal construction activities are below significance levels. The applicant has presented the diesel emissions from the different types of equipment to be used along with the requirements of SCAQMD regarding the sulfur content of the diesel fuel. Staff considers the recommended compliance requirements in **Air Quality** section regarding (specified as conditions of certification AQ-SC1through AQ-SC5) as adequate to maintain the cancer and noncancer risks below staff's and SCAQMD's significance levels in the proposed short-term 18-month construction period.

Operational Impacts

The main health risk from CPV Sentinel would be associated with emissions from its combustion turbines, 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 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 CPV Sentinel's air toxic contaminants would be highest in the immediate area and decrease rapidly with distance.

The applicant's estimates of CPV Sentinel'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 (CPV Sentinel 2007a pp 7.6-5 through 7.6-7 and Appendix I-4). 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 agrees with 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 (PMI) is 0.030 for a location on the eastern property boundary, while the maximum hazard index for acute effects is 0.115 for a point approximately 2 miles to the northwest of the site. These values are well below staff's and SCAQMD's Rule 1401-specified significance criterion of 1.0, suggesting that the pollutants in question 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
Sentinel Project's Operation Hazard/Risk

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Non-cancer	0.115	1.0	No
Chronic Non-cancer	0.030	1.0	No
Individual Cancer	$0.856x10^{-6}$ (a)	10.0×10^{-6}	No

Staff's summary of information from CPV Sentinel 2007a, pp. 7.6-5 and 7.6-6, and Appendix I-4.
(a) Risk at the point of maximum impact

The cancer risk estimate for the point of maximum impact is 0.856 in 1,000,000 at a location at the eastern property boundary. This risk estimate 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. This risk estimate is similarly below the requirements of SCAQMD's Rule 1401which specifies a significance criterion of 10 in 1, 000,000 for a project with the best control technology for toxics (T-BACT).

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 related controls include 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 CPV Sentinel's cooling tower using underground water from the Mission Creek sub basin. 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 risk associated with bacterial 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 0.856 in 1,000,000, which does not contribute significantly to the average lifetime individual cancer risk of 330,000 in 1,000,000. Modeled facility-related risks are much lower for more distant locations. Given the conservatism in the calculation method used, the actual risks would likely be much smaller. Therefore, the incremental risk estimate for CPV Sentinel's operation is not a 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 0.030) 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 cumulatively significant. As with cancer risk, long-term non-cancer hazard risk would be lower at all other locations.

Given the identified lack of significant public health impacts from CPV Sentinel's operation, this project does not create environmental justice concerns related to public health.

COMPLIANCE WITH LORS

The toxic pollutant-related cancer and noncancer risks from the construction and operation of the proposed project reflect the effectiveness of compliance with the LORS designed to maintain these risks below levels of health significance. The construction-related measures include the use of effective controls against particulate matter and diesel exhaust from construction activities. The operations-related measures include the use of cleaner-burning natural gas and an oxidation catalyst against volatile and nonvolatile organic pollutants. Since these risk estimates are far below the significance levels established in these applicable LORS, staff concludes that the proposed construction and operational plan would complying with the health and safety LORS listed in **Public Health Table 1** against public exposure to hazardous levels of toxic pollutants.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff did not receive any agency or public comments on the public health aspects of CPV Sentinel project's operations.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the toxic air emissions from the construction and operation of this proposed 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 or other bacterial growth would ensure that the risk of bacterial 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.

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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.

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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 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, and 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 (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 standards were set to protect against asthma, premature death and bronchitis-related symptoms within 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.

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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

Testimony of Hedy Born

SUMMARY OF CONCLUSIONS

The CPV Sentinel Energy Project (CPV Sentinel) would require a construction period of 18 months to complete. The applicant would use local and regional labor. CPV Sentinel would not create any significant adverse socioeconomic impacts on the area's schools, housing, law enforcement, emergency services, hospitals, or parks and recreation. Public benefits from the construction of the project include capital cost expenditures, construction payroll, and the value of locally and regionally purchased materials and supplies.

INTRODUCTION

This staff socioeconomics impact analysis evaluates the project's induced changes on community services and/or infrastructure, and related community issues, such as environmental justice. Staff discusses the estimated impacts of the construction and operation of CPV Sentinel on local communities, community resources, and public services.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Socioeconomics Table 1
Laws, Ordinances, Regulations, and Standards

STATE	
California Education Code, section 17620	Authorizes the governing board of any school district 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	Provides for school district levies against development projects. As amended by SB 50 (Green, Chapter 407, section 23, Statutes of 1998), these sections state that public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.
LOCAL	
Riverside County Ordinance No. 659 (**Development Impact Fee)**	Requires the payment of an impact mitigation fee prior to the final inspection by Building & Safety of any commercial and industrial developments and any residential dwellings.
Riverside County Ordinance 673 (Transportation Uniform Mitigation Fee)	Funds engineering, purchasing of right-of-way, and construction of transportation improvements required by the year 2010 in the Coachella Valley. Transportation Uniform Mitigation Fee (TUMF) fee amounts are based on an equation involving the number of average weekday trips generated by a particular development.

SETTING

The proposed project site is located within an unincorporated area of western Riverside County. The 37-acre power plant site is situated just north of the Palm Springs city limits (8 miles northwest of the center of Palm Springs) and 2.5 miles west of the center of the city of Desert Hot Springs, within the Desert Hot Springs sphere of influence.

With an area of more than 7,200 square miles, Riverside County is the fourth largest county in California and has ranked among the fastest growing counties in California in recent years (CPVS 2007a). It is bordered by San Bernardino County to the north, Orange County to the west, San Diego and Imperial Counties to the south, and the State of Arizona to the east (CPVS 2007a). For a full description of the socioeconomic setting, please refer to Section 7.8 of the CPV Sentinel AFC.

Due to the site's proximity to San Bernardino County, staff used the Riverside-San Bernardino Metropolitan Statistical Area (MSA) to determine the availability of a construction workforce. However, in general the study area defined by the applicant and also defined by staff in the Socioeconomics section of the AFC includes the cities of Palm Springs and Desert Hot Springs and the County of Riverside. The study area was used to determine the availability of community services and infrastructure impacts from the CPV Sentinel project, as well as fiscal and non-fiscal (private sector) benefits.

DEMOGRAPHIC SCREENING

The purpose of demographic screening is to determine whether a below poverty level or minority population exists within the potentially affected area of the proposed site. Staff conducts the screening in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA[1] Compliance Analysis," a guidance document of the U.S. Environmental Protection Agency (U.S. EPA) (U.S. EPA 1998). Minority populations, as defined by this guidance document, are identified where either:

- the minority population of the local area is greater than 50 percent 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 local area have a minority population greater than 50 percent.

In 1997, the President's Council on Environmental Quality issued Environmental Justice Guidance that defines *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 Bureau of the Census's Current Population Reports, Series P-60 on Income and Poverty (OMB 1978).

Staff has reviewed Census 2000 information by census block for minority populations within a six-mile radius of the site. Socioeconomics Figure 1 shows that the minority population within the six-mile radius is 53.53 percent.

Because there is a greater than 50 percent minority population living in proximity to the proposed project, other sections of this PSA consider environmental justice in their impact analyses, including Air Quality, Public Health, Traffic and Transportation, Hazardous Material Handling, Noise, Transmission Line Safety and Nuisance, Waste Management, Soil and Water Resources, Visual, and Land Use.

Census 2000 by census block group information indicates that the below poverty population is 22.47 percent within the six-mile radius. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years of age.

[1] National Environmental Policy Act.

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The criteria used in determining whether project-related socioeconomic impacts would be significant are presented in Appendix G of the California Environmental Quality Act (CEQA) Guidelines. Impacts attributable to the project are considered significant if they would:

- induce substantial growth or concentration of population;
- induce substantial increases in demand for public services; or
- displace a large number of people.

Staff reviewed the CPV Sentinel Energy Project socioeconomic section in the AFC and other socioeconomic data. Staff used the socioeconomic data provided and referenced from governmental agencies, trade associations, and its own independent analysis. Criteria for subject areas such as utilities, fire protection, water supply, and wastewater disposal are identified in the Reliability, Worker Safety, and Soil and Water Resources sections of this document. Impacts on housing, parks and recreation, schools, medical services, law enforcement, and cumulative impacts are based on subjective judgments or input from local and state agencies. Typically, substantial long-term employment of people from regions outside the study area would have the potential to result in significant adverse socioeconomic impacts.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Population and Employment

Due to the site’s proximity to San Bernardino County, staff used the Riverside-San Bernardino Metropolitan Statistical Area (MSA) to determine the availability of a construction workforce. However, in general the study area defined by the applicant and also defined by staff in the Socioeconomics section of the AFC includes the cities of Palm Springs and Desert Hot Springs and the County of Riverside.

In 2006, 881,303 people were employed in Riverside County (U.S. Census 2006). Construction gained 24,200 jobs between 2001 and 2005 (CPVS 2007a), and according to the 2006 American Community Survey (based on 2000 Census data), the 2006 construction labor force in Riverside County was 112,297 (U.S. Census 2006). According to Employment Development Department (EDD), in 2005, the top employment sectors in Riverside County were trade, transportation and utilities (19.5 percent), government (17.5 percent), construction (13.2 percent), and leisure and hospitality with 11.5 percent of all jobs (see Table 7.8-1 in the AFC). The following Socioeconomics Table 2 shows total labor by skills needed for the project in the Riverside-San Bernardino-Ontario MSA.

Socioeconomics Table 2
Project Labor Needs (Peak Configuration) and Available Labor by Skill

Trade	Riverside-San Bernardino-Ontario MSA 2004	Workers Needed (Maximum)	SOC Code[1]
Boilermaker	320	9	51-8021
Carpenter	28,050	50	47-2031
Electrician	6,730	84	47-2111
Laborer	20,010	36	47-2061
Pipefitter/Sprinklerfitter	4,660	84	47-2152
Painter/Insulator	7,570	8	47-2141
Bricklayer/Mason	2,630	2	47-2021
Operating Engineers	3,980	19	47-2073
Millwrights	120	34	49-9044
Ironworkers	760	85	47-2221
Sheetmetal	2,930	3	47-2211
Surveyors	500	6	17-1022
Construction Staff	106,020	20	47-2000

1. Standard Occupational Classification (SOC) code for U.S. Department of Labor. Codes correlate to the craft/skill noted in this table.

Source: EDD 2007; CPVS 2007a; and LW 2008a.

The projected CPV Sentinel construction period is 18 months with an estimated start time of December 2008, and an on-line date of May 2010.[2] The construction and start-up schedule assumes a single-shift work week with 12 hours per day, seven days per week. Overtime and additional shift work may be used to maintain or enhance the construction schedule. As shown in updated Table 7.8-10 (included in a response to Data Request #74, dated April 11, 2008), the number of construction workers (total on-site staff) would range from 27 in the first month of construction to 371 in the sixth month of construction, the peak period (LW 2008). The average number of workers on site over the course of the 18-month construction period would be 212.

Between months 10 and 15 of construction, it is expected that approximately 28 percent of the entire millwright labor force in the MSA would be working at the proposed project. Staff agrees with the applicant that this would not be seen as a significant, as this demand would be for a relatively short period of time, and millwrights typically travel from job site to job site during the construction season in order to make a living. Furthermore, according to Local Union 1607, millwrights could travel from the Los Angeles MSA in order to meet the demand of construction projects in Riverside County (CPVS 2007a).

The applicant has stated that operation and maintenance of the proposed project would require 10 skilled full-time employees and 4 part-time employees (see Table 7.8-11 in

[2] In February 2007, Southern California Edison (SCE) executed a long-term contract for the capacity, energy, and ancillary services from five of the eight proposed CPV Sentinel units, to be delivered to SCE at Devers Substation by August 1, 2010. In March 2008, SCE signed an additional long-term power purchase agreement for the remaining three CPV Sentinel units for an on-line date of May 1, 2012.

the AFC). To the extent practicable, the CPV Sentinel has also stated that it is committed to give local preference in hiring and procurements (that is, Riverside County region).

The applicant states that a more-than-adequate labor supply should be available from Riverside County alone (CPVS 2007a). In the larger regional area, Socioeconomics Table 2 shows that total labor by skill in the Riverside-San Bernardino-Ontario MSA is considerable when compared to the construction needs of the CPV Sentinel project. Staff agrees that there is more than adequate construction labor by skill within this regional area.

Secondary Economic Project Impacts

The Impact Analysis for Planning (IMPLAN) model (Professional Version 2.0, copyright Minnesota IMPLAN Group 2004) used in the CPV Sentinel AFC to estimate employment impacts from the project on the affected area is widely used and therefore acceptable to staff. The applicant estimated the indirect and induced impacts using multipliers that were derived from IMPLAN economic modeling software and data specific to the study area (CPVS 2007a).[3]

As stated in the AFC, construction activity would result in secondary economic impacts (indirect and induced) within Riverside County. The applicant estimates that indirect and induced effects of construction would include an additional 389 jobs; $15,082,538 in labor income; $2,550,991 in indirect business taxes (including sales, excise, and other taxes paid during construction); and $43,015,431 in output (the total value of goods and services) (CPVS 2007a; LW 2008). These impacts would be temporary, since they are attributable to temporary construction activities, and would lag behind the direct effects of construction by approximately six to 12 months.

Similar to construction, the applicant states that operation of the proposed project would result in indirect and induced economic impacts within Riverside County. The applicant estimates that direct and induced employment effects of annual operation that would occur within Riverside County would be an additional 20 permanent jobs; $888,056 in labor income; $149,796 in indirect business taxes (including sales, excise, and other taxes paid); and $2,493,843 in output.

Staff considers these projected beneficial economic impacts to be reasonable and finds the economic analysis acceptable and consistent with those of past siting projects. Socioeconomics Table 3 provides a summary of socioeconomic data and information from this analysis.

Housing

The applicant estimates that all of the construction workers would commute daily two hours or less each way to the proposed project site within Riverside County. As stated earlier, during the peak construction period (month six), the number of weekly

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[3] Indirect impacts are the changes in sales, income, or employment within the study area and region for companies supplying goods and services during construction and operation; induced impacts are changes in spending resulting from direct and indirect changes in the economy.

commuters would be about 371. Given the size of the labor force within commuting distance of the site, construction laborers are not expected to relocate for the 18-month construction period.

According to the 2006 American Community Survey and 2000 Census, there were approximately 732,433 housing units in Riverside County (U.S. Census 2006), including 7,034 units in Desert Hot Springs and 30,823 units in Palm Springs (U.S. Census 2000). These totals include housing units for rent, for sale, rented or sold, not occupied, for seasonal or recreational use, and for migrant workers' use. In 2006, Riverside County had a vacancy rate of 12.2 percent (U.S. Census 2006). At the time of the 2000 Census, Desert Hot Springs had a vacancy rate of 16.7 percent, and Palm Springs had a vacancy rate of 33.4 percent (U.S. Census 2000).

In addition to owner-occupied and rental housing, there are a number of motel/hotel accommodations and recreational vehicle sites throughout the study area. Palm Springs has approximately 187 hotels, with a total of approximately 6,400 hotel/motel rooms. The hotel occupancy rate in Palm Springs for the 2005–2006 fiscal year was 50.67 percent (CPVS 2007a). Palm Springs's economy relies on a tourist season that lasts approximately seven months of the year (October through April). Even during the tourist season, the highest occupancy rate for Palm Springs in recent years has not exceeded 72 percent (CPVS 2007a).

Desert Hot Springs has more than 39 hotels and motels. The total number of hotel/motel rooms is approximately 1,000. In May 2007, the applicant surveyed hotels in the Desert Hot Springs area and found that the occupancy rate was approximately 60 percent (CPVS 2007a).

In addition, Palm Springs has 13 mobile home parks with 2,635 spaces. The applicant surveyed a number of mobile home parks in May 2007. The parks' average annual occupancy rate was reported to be approximately 90 percent. Desert Hot Springs has eight mobile home parks with a total of 768 spaces. Again the applicant surveyed mobile home parks in Desert Hot Springs; the parks' average annual occupancy rate was reported to be approximately 57 percent (CPVS 2007a).

If construction workers do commute it would most likely be on a week-to-week basis. Dependents do not usually accompany construction workers to the site when the project is short-term as the CPV Sentinel project would be. Given the availability of housing, motel and hotel rooms, and mobile home parks and the fact that most workers would be commuting on a daily basis, staff does not expect this project to adversely impact local housing during construction.

The project would have 10 skilled full-time employees and 4 part-time. The applicant has stated that to the extent practicable, preference in hiring and procurements would be given to local residents and businesses—that is, those in the Riverside County region. Even if the employees relocated to the study area, based on the above-listed vacancy rates, staff does not expect that the 14 full- and part-time employees would have difficulty finding housing within Riverside County. The relocation of 14 full- and part-time employees and their families would not create a substantial increase in population that would, in turn, create a substantial increase in the demand for public services. Were all 14 full- and part-time employees to locate within the study area, using three persons per household, an additional 42 people would be added to the population, representing 0.002 percent of the Riverside County population in 2006 (U.S. Census 2006).

Staff concludes that the construction and operation workforce would not have a significant adverse impact on housing within the project study area.

Fiscal and Non-Fiscal Impacts

The project is being proposed by CPV Sentinel, LLC, which would construct and operate the power plant. The CPV Sentinel project has a projected construction cost of $380 million. The proposed project is located within the unincorporated areas of Riverside County, thus the county has taxing authority over the project. The general tax levy for Riverside County is determined in accordance with state law and is limited to 1.15907 percent of the assessed value of the property (CPVS 2007a). The assessed value of property is generally the cash or market value at the time of purchase, and this value does not increase more than 2% per year until the property is sold or any new construction is completed, at which time the property tax must be reassessed.

It is estimated that the proposed project would yield approximately $5.1 million in local property tax revenues to Riverside County annually, based on a final assessed property value of approximately $440 million (CPVS 2007a; LW 2008). Given current legislation and tax revenue allocation practices, it is likely that the Riverside County General Fund and the local school district (Palm Springs Unified School District) would be the greatest beneficiaries of the property tax revenue. However, many of the other special service districts and special purpose funds that provide a wide range of services to county residents would also benefit to a lesser extent.

Sales tax revenues for Riverside County would increase as a result of construction and operation of the proposed project and due to increased retail sales in the area (that is, gas, food, and lodging from construction and operation worker purchases and from supplies purchased locally). The CPV Sentinel project, including the revised water supply plan, would generate approximately $23,287,000 in sales tax revenue to the State of California. The state would allocate 1 percent of the sales and use tax ($2,332,000) to Riverside County and 0.5 percent ($1,166,000) to the Riverside County Transportation Commission (LW 2008).

Although most of equipment for the project (for example, turbines and other major equipment) would be purchased outside Riverside County for installation at the project site, about $9.066 million worth of project construction-related materials would be purchased within Riverside County. These local purchases would include building materials and supplies, such as scaffolding, insulation, and paint to the maximum extent practicable.

With respect to operational sales tax, the applicant has estimated that the proposed project would generate approximately $34,875 in taxable sales (7.75 percent sales tax multiplied by $450,000 worth of locally purchased materials) during its first year of operation. Most of this revenue ($28,125) would go to the State of California. An estimated $4,500 would be retained by Riverside County and $2,250 by the Riverside County Transportation Commission (CPVS 2007a).

In addition, the County of Riverside Transportation and Land Management Agency (TLMA) requires a Transportation Uniform Mitigation Fee (TUMF), which is based on an equation involving the number of average weekday trips generated by a particular development. As stated in the Traffic and Transportation section of the AFC (Section 7.10), the applicant has proposed a worker carpooling program (assumed at 11 percent single trip reduction), which would result in a reduction of trips from 371 to 330 one-way vehicle trips. The number of construction workers (craft) would be expected to be less than 300 for approximately 13 months out of the 18-month construction period (CPVS 2007a). Plant operations would require daily commutes of approximately 10 full-time and 4 part-time (May to September) personnel. According to the TUMF Handbook, the fee for Industrial projects would be $1,031.56 per 1,000 square feet or $7,666.40 per acre (CVAG 2007). Although the 37-acre project site would not be fully developed, conservatively the fee is estimated to be a maximum of $283,656.80. The fee would be assessed following project approval and paid prior to initiation of construction.

TLMA also requires a mitigation fee to fund construction of major thoroughfares or bridges. Industrial/commercial developments pay a fee based on the gross acreage of the project, as determined by TLMA permits staff. However, CPV Sentinel would not be located within one of the four Road and Bridge Benefit Districts, and therefore, the fee would not apply to the project site (Hansen 2008).

Finally, Riverside County Planning Department requires Development Impact Fees (DIF), which may be assessed once plans have been submitted and paid prior to initiation of construction. Riverside County Ordinance No. 659 requires impact fees be collected from developers for needed community facilities, open space, and wildlife and their habitats. Industrial public facilities within the San Gorgonio area are assessed a fee at $2,442 per acre (RCTLMA 2008). CPV Sentinel would include 85 acres of disturbance during construction, 60.5 acres of which would be permanent disturbance (including the 37-acre project site, 14-acre construction laydown area and 9.5 acres of linear ROWs). Therefore, the fee would range depending on the assessed acreage (37 for the project site to 60.5 acres of permanent disturbance), and so the DIF is estimated to be approximately $90,354 to $147,741. Similar to the TUMF, the DIF would be assessed following project approval and paid prior to initiation of construction.

To ensure that the Riverside County Development Impact Fee and Riverside County Transportation Uniform Mitigation Fee are paid, staff has proposed Conditions of Certification SOCIO-1 and SOCIO-2, respectively.

The non-fiscal impacts of the CPV Sentinel project include:

- estimated capital costs of $380 million,
- estimated construction payroll of $41.8 million over 18 months,
- estimated operations payroll of $1.322 million annually to the region.

Public Services

Education

The project site is located within the boundaries of the Palm Springs Unified School District (PSUSD). The closest schools are located in Desert Hot Springs, approximately four miles east-northeast of the site. As is shown in the Table 7.8-3 in the AFC, the school district is currently at or just over capacity at the district level. Nine elementary schools, one middle school, and two high schools have enrollments that exceed capacity, while a similar number of schools are slightly under capacity. School enrollment is expected to increase for the school district. The applicant has stated that plans are underway for the addition of four new schools within the school district. Plans include a new high school in Ranch Mirage, two elementary schools in Desert Hot Springs, and one middle school in Desert Hot Springs (CPVS 2007a).

During construction, most of the labor force would commute daily from within Riverside County. The addition of project-related children to schools that are at or over capacity may increase costs in terms of supplies, equipment, and/or teachers but the impact would be small. Even so, this worst-case scenario is unlikely to occur since any non-local construction workers would not likely relocate family members for the relatively short duration of construction.

For operation of the CPV Sentinel, 14 full- and part-time operation workers are expected to be hired from the local labor force of Riverside County. A worst-case scenario, using an average family size of three persons per household, would result in the addition of 14 school children to the Palm Springs Unified School District. This would result in an increase of less than 1 percent using 2006–2007 enrollments (24,129 children) for the Palm Springs Unified School District (CPVS 2007a).

Education Code section 17620 states that school districts are authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities. School facilities are defined as “any school-related consideration relating to a school district’s ability to accommodate enrollment.” California Government Code sections 65996–65997 state that except for a fee, charge, dedication, or other requirement authorized under section 17620 of the Education Code, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.

The PSUSD charges owners of new commercial industrial development $0.42 per square foot for covered and enclosed space (“habitable” structures). Based on an estimated 5,670 square feet of habitable space for the CPV Sentinel project, the PSUSD would charge the applicant a one-time school impact fee of approximately $2,381.40. Proof of payment of this statutory development mitigation fee at least 30 days prior to the start of project construction would be required by staff’s proposed Condition of Certification **SOCIO-3**.

Law Enforcement

Palm Desert Police Department. The Palm Desert Police Department (PDPD) provides police protection services to the unincorporated areas of Riverside County in the north Palm Springs area. The Palm Desert Police Department Patrol Division consists of 78 sworn deputy sheriff positions; 36 of these positions are dedicated to the patrol division, with the remaining deputies dedicated to special assignments such as the Traffic Division, Special Enforcement Teams, School Resource Officer, and Narcotics Enforcement (CPVS 2007a). The PDPD station closest to the proposed project site is at 50290 Main Street in Cabazon (approximately 12 miles to the west). Despite this distance, response time to the project area would be less than five minutes, as officers patrol assigned beats and would always respond from the field (CPVS 2007a).

Palm Springs Police Department. The city of Palm Springs Police Department (PSPD) would provide law enforcement services to the project site and vicinity in the event that the PDPD needs assistance (PSPD 2007a). The police department currently has 89 full-time officers, 60.5 civilian officers, 32 non-sworn volunteers, and 26 reserve officers (PSPD 2007b). The Police Department operates one station at 200 South Civic Drive (approximately nine miles southeast of the project site).

Because of the on-site security during construction and operation and other safety procedures described in the Worker Safety and Health section of the AFC and because the operation of power plants require little in the way of law enforcement, staff concludes that the existing law enforcement resources would be adequate to provide services to the CPV Sentinel project during construction and operation.

Public Utilities

Electricity. Southern California Edison (SCE) currently supplies electricity to the project area. The SCE Devers Substation is located approximately 700 feet west of the proposed project site, and the Indigo Energy Facility is located approximately 1.8 miles to the southeast.

Water Supply and Wastewater Treatment. Water is currently supplied to the project area by the Mission Springs Water District (MSWD). The MSWD provides water and sewer service to an area of 135 square miles. However, the project site area relies on septic systems, as the MSWD's sewer system does not extend to the proposed project site.

Gas. Natural gas is supplied to homes and businesses in the project vicinity by SoCalGas. Major industrial users such as gas-burning power plants are supplied by direct connection to the existing network of gas supply pipelines. SoCalGas serves a population of 20.1 million consumers through 5.6 million gas meters in more than 500 communities.

Waste. All solid, inert, and household-type waste in the area is currently picked up by Palm Springs Disposal Services (PSDS). According to the PSDS, after pickup, the waste is brought to the Edom Hill Transfer Station, which is operated by Waste Management North America. After arriving at the transfer station, the waste is moved onto larger trucks where it is moved to the Badlands Landfill, located off the Theodore Road exit on U.S. Highway 60 at the east end of Moreno Valley. The Badlands Landfill capacity for waste is projected to last 20 years (CPVS 2007a).

Water and wastewater discharge is discussed in the Soil and Water Resources section of this document; solid waste removal is discussed in the Waste Management section of this document; and supplies of electricity and natural gas are discussed in the Reliability section of this document.

Medical Services

The project site is served by both the Palm Springs Fire Department (PSFD) and the Riverside County Fire Department (RCOFD). Under an agreement between the two agencies, the initial or first response operational authority is maintained by the PSFD (CPVS 2007a). Second fire engine response to the project site is the responsibility of PSFD; however, in situations when assistance is needed, an engine unit from RCOFD would be requested. Fire protection is analyzed in the Worker Safety section of this document.

Paramedic services are contracted to American Medical Services (AMR) by the RCOFD and PSFD. AMR maintains a two-person unit (one emergency medical technician [EMT] and one paramedic) at 11600 Palm Drive in Desert Hot Springs, approximately 4.5 miles northeast of the proposed project site. The response time to the project site would be approximately 10 to 15 minutes. If more than one ambulance is needed, AMR would request assistance from the 12 additional ambulances stationed throughout the Coachella Valley (CPVS 2007a).

Palm Springs has one general hospital, Desert Regional Medical Center, with a 393-bed capacity. The hospital is located at 1150 North Indian Canyon Drive (6.2 miles to the south of the project site) and is the closest hospital to the proposed project site, with an estimated seven to 10 minutes' driving time to the site. Other hospitals/medical facilities within a 10-mile radius of the proposed project site are Angel View Children's Hospital, approximately nine miles to the northeast, and Canyon Springs Hospital, approximately 10 miles to the southeast. Palm Springs also has approximately 187 physicians/surgeons, 42 dentists, six optometrists, and 19 chiropractors (CPVS 2007a).

Because of the on-site security during construction and operation and other safety procedures described in the Worker Safety and Health section of the AFC, staff concludes that the emergency medical services resources would be adequate to meet the needs of CPV Sentinel during construction and operation.

Parks and Recreation

The 794,000-acre Joshua Tree National Park is managed by the U.S. Department of the Interior National Parks Service and is located just a few miles east of Desert Hot Springs. Congress changed the status of the Joshua Tree National Monument to a national park in October 1994 (NPS 1997). Recreational activities available at the park include backpacking, camping, mountain biking, rock climbing, geologic tours, birding, horseback riding, and star gazing (NPS 2008).

Within Riverside County, the Riverside County Regional Park and Open-Space District is an independent agency governed by a board of supervisors that manages and operates more than 44,000 acres, which includes 40 parks, reserves, historic, or archaeological sites and 90 miles of regional trails (Riverside County Parks 2008). Finally, Desert Hot Springs itself has six parks within its city limits: Arroyo Park, Constitution Park, Eastside Park, Hot Springs Park, Mission Springs Park, and Wardman Park.

Staff does not expect the construction or operation workforces to have a significant adverse impact on parks and recreation because of the number and variety of parks within the regional project area. In addition, construction workers are unlikely to bring their families to a work site, and therefore, impact existing park services.

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 15130).

Cumulative impacts may 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 CPV Sentinel project would average 212 workers per month during the 18-month construction period, December 2008 through May 2010. Potential concurrent construction of several industrial and mixed-use residential projects planned in the project vicinity include the following (CPVS 2007a):

- Indian Avenue/I-10 Interchange Project: This proposed project involves reconstruction of the Indian Avenue/I-10 Freeway interchange and is located south of the proposed project. This reconstruction is expected to begin in 2008.
- Dillon Wind Farm: This proposed project includes the installation of 45 wind turbines located in three separate areas, including (1) an area west of Devers Substation, (2) an area 2,000 feet east of the project site, and (3) an area 4,500 feet to the southeast of the project site. The environmental impact report for this project was recently certified by Riverside County.
- Wind Energy Conservation System (WECS) 20 Permit Project: This proposed project consists of construction of eight new GE 1.5-MW wind turbine generators in the existing WECS 20 Wind Park. This site is located approximately 0.5 mile west of State Route 62 and two miles north of I-10, about two miles northwest of the proposed project site.
- Green Path Project: The main feature of the proposed Green Path project is a new 100-mile, 500-kV line planned to extend from the Devers-Palo Verde transmission corridor north to a new Upland Substation in the northeastern sector of Los Angeles Department of Water and Power (LADWP) service territory. The project would

increase the reliability and voltage support of the existing system by upgrading to the 220-kV standards of existing corridors. Planned construction is 2007 to 2009; planned in-service date is late 2010.

- Oasis Annexation: This proposed project includes construction of a mixed-use development (including residential) on 155 acres located approximately 3.2 miles northeast of the project site.
- Alpine Group Development: This proposed project includes construction of a mixed-use development (including schools and high-density residential) on 160 acres located one mile northwest of the project site. The city of Desert Hot Springs is expecting to annex and approve this project.
- Palmwood Specific Plan and Outparcels Development: This proposed project includes construction of a mixed-use development (including 1,853 residential units) on 1,926 acres located 6.5 miles north of the site.

While increased demand for lodging services could occur in the area during construction of any future development projects, a sufficient number of rooms exist within commuting distance to accommodate the proposed project and the industrial and mixed-use residential projects listed above, were they to be constructed during the CPV Sentinel project proposed construction period, December 2008 through May 2010. In addition, most workers are expected to commute daily to the CPV Sentinel project site rather than temporarily relocate to the area.

Power plant construction is specialized in nature and workers in the affected trades for Riverside-San Bernardino MSA number 117,820 (see Socioeconomics Table 2). Therefore, there would be a sufficient number of skilled construction workers to accommodate the CPV Sentinel project as well as the cumulative development projects. Although there is a sufficient workforce for these projects, if needed, an additional labor force would be available from the Los Angeles metropolitan area, which is approximately two hours west of the site.

Similarly, cumulative impacts would not result from the operation phase of the power plant, because the number of new permanent personnel is small (10 full-time and 4 part-time workers), and these workers would likely be from Riverside County and would not need to relocate to the project area.

Based on this information, staff agrees with the applicant that potential cumulative impacts to socioeconomics would be less than significant.

NOTEWORTHY PUBLIC BENEFITS

Important public benefits discussed under the “Fiscal and Non-Fiscal Impacts” subsection in this section are capital expenditures, construction payroll, sales taxes, property taxes, and the value of regionally purchased construction and operation equipment and materials.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comments were provided in writing on the contents of the PSA from agencies, organizations and members of the public, as well as the Applicant. Comments related to issues presented in the **Socioeconomics** section of the PSA are summarized below. Each comment is followed by a response.

AGENCY COMMENTS ON THE PSA

The County of Riverside, Transportation and Land Management Agency, Planning Department was the only public agency that provided comments on the Socioeconomics Section of the Preliminary Staff Assessment. Their comments and responses are presented in this section.

Comment 1: County of Riverside (08/27/08). In its comment letter, the County of Riverside attached Preliminary Draft Conditions of Approval for the proposed CPV Sentinel Project (Public Use Permit #00897). Prior to building permit issuance (Section 80, Trans 3), the County recommends that "the project proponent shall pay the Transportation Uniform Mitigation Fee (TUMF) in accordance with the fee schedule in effect at the time of issuance, pursuant to Ordinance No. 673." Payment of this fee would affect the fiscal impacts of the project, and therefore, would pertain to Socioeconomics.

Response: Within the Socioeconomics Section of the PSA, the TUMF fee is listed in Socioeconomics Table 1 (Laws, Ordinances, Regulations, and Standards), is discussed under the section on Fiscal and Non-Fiscal Impacts above, and is listed in Socioeconomics Table 3, which describes the capital costs associated with the project. In addition, proposed Conditions of Certification **SOCIO-2** states that the project owner shall pay a one-time statutory TUMF to Riverside County and this payment would be verified at least 30 days prior to the start of construction by the Energy Commission CPM.

Therefore, Riverside County's Preliminary Draft Conditions of Approval that pertain to Socioeconomics were already included in the PSA analysis and no text changes are required.

APPLICANT COMMENTS ON THE PSA

The Applicant (CPV Energy, LLC) provided one minor comment on the Socioeconomics PSA, which is summarized below along with the relevant response.

Comment 1: CPV Energy, LLC (8/21/08). On August 21, 2008, the Applicant provided written comments on PSA Section 4.8 (Socioeconomics) in tabular format. Comments on Socioeconomics were limited to a text correction regarding the voltage of the existing 220 kV transmission system that would be upgraded with the Green Path Project in the cumulative projects list.

Response: Text in the Socioeconomics Section of the FSA has been revised as appropriate to reflect the Applicant's comment that the voltage should be "220 kV," not "230 kV" as was originally written.

CONCLUSIONS

Estimated gross public benefits from the CPV Sentinel project include increases in sales tax, employment, and income for Riverside County. For example, the applicant estimates an average of 212 direct project-related construction jobs for the 18 months of construction. The total capital cost of the CPV Sentinel project is estimated at $380 million. The construction payroll is estimated at $41.8 million for 18 months of construction, and the operation payroll is estimated at $1.322 million. The total sales tax during construction is estimated at $23.2 million. An estimated $9.066 million would be spent locally for materials and equipment during construction; an additional $450,000 million would be spent for local materials during the first year of operation. On average, the estimated budget for the proposed project would be $3.2 million for operations and $5 million for maintenance.

Staff concludes that construction and operation of the CPV Sentinel project would not cause significant direct or cumulative adverse socioeconomic impacts on the study area's housing, schools, law enforcement, emergency services, hospitals, and parks. Staff also concludes that the CPV Sentinel project would not induce substantial growth or concentration of population; induce substantial increases in demand for public services; or displace a large number of people. In addition, the revised water supply plan, which was submitted as a supplement to the AFC (LW 2008a), would be a minor portion of the overall project in terms of construction cost and labor requirements and would not have any substantial socioeconomic effects. The revised water supply plan would not change the analysis, conclusions, or proposed conditions of certification presented by staff for socioeconomic resources. Hence, there would be no socioeconomic environmental justice issues (disproportionate impacts on minorities or poverty populations) related to this project.

Finally, the following Socioeconomics Table 3 provides a summary of socioeconomic data and information from this analysis, with emphasis on economic benefits of the CPV Sentinel project.

Socioeconomics Table 3
Data and Information

Total Project Capital Costs	**$380 million**
Estimate of Regionally Purchased Equipment and Materials	
Construction	$9.066 million
Operation	$450,000 annually
Estimated Annual Property Taxes	$5.1 million
Estimated School Impact Fees	$2,381.40 one-time fee to PSUSD
Riverside County Mitigation/Impact Fees	$90,354 to $147,741 (DIF) $283,656.80 (TUMF)
Direct Employment	
Construction (average)	212 jobs
Operation	14 full-time and part-time permanent employees
Secondary Employment	
Construction	389 jobs (Riverside County, State of California)
Operation	20 jobs (Riverside County)
Direct Income	
Construction	$41.8 million
Operation	$1.322 million
Secondary Income	
Construction	$15,082,538 million in labor income (Riverside County and California)
Operation	$888,056 in labor income; $2,493,843 in output (non-labor costs plus value added)
Payroll	
Construction	$41.8 million for 18 months (2007 dollars)
Operation	$1.322 million annual total (2007 dollars) [$1.122 million annually for 10 full-time employees; and $200,000 annually for 4 part-time technicians (May to September)]
Estimated Sales Tax	
Construction	$23.2 million (2007 dollars)
Operation	$34,875 during the first year (2007 dollars)
Average Unemployment Rates (February 2008, not seasonally adjusted)	Riverside County – 7.0% City of Desert Hot Springs – 9.6% City of Palm Springs – 5.4%
Percent Minority Population (6-mile radius)	53.53 percent based on the 2000 Census.
Percent Poverty Population (6-mile radius)	22.47 percent based on the 2000 Census.

Source: CPVS 2007a; EDD 2008; LW 2008; URS 2007.

PROPOSED CONDITIONS OF CERTIFICATION

SOCIO-1 The project owner shall pay a one-time statutory Development Impact Fee to Riverside County.

Verification: At least 30 days prior to the start of construction, the project owner shall provide proof of payment of the statutory Development Impact Fee to the Energy Commission CPM.

SOCIO-2 The project owner shall pay a one-time statutory Transportation Uniform Mitigation Fee to Riverside County.

Verification: At least 30 days prior to the start of construction, the project owner shall provide proof of payment of the statutory development impact fee to the Energy Commission CPM.

SOCIO-3 The project owner shall pay the one-time statutory school facility development fee to the Palm Springs Unified School District as required by Education Code section 17620.

Verification: At least 30 days prior to the start of project construction, the project owner shall provide to the CPM proof of payment of the statutory development mitigation fee.

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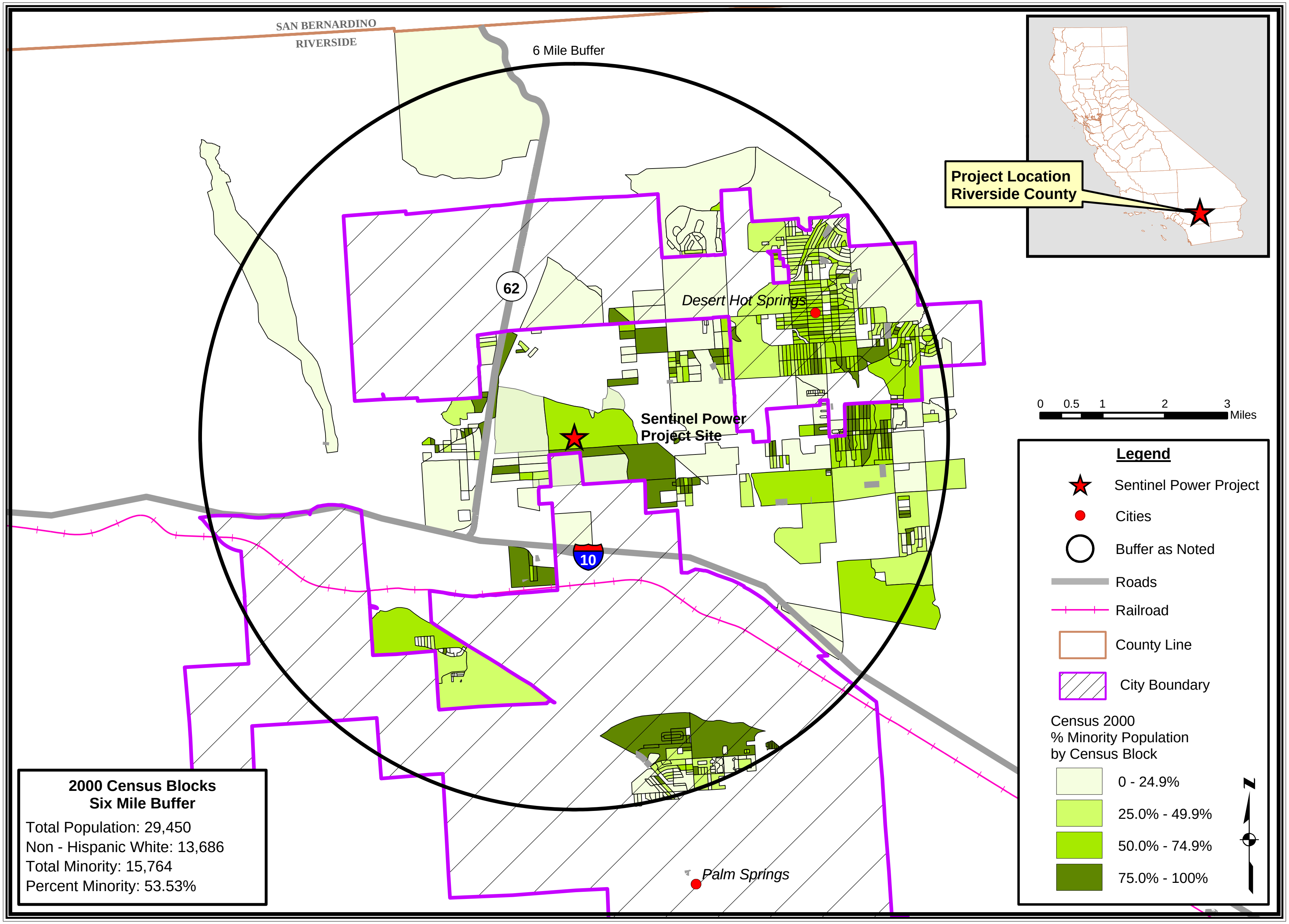
SOCIOECONOMICS - FIGURE 1

CPV Sentinel Energy Project - Census 2000 Minority Population by Census Block - Six Mile Buffer



CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: California Energy Commission Statewide Power Plant Maps 2008 - Census 2000 PL 94-171 Data - Matrix PL2

SOIL AND WATER RESOURCES

Testimony of Christopher Dennis, P.G., John Fio, and John Kessler, P.E.

SUMMARY OF CONCLUSIONS

With the implementation of staff's recommended conditions of certification, staff concludes that the project would not cause any unmitigable significant impacts and would conform to LORS.

The circumstances that led to the development of the applicant's proposed Water Supply Plan (WSP) are unique to this case. As a result, staff believes that although its recommendation is that the Energy Commission find the project with respect to Soil and Water Resources would not cause a significant adverse water resources impact and would conform to LORS, the complexities of this case deserve to be highlighted. Staff has looked carefully at both the potential for the project to cause significant adverse impacts combined with the adequacy of mitigation, and the project's conformance with LORS, including the Energy Commission's 2003 Integrated Energy Policy Report (IEPR) water conservation policy.

With respect to the potential for significant impacts associated with the project's extraction of groundwater, staff believes the applicant's proposal to import new water into the Mission Creek Groundwater Sub-basin (MCGS) for recharge at 108% of the project's use would avoid contributing to the depletion of groundwater in a basin that is already in overdraft. In addition, to ensure that there are no temporary effects on other groundwater users in the basin, staff has proposed a number of conditions of certification that require recharge activities to occur on a schedule that results in no change in groundwater levels at residential wells and the 330-acre Willow Hole Conservation Area, which hosts several state and federally-protected plant and animal species.

The Energy Commission's 2003 IEPR policy on water use for power plant cooling, states that the Energy Commission will approve the use of fresh water for cooling purposes by power plants which it licenses only where alternative water supply sources and alternative cooling technologies are shown to be 'environmentally undesirable' or 'economically unsound'. In evaluating compliance with this policy, staff first assessed whether the proposed project will use fresh water. Based on guidance provided in the State Water Resources Control Board's policies and Title 22 of the California Code of Regulations, staff concluded that it will use fresh water. Next, staff determined that that reclaimed water from the Mission Spring Water District's Horton wastewater treatment plant is neither environmentally undesirable nor economically unsound. Staff also reviewed the option for dry cooling and concluded that at this time it appears economically unsound due to the lower cooling efficiency and loss of power generation.

Staff then looked to previous powerplant siting case decisions of the Energy Commission to determine whether additional evaluation of the conformity of the project with the policy was appropriate. Based on the Commission's decisions in the recent Panoche Energy Center (06-AFC-5) and the Starwood-Midway Project (06-AFC-10) Projects, staff concluded that the Energy Commission has also considered the intent of the policy in determining a project's conformity with the policy. The Energy Commission's findings in both of these cases appeared to conclude that a project proposing to use a fresh water source that is of higher quality than the most degraded source reasonably available to the project, can comply with the policy where the project also includes measures that would accomplish conservation of water of a greater quantity and higher quality than the project would use. Water conservation quantities required in the Final Decisions for Panoche Energy Center and Starwood-Midway cases relative to the project's maximum annual water use were 109% and 100+% respectively.

The CPV Sentinel project as proposed would accomplish conservation of an even greater quantity of water than the project would use (approximately 150% of the project's maximum water use, and 300% of the project's average water use). However, staff remains concerned that water conserved under the WSP is not of a higher quality than the project's source of supply. Given this, staff notes that the WSP would result in conservation of fresh water far in excess of that conserved in the two previous siting cases discussed. Given that the Energy Commission has found that conservation of a higher quantity and quality of water can be used to support a finding of compliance with the policy, staff concluded that it is reasonable to find that conservation of a significantly greater quantity of water than used by the project can also support a finding of conformity with the policy.

Staff has attempted to arrive at a solution that would meet the spirit of the 2003 IEPR policy. Building from principles articulated in prior siting case decisions that the policy can be applied more broadly than its express terms, staff has determined that the proposed WSP associated with the CPV Sentinel project is a preferable option for water supply and for achieving conservation relative to the alternatives. However, staff's recommendation to the Energy Commission depends on the assumption that the recommended conditions of certification contained in the Final Staff Assessment would be adopted in the Final Decision. This would ensure that the applicant's proposed water conservation measures are fully implemented, and the water savings identified above are achieved.

Staff also recommends that the 2003 IEPR Policy be revisited during the next IEPR proceeding to enable the Commission to provide staff with additional direction on the application of the policy in future powerplant siting cases. If the Energy Commission believes it is appropriate to allow use of fresh water for cooling when alternatives are viable, clarifications about the types of benefits that can support a finding of conformity of a project with the policy would be helpful to both staff and developers. The staff has been a strong proponent of the Commission's water conservation policy for powerplant cooling since its adoption in the 2003 IEPR and wants to ensure it is appropriately following the Commission's policy guidance in this critical area in the future.

INTRODUCTION

This section analyzes potential impacts to soil and water resources from the construction and operation of the CPV Sentinel project. The analysis specifically focuses on the following questions:

- Whether the project would violate any water quality standards or waste discharge requirements.
- Whether the project would substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- Whether the project would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding or substantial erosion or siltation on- or off-site.
- Whether the project would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Whether the project would place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- Whether the project would contribute to any lowering of the groundwater levels such that protected species or habitats are affected.
- Whether the project would cause substantial degradation to surface water or groundwater quality.

Where the potential for impacts are identified, staff has proposed mitigation measures to reduce the significance of the impact and, has recommended conditions of certification.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental Laws, Ordinances, Regulations, and Standards (LORS) have been established for the CPV Sentinel project. Compliance with LORS ensures the most appropriate use and management of both soil and water resources. The requirements of these LORS are specifically intended to protect human health and the environment. The potential for project compliance with these LORS is a major component of staff's analysis.

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. The Clean Water Act also establishes protection of navigable waters through Section 401. Section 401 certification through the Army Corps of Engineers and Regional Water Quality Control Board (RWQCB) is required if there are potential impacts to surface waters of the State and/or Waters of the United States, such as perennial and ephemeral drainages, streams, washes, ponds, pools, and wetlands. Section 401 requires impacts to these waters to be quantified and mitigated.
Resource Conservation and Recovery Act	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.
State LORS	
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.
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 as a waste or unreasonable use of fresh water, if suitable recycled water is available. The availability of recycled water is determined based on criteria listed in Section 13550 by the State Water Resources Control Board (SWRCB).
Public Resources Code Section 21151.9	Public Resources Code section 21151.9 requires cities and counties to comply with Part 2.10 of Division 6 (beginning with section 10910) of the Water Code (Part 2.10) when preparing an Environmental Impact Report (EIR) for projects that meet or exceed a specified threshold of water use. The Energy Commission's licensing process is exempt from the requirement to prepare an EIR (Pub. Resources Codes § 21080.5; Cal. Code Regs., tit. 14, § 15251(j)), but the Energy Commission staff addresses the issues identified in Part 2.10 for projects that meet or exceed the specified threshold as part of its staff assessment.
SWRCB WQO 99-08	The SWRCB regulates stormwater discharges associated with construction projects affecting areas greater than or equal to 1 acre to protect state waters. Under Order 99-08, the SWRCB has issued a National Pollutant Discharge Elimination System (NPDES) General Permit for stormwater discharges associated with construction activity for which applicants can qualify if they meet the criteria and upon preparing and implementing an acceptable SWPPP and notifying the SWRCB with a Notice of Intent.
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 specifies Primary and Secondary Drinking Water Standards in terms of Maximum Contaminant Levels (MCLs). These MCLs include total dissolved solids (TDS) ranging from a recommended level of 500 milligrams per liter (mg/l), an upper level of 1,000 mg/l and a short term level of 1,500 mg/l. Other water quality MCLs are also specified, in addition to MCLS specified for heavy metals and chemical compounds.

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.
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 13751	The licensed well driller (C-57 license) of any well in the State of California is required to complete and submit a Well Completion Report which describes the well location, well driller's name and address, well owner, and well construction details. A well completion report must submitted within 60 days of well installation to the Department of Water Resources.
Local LORS	
Riverside County Public Use Permit 897	This permit identifies the county planning department's preliminary conditions of approval for the proposed project.
Riverside County General Plan	Address issues such as drainage, erosion control, hazardous material spill control, facility siting in flood zones, and stormwater discharge.
Riverside County Ordinance 458.12	Regulates development within flood hazard zones in Riverside County.
Riverside County Ordinances 457, 592.1, and 650.	Regulates the permitting, construction, and operation of onsite sewer systems.
Riverside County Ordinance 682	Regulates the construction, reconstruction, abandonment, and destruction of wells.
Riverside County Ordinance 754.2	Regulates storm water discharges.
State Policies and Guidance	
The Porter-Cologne Water Quality Control Act of 1967, Water Code Sec 13000 et seq.	Requires the 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	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.
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.
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	The 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 RWQCB administers the requirements of the Act.
Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq)	In the 2003 Integrated Energy Policy Report (IEPR), consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy 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 CPV Sentinel project would be located in the Coachella Valley, in an unincorporated part of central Riverside County, California, near the city of Desert Hot Springs (DWR2003). The Coachella Valley is in the northwestern Colorado Desert region of the Sonoran Desert where water resources are extremely limited (DWR2003).

REGIONAL WATER RESOURCES

The primary source of water to the Coachella Valley has historically been from the surrounding mountains where surface runoff flows along rivers, creeks, and washes which discharge to and infiltrate the alluvium-filled valley. Infiltration of surface water into these alluvial sediments forms what is known as the Coachella Valley Groundwater Basin. This groundwater basin is the primary natural water supply for the Coachella Valley region.

There is little to no surface water outflow from the basin due to the high infiltration rates of the soil, high evapotranspiration rates, and presence of spreading basins that intercept surface water flows for infiltration. Any remaining surface flow discharges to the Salton Sea, located approximately 41 miles to the southeast.

Groundwater recharge from precipitation is considered minimal in the Coachella Valley Groundwater Basin because direct recharge from rainfall within the basin is significantly less than the potential rate of evapotranspiration and potential for soil moisture retention (PSOMAS2004). In portions of the basin where there has been development, a potentially significant volume of water that is used may be returned to the groundwater basin through wastewater treatment plant (WWTP) percolation basins, septic systems, and inefficient irrigation practices.

A relatively new source of water in the Upper Coachella Valley has resulted from the importation and spreading of Colorado River water for groundwater recharge. There are two spreading grounds for enhanced percolation of the imported water: the Whitewater River spreading grounds and Mission Creek spreading grounds. Spreading operations began in 1973 at the Whitewater River grounds and in 2002 at the Mission Creek spreading grounds. Since 2002, this recharge is necessary because groundwater pumping in portions of the basin has created overdraft conditions. Overdraft is defined herein as natural recharge to a groundwater basin that is less than outflow from the basin. (This definition specifically excludes artificial recharge to the groundwater basin.) A managed groundwater basin is defined herein as one where water is imported and/or pumping extraction are rates limited in order to manage groundwater levels and quality.

The Desert Water Agency (DWA) and Coachella Valley Water District (CVWD) are the primary agencies responsible for importing surface water and recharging groundwater in the Upper Coachella Valley. The water imported for recharge is delivered by the Metropolitan Water District of Southern California (MWD) through its aqueduct to the spreading grounds which are owned and operated by DWA and CVWD. This water delivery is facilitated through a series of water management and delivery agreements. The water delivered for recharge under these agreements is infiltrated in the upper portion of the Coachella Valley Groundwater Basin. Further detail regarding this source of water, the agreements, and the relationship to the project, is discussed below.

Upper Coachella Valley Groundwater Basin

As shown in **Soil & Water Figure 1,** the project would be located on the upper Coachella Valley Groundwater Basin where it is surrounded by the Little San Bernardino Mountains on the north, San Bernardino Mountains on the northwest, and the San Jacinto Mountains on the south and east (DWR1964). The Whitewater River is the main drainage on this portion of the basin. This river is fed by Mission Creek, the San Gorgonio River, Little and Big Morongo Creeks, Box Canyon Washes, and a number of smaller mountain drainages (DWR1964). Most of the flow occurs during intense storms, leaving the creeks and washes dry most of the year. When water is present, flows can be up to 29 cubic feet per second (cfs) (IWRIS2008).

The upper portion of the basin is further defined by northwest and southeast trending faults. These faults offset bedrock and the overlying alluvium, forming four groundwater sub-basins. The faults have displaced the alluvium and bedrock creating subsurface stairstep-like barriers to groundwater flow between the sub-basins. From north to south, the faults are the Mission Creek, Banning, and Garnet Hill faults, all parts of the San Andreas fault system. The faults act as a barrier to lateral groundwater movement in the alluvial material resulting in a drop in groundwater elevation across each subsequent downgradient fault zone. The four groundwater sub-basins defined by these faults are known as the Desert Hot Springs (DHSGS), Mission Creek (MCGS), Garnet Hill (GHGS), and Whitewater River (WRGS) sub-basins (Tyley1971). The project would be located on the MCGS.

MISSION CREEK GROUNDWATER SUB-BASIN

The 76 square-mile MCGS (DWR2003) is bounded on the north by the Mission Creek fault and on the south by the Banning Fault. An estimated 1,400 to 7,000 acre feet per year (AFY) of groundwater moves laterally across the constrictive Banning fault to the Garnet Hill Groundwater Sub-basin (GHGS) (GSI2005). To the west, the sub-basin is bounded by the San Bernardino Mountains and to the east by the Indio Hills. Artesian conditions have historically been present near a narrow strip along the northwest portion of the Seven Palms Ridge (DWR1964), allowing for the development of a unique

Willow-Mesquite biological community that is now threatened due to declining groundwater levels. Depth to groundwater in other parts of the sub-basin averages 300 feet below ground surface (GSI2005).

The MCGS is filled with Holocene and late Pleistocene unconsolidated sediments eroded from the San Bernardino and Little San Bernardino Mountains (Psomas2005). There are three significant water bearing sedimentary deposits recognized in the basin: the Ocotillo Conglomerate, Cabazon Fanglomerate, and Holocene alluvial and sand deposits. These deposits are lenticular and laterally limited alluvial fan and pediment deposits that coalesce with one another.

The MCGS is considered an unconfined aquifer with a saturated thickness of 1,200 feet or more and an estimated total storage capacity on the order of 2.6 million AF (AF) (DWR2003). The sub-basin is naturally recharged by surface and subsurface flow from the Whitewater River, Mission Creek, San Gorgonio River, Little and Big Morongo Washes, Long Canyon, and surrounding mountain drainages (Psomas2005). Irrigation return flow and discharges from municipal and individual subsurface wastewater disposal systems also contribute to recharge. The MCGS supplies high quality water for domestic use to individual groundwater pumpers and retail water to the City of Desert Hot Springs, and the communities of North Palm Springs, West Palm Springs, Desert Crest, West Garnet, Painted Hills, and Mission Lakes through the Mission Springs Water District (MSWD) and CVWD.

The MCGS, like other groundwater sub-basins in the Coachella Valley, is in a state of overdraft. Water level declines have been apparent since the early 1960s and, in the 1970s, when the United States Geological Survey (USGS) sponsored the development of groundwater analog models to assist the DWA and CVWD in their water management decisions regarding importing water for groundwater recharge (Tyley1971; Tyley1974). Water levels have declined in the MCGS approximately 63 feet during 1955 to 1997 (Slade2000) and are expected to continue to decline (Psomas2007).

In California, groundwater management is a local activity defined by planned and coordinated monitoring, operation, and administration with the goal of long-term sustainability of the resources (DWR2003). Recognizing that water in the sub-basin is a diminishing resource, several transfer, exchange, and management agreements have been negotiated between DWA and MWD beginning in 1962. The purpose of these agreements was to bring freshwater into the Whitewater River Groundwater Sub-basin (WRGS) and MCGS to arrest the declining water levels and replenish groundwater in these sub-basins on an ongoing basis.

Since 2002, groundwater has been recharged at the Mission Creek spreading grounds through a surface water importation program. In 2004, a Settlement Agreement between the MSWD, DWA, and CVWD established a Management Committee for the MCGS consisting of the General Managers from the DWA, CVWD, and MSWD. This committee is charged with reviewing the sub-basin's production and recharge activities each year and allocating the amount of water available for recharge in the current year based on the proportionate use by each agency/district during the previous year. As part of this agreement, a draft Water Management Plan (Dodson2008) was developed by the MSWD and an annual Engineer's Report is completed by the DWA. The Engineer's Report for 2007 was published in April 2008.

According to the 2008 Engineer's Report, the MCGS water supply is managed by the DWA (K&S2008). DWA is primarily responsible for replenishing the groundwater in the MCGS, and is a water retailer in the WRGS. MSWD is a water retailer with a jurisdictional boundary covering much of the MCGS. CVWD has two production wells in the MCGS, but does not replenish or provide water to users in the MCGS. The CVWD is responsible for replenishing the WRGS. Although the CVWD and DWA have entitlements to State Water Project (SWP) water, they do not have a physical connection to that water supply. As a workaround solution, the CVWD and DWA have entered into transfer and exchange agreements with the MWD to exchange Colorado River water for SWP water on a one-to-one basis (**Soil & Water Table 2**). The MWD has allocation rights to both water resources. This exchange agreement remains effective to the year 2035. However, the California Department of Water Resources (DWR) may in any year change the amount of SWP water allocated to the DWA and CVWD. As a result, in drought years, the MCGS could face accelerated overdraft conditions.

Based on the MWD Colorado River water priority rights, the MWD's actual allocation from that source varies year by year. As a result, the volume of water available for importation into the MCGS varies year by year. Through year 2010, the combined DWA and CVWD SWP water allocation is 171,000 AFY with 121,000 AFY going to the CVWD and 50,000 AFY going to the DWA (K&S2005). From 2010 to 2035 the combined SWP water allocation for the DWA and CVWD will be 194,000 AFY with 55,750 AFY going to the DWA and 138,250 AFY going to the CVWD (L&W2008c).

The DWA and CVWD have also entered into advance delivery agreements with the MWD. These agreements allow the DWA and CVWD to store surplus Colorado River water in the MCGS and WRGS which must be exchanged for SWP water when needed by the MWD. These agreements help to relieve the overdraft condition of the two sub-basins and provide a storage bank for the MWD for excess Colorado River water. In efforts to further reduce the overdraft conditions, the DWA and CVWD have also purchased surplus SWP water. This surplus water is available in one of two pools, Pool A and Pool B, and consists of turn-back water that was previously allocated to other SWP water users. A summary of the requested deliveries and actual deliveries since construction of the Mission Creek spreading grounds is presented in **Soil & Water Table 2** below.

SOIL & WATER Table 2
Summary of Total Water Allocated to the Desert Water Agency[1]

Year	Table A - Allocation (AF)[2]	Actual Allocation Deliveries (AF)	Difference Between Table A Allocation and Allocation Delivered (AF)	% Allocation Delivered	Pool A Purchase (AF)	Pool B Purchase (AF)	Total Delivery (AF)
2002	38,100	26,670	-11,430	70%	271	510	27,451
2003	38,100	34,290	-3,810	90%	285	36	34,611
2004	38,100	24,765	-13,335	65%	---	102	24,867
2005	50,000	45,000	-5,000	90%	171	951	46,122
2006	50,000	50,000	0	100%	0	0	50,000
2007	50,000	30,000	-20,000	60%	0	0	30,000
2008	50,000	17,500	-32,500	35%	---	---	17,500

Notes:
1. Source: DWR2008a. Advance deliveries are part of a groundwater banking agreement and are not permanent additions to the sub-basin. Therefore, the advance deliveries are not included in this table
2. AF = acre-feet

As illustrated in **Soil & Water Table 2**, in all but one instance the full allocation has not been delivered. The 2008 Engineer's Report states that full delivery of the SWP allocation is required to maintain the current conditions in the MCGS (K&S2008). Without full allocation deliveries, cumulative overdraft will continue.

Groundwater Quality

The MCGS groundwater has won awards for taste several times over the past few years (MSWD2008a). The drinking water is characterized as calcium-sodium-sulfate-bicarbonate (DWR1964, Slade1981). TDS ranges from 200 mg/l in the recharge zones near the northwest end of the sub-basin to more than 800 mg/l in the downgradient southeast end of the sub-basin (USGS1978). Radioactive uranium has been detected in MSWD well 26A at concentrations greater than the California Maximum Contaminant Level (MCL). Lindane and antimony have also been detected in MSWD well 24 at concentrations above the MCL (Psomas2005).

Reclaimed Wastewater

There are two wastewater treatment plants (WWTP) in the MCGS, both operated by the MSWD (Psomas2004; Psomas2005). The larger of the two is the Horton WWTP, with a capacity of approximately 2.5 million gallons per day (mgd) (2,800 AFY) and a 2.0 mgd discharge capacity. The smaller plant, the Desert Crest WWTP, has an approximate capacity of 0.18 mgd (202 AFY) and is planned to be abandoned (Psomas2004). Combined, percolation at these WWTPs results in an estimated 1,013 AFY of water returned to the MCGS (Psomas2004). Both plants treat the effluent to secondary levels prior to allowing the water to percolate and evaporate in retention basins. Neither WWTP has customers for tertiary water. Approximately 341 AFY of additional water returns to the MCGS from non-sewered private disposal systems (Psomas2004).

Landscape and agricultural irrigation return flow has been estimated at 302 AFY (Psomas2004). Using these numbers, staff calculated the total return flow at 1,656 AFY.

PROJECT, SITE, AND VICINITY SETTING

The proposed CPV Sentinel project is an 850-megawatt (MW) facility that would consist of eight simple-cycle General Electric LMS-100 natural gas-powered turbines. The project is designed to provide power during times of peak demand over the plant's projected lifespan of 30 years (CPVS 2007a). CPV Sentinel has already entered into a contract with Southern California Edison to supply electricity from all eight turbines during peak electrical demands. The LMS-100 turbines would be water-cooled using inlet air fogging and a wet evaporation tower for the intercooler system.

Project construction would encompass approximately 37 acres, including the laydown area and a 3/4-acre stormwater retention basin (CPVS 2007a). The 14-acre construction laydown area would be located in an undeveloped area within an existing wind farm. The project would include the construction of a 2.6-mile long natural gas line from the Indigo power plant to the project site, a 2,300-foot long transmission line from the project site connecting to the Devers Substation, and a 3,200-foot long potable water supply line from Dillon Road to the south of the project site.

The project applicant also proposes to implement a Water Supply Plan (WSP) as part of the project. The WSP has four main components.

1. The project owner would fund the installation of a recycled water line to serve the Palm Springs National Golf Course (PSNGC) and convert the golf course irrigation water supply from groundwater to recycled water from the DWA WWTP. The new recycled water line would consist of approximately 900 feet of 12-inch pipeline extending from an existing DWA service main located along South Murray Canyon Drive in Palm Springs. Both the golf course and WWTP are located within the WRGS.

2. The project applicant would fund the replacement of existing residential irrigation controllers with new water conserving irrigation controllers within the WRGS, GHGS, and MCGS. These new controllers would replace existing ones on at least 4,800 existing homes.

3. The project applicant proposes a water transfer and exchange program intended to replenish groundwater in the MCGS with fresh water equal to that extracted from onsite wells. The imported water would come from the Colorado River in exchange for water purchased in Kern County.

4. Lastly, as part of the project owner's agreement with the DWA to import fresh water, the project owner has agreed to make payments in to the Replenishment Program on a voluntary basis in accordance with the terms of the 2001 Ocotillo Well Metering Agreement and 2003 Replenishment Agreement (L&W2008c).

Soils

The proposed CPV Sentinel project site, offsite pipeline routes, and the transmission line corridor are located on areas of very deep, moderately well to excessively drained soils on alluvial and pediment deposits. Surface soils typically consist primarily of gravelly sand and fine sand. The primary soil types are listed below. Additional soil characteristic data can be found in Table 7.9-1 of the Application for Certification (AFC).

SOIL & WATER Table 3
Soil Types Potentially Affected & Characteristics

Primary Soil Name	Slope Class	Water Erosion Potential	Wind Erosion Potential	Permeability (in/hr)	Shrink-Swell Potential
Carsitas (CdC) Gravelly Sand	0 to 9 %	Moderate	Slight	Rapid	Low
Carsitas (ChC) Cobbly Sand	2 to 9 %	Slight	High	Rapid	Low
Carsitas (CkB) Fine Sand	0 to 5 %	Slight	High	Rapid	Low
Myoma (MaB) Fine Sand	0 to 5 %	Slight	High	Rapid	Low

Source: NRCS2008

In general, soils of the project are highly permeable and have low to moderate water erosion potential. The wind erosion potential is high, except in the areas of gravelly sand (Carsitas soils). The applicant proposes to apply groundwater during construction as the primary BMP to limit erosion from wind.

Storm Water

Storm water would be managed in accordance with a site-specific SWPPP and completion of the conditions itemized in Riverside County's Public Use Permit 897 and Ordinance 754.2. Both establish methods of when and how to control and manage storm water flow as it reaches the project, flows across the project, and then leaves the project. A draft SWPPP has been prepared for both the construction and operational phases of the project. A final SWPPP would be required before the project construction can begin as a condition of certification.

The proposed power block would not be within a Federal Emergency Management Agency (FEMA) designated flood zone. Part of the natural gas transmission line would be constructed within a FEMA designated 100 to 500-year flood zone area (Zone B) or area subject to a 100-year flood with an average depth of less than one foot.

The existing storm water flow across the project site is from northwest to southeast and occurs as sheet flow. The power plant would be constructed on cut-and fill material with stormwater intercepted by diversion ditches which would direct drainage around the power plant. Collected runoff would be retained in a retention basin that would be discharged with non-point source flows that would equal to or less than the pre-developed peak flows. All drainage features would be designed in accordance with Riverside County's storm water requirements (Riverside County Public Use Permit 897 and Ordinance 754.2).

Contaminated Soil and Groundwater

Potentially contaminated soils and groundwater are discussed in the **Public Health** and **Waste Management** sections of this document.

Project Water Supply

The CPV Sentinel project would pump groundwater for process use. Water would be supplied by up to five groundwater wells that would be installed at the project site. All potable water needs would be supplied via a potable water supply pipeline connection to the Dillon Road main line owned and operated by the MSWD. All of the water supplied by the MSWD comes from wells installed in the MCGS and the adjacent GHGS. The AFC also includes a discussion of the feasibility of utilizing wells onsite for potable water supply. This would avoid any approval and service fee by the MSWD, but the project owner would still make voluntary payments of the replenishment fee to the DWA in accordance with their 2008 agreement with the DWA (LW2008d). The proposed project's use of water is discussed below.

Potable Water Use

Groundwater from onsite wells or 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 2 AFY. If municipal water would be used for potable needs, that water would be piped in from the MSWD main located on Dillon Road. During construction, potable water use would be limited to drinking water provided in bottles, and waterless portable facilities would be used for sanitary needs.

Construction Water Use

During construction of the power plant, the project applicant proposes using groundwater from onsite wells.[1] **Soil & Water Table 4** below presents a summary of the proposed water use during construction. The average daily use would be 25,000 gallons, and used primarily for dust suppression and vehicle washing. A portion of this water use would return to the groundwater basin as return flow. During hydrotesting of the natural gas pipeline, up to 300,000 gallons of water could be used with a maximum daily use of 250,000 gallons. This wastewater either would be trucked to a treatment and disposal facility or percolated onsite depending on the results of water analysis after the hydrotesting event.

[1] The use of trucks to bring water to the site from offsite source(s) is not evaluated in this FSA.

SOIL & WATER Table 4
Proposed Annual Construction Water Demands

Average Daily Use (gallons)	Maximum Daily Use (gallons)	Water Supply Source	Delivery Method
25,000 (0.08 AF)	250,000 (0.77 AF) Includes Natural Gas Pipeline Hydrotesting	Groundwater	New or Existing Onsite Wells

Source: CPVS2007a

Construction is expected to require 18 months to complete (CPVS2007a). Assuming 235 working days in the year, the estimated average water use for construction would be 27 AF (CPVS2007a).

Operations Water Use

The project also proposes to use groundwater during project operations. Up to a maximum of 1,100 AFY would be used for plant processes, with an average use of 550 AFY. Groundwater would also be used as the backup water supply. The onsite well field would include enough wells for redundancy should one or more of the onsite wells fail.

Wastewater

Sanitary (septic)

The sanitary wastewater system would collect wastewater from sinks, toilets, and other sanitary facilities for discharge to an onsite septic system. This system would be permitted and operated in accordance with the Riverside County Ordinances 457, 592.1, and 650.

Process Wastewater and Reuse (ZLD)

The process wastewater system 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 management of this waste is further discussed in the **Waste Management** section of this FSA. The primary wastewater stream is cooling tower blowdown. 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.

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 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 or degradation of water resources, are among those staff believes could be most potentially significant associated with the proposed project. The thresholds of significance for soil and water resources are discussed below.

Staff evaluated the potential impacts to soil and water resources including the effects of construction and operation activities that could result in erosion of soils, the deposition of sediments into surface waters or the contamination of either groundwater or surface water. Staff also evaluated the potential of the project's proposed water use to cause a significant depletion or degradation of local and regional water resources

To evaluate if significant impacts to soil or water resources would occur, staff assessed:

- Whether the project would violate any water quality standards or waste discharge requirements.
- Whether the project would substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- Whether the project would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding or substantial erosion or siltation on- or off-site.
- Whether the project would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Whether the project would place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- Whether the project would contribute to any lowering of the groundwater levels such that protected species or habitats are affected.
- Whether the project would cause substantial degradation to surface water or groundwater quality.

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 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. Implementation of these measures is ensured through adoption of specific conditions of certification.

Construction Impacts and Mitigation

Construction of CPV Sentinel would include soil excavation, grading, installation of utility connections and the use of water, primarily for dust suppression and hydrotesting of the natural gas pipeline. 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 existing hazardous materials present in the subsurface soil and groundwater. Project water demand could affect quantity of groundwater 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 and Groundwater Contamination

Potentially contaminated soils and groundwater are discussed in the **Public Health** and **Waste Management** sections of this document.

Soil Erosion Potential by Water and Wind

The CPV Sentinel site would be subject to wind and water erosion during construction and operation. Project construction would be completed over an 18-month period (CPVS2007a). The total earth movement would be significant, with up to 20 feet of cuts and fills amounting to approximately 250,000 cubic yards (CPVS2007a). The earthwork would consist of primarily cut and fill grading with excavation for foundations and underground systems (CPVS2007a).

Construction activities can lead to adverse impacts to soil resources including increased soil erosion, soil compaction, loss of soil productivity, and disturbance of soils crucial for supporting vegetation and water dependant habitats. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Soil erosion results in the loss of topsoil and increased sediment loading to nearby receiving waters or sewer systems. The magnitude, extent, and duration of those impacts would depend on several factors, including the proximity of the CPV Sentinel site to surface water, the soil types 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.

A draft project grading plan and Storm Water Pollution Prevention Plan (SWPPP) has been prepared by the applicant that includes Best Management Practices (BMPs) for wind and water erosion control during project construction (URS2008a The implementation of appropriate erosion control measures would help conserve soil resources, maintain water quality, prevent accelerated soil loss, and protect air quality. The erosion and sedimentation control measures that the applicant will implement include: 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. Watering for fugitive particulate matter emission control during soil handling, bulldozing and grading is expected to maintain soil moisture (CPVS2007a). During grading work, soil would also be stabilized by maintaining sufficient water content to make it resistant to weathering and erosion by wind and water. Silt fences would be placed at adequate spacing perpendicular to the drainage path and generally oriented in a northwest to southeast direction to trap sediment before it can migrate. Conditions of Certification in the **Air Quality** section of this FSA provide mitigation that would prevent significant impacts from fugitive dust and soil erosion by requiring offsite access road paving before construction and dust control to disturbed lands during construction.

In the absence of proper BMPs and due to the soil type, the project earthwork could cause significant fugitive dust and erosion. As shown in **Soil and Water Table 3**, the predominant surface soil condition on the proposed CPV Sentinel site is fine to gravelly sand with a water erosion potential of slight to moderate. The surface textures of these gravelly areas have a slight potential for wind erosion and those areas with a finer component have a high potential for wind erosion (NRCS2008). However, with implementation of BMPs identified by the applicant in the AFC and required by **SOIL&WATER-1** and **-2**, significant soil erosion impacts would be avoided. Overall, staff believes the applicant has identified a reasonable plan and sequence for implementing BMPs that would avoid significant adverse impacts. Staff concludes that through the proper application of BMPs as required by **SOIL&WATER-1** and **-2**, the impact to soil resources from water and wind erosion would be reduced to a level that is less than significant.

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 impacted if the stormwater drainage pattern concentrates runoff in areas that are not properly protected, causing erosion of soils and sediment discharge off-site and possibly into surface waters.

The CPV Sentinel site would be located in an undeveloped area. Brush would be cleared prior to grading. The stormwater runoff percolates into the soil and flows overland off-site. Several project features would contribute to the potential for significant water erosion effects, including the high volume of earth displacement, the long duration for construction, and soil properties that have a low to moderate potential for water erosion.

Construction of the CPV Sentinel project would add impervious areas to the site, causing an increase in stormwater runoff. Drainage and erosion control measures creating a separate drainage system for the power plant are proposed and, during grading work, soil would be stabilized by maintaining sufficient water content to make it resistant to weathering and erosion by wind. However, a draft SWPPP has been prepared that provides conceptual plans for erosion and drainage control measures that would be used during project construction (URS2008a). The draft SWPPP includes BMPs for properly storing and containing hazardous materials used, and hazardous waste generated, during the course of construction. Staff proposes Condition of Certification **SOIL&WATER-1** to ensure the applicant complies with SWRQCB Order 99-08 which would require the applicant to develop and implement a SWPPP. Staff also proposes Condition of Certification **SOIL&WATER-2** which would ensure the applicant complies with flood control and grading provisions of Riverside County Public Use Permit 897. Staff concludes that through the proper application of BMPs in accordance with these conditions, the impact to water quality would be reduced to a level that is less than significant.

Staff believes that, through the proper application of BMPs, the impact to soil and water resources from stormwater drainage during construction would be reduced to a level that is less than significant.

Flooding and Tsunami

The CPV Sentinel site is not located within the 100-year floodplain as defined by Federal Emergency Management Agency (FEMA). The project site is too far inland to be affected by tsunami. The site is also to far from a large water body to be affected by seiche.

The southeast leg of the natural gas pipeline would be located in FEMA Zone B, which is defined as an area between the 100 and 500-year flood or an area subject to a 100-year flood with an average depth of less than one foot. To mitigate potential impacts staff proposes Condition of Certification **SOIL&WATER-1**and **-2** that would require BMPs that would ensure the pipeline would not be affected by or exacerbate flooding.

Project Water Supply

The proposed CPV Sentinel project would use groundwater during construction from five wells constructed at the project site. The depth to groundwater at the project site is estimated to be between 300 to 400 feet below ground surface. Groundwater would not be encountered during grading and facility construction.

Soil and Water Table 4 presents a summary of proposed groundwater use. To meet the construction water demand, the applicant estimates that daily water demand during construction would average 25,000 gallons per day (gpd) with a maximum of 250,000 gpd. Up to 300,000 gallons of groundwater would be used during hydrotesting operations. The average annual groundwater use would be 27 AF (40.5 AF over 18 months of expected project construction). The project applicant estimated that the cone of depression would have a 200-foot radius and a maximum drawdown 1.85 feet (L&W2008c).

The proposed use of groundwater for construction would be limited in duration, and volume. Staff recommends Condition of Certification **SOIL&WATER-3** to ensure the wells are constructed in accordance with state and local LORS. Conditions of certification presented in the section on water supply for operation ensure there will be no impacts to the MCGS.

Potable water demands during construction would 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 would not be significant adverse environmental impacts associated with potable water use during project construction.

Wastewater

Soil and Water Table 4 shows the volume of groundwater that would be needed for one-time hydrostatic testing of pipelines and pressure vessels during construction. This water would be reused to the extent possible and then discharged as wastewater. In addition, a small amount of groundwater 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. The discharge of any non-hazardous wastewater during construction would be required to be in compliance with regulations for discharge. The equipment wash water would be transported to an appropriate treatment facility. The project hydrostatic test water would be reused to the extent possible and then discharged to the surface or trucked offsite to an appropriate treatment and disposal facility pending results of water testing for chemicals and metals. Staff concludes that no significant impact from wastewater disposal would occur.

Operation Impacts and Mitigation

Operation of the CPV Sentinel project 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 CPV Sentinel project. Stormwater runoff from the CPV Sentinel site could result in potential impacts if increased runoff flow rates and volumes discharged from the CPV Sentinel site increase downstream flooding. Water quality could be impacted by discharge of eroded sediments from the CPV Sentinel site, discharge of hazardous materials released during operation, or migration of existing hazardous materials present in the subsurface soils and groundwater. Water supply for plant processes, cooling, fire protection, and landscape irrigation could lead to potential quantity or quality impacts to groundwater resources. Potential impacts to soil, stormwater, water quality, water supply, and wastewater related to the operation of the CPV Sentinel project, including the applicant's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

Soils

The applicant has proposed permanent erosion control measures to mitigate all potential soil related impacts from the operation of the CPV Sentinel project. During operations, the project site would be covered predominantly with gravel 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 project site would be covered by foundations and paving. These measures would be included in the general NPDES permit the project owner would be required to complete. With implementation of the permit requirements, staff does not believe there would be significant impacts to soil resources during operation of the CPV Sentinel project.

Stormwater

Staff has reviewed the applicant's stormwater discharge estimates and believes the applied methodology is sound and is consistent with the design criteria. Staff is satisfied with the applicant's conceptual plans for managing stormwater, and general methodology for estimating stormwater rates and that the applicant is using the correct design criteria for the 100-year, 24-hour storm. The applicant's calculations also show recognition that the higher runoff that would occur in the post-developed condition would need to be attenuated by sediment/stormwater retention facilities and result in a discharge less than or equal to the pre-developed runoff rate. The applicant has also demonstrated that the capacity of the sediment/stormwater retention facilities are adequately sized to attenuate discharge from the site to less than the pre-developed condition.

Staff has also reviewed the applicant's conceptual 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 hazardous materials. Potentially significant water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact stormwater runoff and drain off-site. If natural stormwater drainages were altered, potentially significant impacts could occur in areas not protected with BMPs through concentrated drainage and ensuing soil erosion and sediment transportation off-site. Recognizing these potential impacts the applicant has prepared a SWPPP that would be required by the general NPDES permit for industrial activity.

Conditions of Certification **SOIL&WATER-4** would require the applicant to comply with the requirements of the general NPDES permit for discharges of storm water associated with industrial activity. With implementation of the permit requirements, staff does not believe there would be significant impacts due to stormwater runoff on and offsite.

Project Water Supply

The applicant has proposed to use two sources of water for project operations. Pumped groundwater from onsite wells would be the primary water supply for all of the project's water demands, except potable water demands, which would be met with groundwater piped to the project from the MSWD main water line in Dillon Road. The project's potential effects on these two water supplies are evaluated below.

Potable Water

Staff analyzed the project's proposed use of potable water to determine if this water use would cause a substantial depletion or degradation of local or regional surface water or groundwater supplies. The applicant proposed to use potable groundwater provided by MSWD to meet the domestic water demands of the operations workforce. The applicant estimates that the project would use an annual maximum of 2.0 AFY. This water was proposed to be piped and metered from the MSWD main line in Dillon Road, approximately 3,200 feet from the project site. However, in response to proposed conditions of certification, the applicant proposed that groundwater from onsite wells may potentially be used to meet the project's potable water needs (LW2008e).

The proposed use of groundwater pumped from onsite wells or as delivered by the MSWD is an incremental increase of groundwater in the MCGS that would contribute to the cumulative overdraft of the sub-basin and result in significant impacts. Analysis and mitigation of these impacts is presented below in the '**Process Water**' section below. Staff recommends the applicant be required to comply with Condition of Certification **SOIL&WATER-5** to ensure the project owner uses no more than 2.0 AFY, and monitors and records the potable water use during operation.

Process Water

Staff analyzed the project's proposed use of groundwater for process use to determine if this water use would cause a substantial depletion or degradation of local or regional surface water or groundwater supplies and quality. The project proposes pumping groundwater from five onsite groundwater wells within the MCGS. In accordance with the proposed WSP the applicant would also percolate and recharge an equal amount of groundwater at the Mission Creek Spreading Grounds. The applicant estimates that the project would use an annual maximum of 1,100 AF and an average of 550 AF of groundwater for project operations, including cooling, process operations, fire protection, and landscaping.

Since 2002, water use in the MCGS has ranged from 15,706 to 19,105 AFY. The proposed maximum volume of pumping for the project represents an increase of 6 to 7% of the total pumping for the sub-basin. The 2008 Engineer's Report shows a reduction of approximately 245,640 AF of groundwater in storage from 1955 to 2007. In addition, **Soil and Water Figure 2** from the 2008 Engineers Report shows that, since record keeping began in the late 1970s, demand has exceeded and will continue to exceed supply into the future even with projected recharge of groundwater.

Psomas 2004 presents a water budget for the MCGS which shows that outflow from the basin, including groundwater pumping, is about 19,400 AFY, while inflows to the basin are about 15,500 AFY. These estimates indicate there may be overdraft on an annual basis of about 3,900 AFY. Mayer and May 2007, also present estimates of inflow and outflow to the basin which indicate outflows exceed inflows by about 5,625 AFY. Neither of these estimates includes inflow from recharge of imported water.

There is uncertainty in some of the parameters used to define inflow and outflow to MCGS, such as the flow across subsurface barriers and return flows. Differing assumptions by various researchers about MCGS have lead to different results for the natural inflow and outflow of water in the sub-basin. To capture variability in assumptions about the MCGS, the work done by Psomas in 2004 and Mayer & May in 2007 was used to develop a water balance for further analysis of changes in basin storage and overdraft conditions.

Staff has prepared two sets of water budgets showing a balance with and without recharge of imported water. These budgets are included in **Appendix B**. Both sets were developed using 2002 – 2007 data on groundwater pumping and recharge as presented in the 2008 Engineers Report. One set was prepared using remaining water balance assumptions presented in Psomas 2004. The other set was prepared using remaining assumptions from the Mayer and May 2007 groundwater model. To estimate non-consumptive return flow, an estimate of 35% was used which is consistent with the estimates used by the 2008 Engineer's Report and Mayer and May 2007. An estimate of 50% was also used to evaluate the sensitivity of the basin budget calculation. This estimate was mentioned in the 2008 District Engineer's Report but was not used in that report for calculation of basin storage. Psomas 2004 uses a return flow estimate of 10.7%. The water budget tables presented in **Appendix B** were used to develop the summary water budget tables presented as **Soil and Water Tables 5 and 6**. These tables show the annual and total changes in MCGS groundwater storage for the six-year period (2002 – 2007) based on the Psomas 2004 and Mayer and May 2007 assumptions, respectively.

Using these estimates of return flow and the annual water use since 2002, basin outflow exceeds inflow by about 36,700 to 55,400 AF, assuming 35% return flow and no recharge for the six year period. When recharge is added, inflow increased by about 500 to 19,200 AF when assuming 35% return flow for the six year period. When 50% return flow and no recharge is assumed, basin outflow exceeds inflow by about 21,000 to 39,800 AF. With recharge and 50% return flow, the inflows exceed outflows by about 16,100 to 34,800 AF.

These water balance estimates show that for the most recent 6 year period, there would have been significant reductions in storage if no imported water had been available for recharge. However, for the same period, given the volume of water that was available for recharge, there was likely a gain in basin storage. The magnitude of this gain was solely due to the volume of water available for recharge. In some years where recharge water was available, there was still a reduction in volume even when considering 50% return flows. These basin storage estimates are therefore sensitive to the volume of recharge available regardless of the range in return flows. Therefore, the decline of the water levels in the MCGS will continue if a reliable supply of surface water for recharge cannot be maintained. Further discussion of water supply reliability is discussed in the next section.

SOIL & WATER Table 5
Summary of the Mission Creek Groundwater Sub-basin Water Balance
Using Psomas 2004 Data and Krieger and Stewart 2008 Data
(net change in basin storage in AF)

Water Year	Water Balance			
	Without Imported Water[1]		With Imported Water[1,2]	
	at 35% return flow	at 50% return flow	at 35% return flow	at 50% return flow
2002	-5,044	-2,688	-311	2,045
2003	-4,755	-2,466	-4,755	-2,466
2004	-6,242	-3,610	-678	1,955
2005	-6,578	-3,868	18,145	20,855
2006	-7,253	-4,387	12,648	15,514
2007	-6,830	-4,062	-5,819	-3,051
Total	**-36,703**	**-21,080**	**19,229**	**34,852**

Notes:
1. Source: K&S2008
2. Source: Psomas2004.

SOIL & WATER Table 6
Summary of the Mission Creek Groundwater Sub-basin Water Balance
Using Mayer and May 2007 Data and Krieger and Stewart 2008 Data
(net change in MCGS storage in AF)

Water Year	Water Balance			
	Without Imported Water[1]		With Imported Water[1,2]	
	at 35% return flow	At 50% return flow	at 35% return flow	at 50% return flow
2002	-8,164	-5,808	-3,431	-1,075
2003	-7,875	-5,586	-7,875	-5,586
2004	-9,362	-6,730	-3,798	-1,166
2005	-9,698	-6,988	15,025	17,735
2006	-10,373	-7,5075	9,528	12,394
2007	-9,950	-7,182	-8,939	-6,171
Total	**-55,423**	**-39,800**	**509**	**16,132**

Notes:
1. Source: K&S2008
2. Source: Mayer&May2007; Psomas2004

The reduction in volume of groundwater storage in the MCGS has lead to significant declines in the water table elevation. As discussed above, Slade 2000 states that from 1955 to 1997 water levels have declined by about 63 feet. The 2008 Engineer’s Report states that, based on data collected, from 1992 to 2003, water levels have declined by 10 to 26 feet due to groundwater pumping alone. **Appendix C** also presents an analysis that shows pumping volumes have increased from an average of about 140 AF per year during the period 1936-1967, to over 16,500 AF per year in 2006 (Psomas2007). Water level declines have similarly increased from about 0.2 foot per year during the 1936-67 period (Tyley1974), to a spatially averaged rate of 0.4 to 0.7 feet per year during the period 1968-2006 since Tyley (1974) conducted his study. Such declines can result in significant impacts from subsidence and loss of aquifer storage potential.

Analysis of potential changes in groundwater levels from project pumping was necessary to evaluate whether there may be any impacts on other wells or water users. Drawdown or decrease in water levels due to groundwater pumping can result in significant impacts where it results in increased drawdown in nearby wells. These impacts can be both short term and long term. Interference or drawdown can result in increased pumping lifts and declines in well productivity. Mitigation of these impacts could require costly modifications including the cost of lowering pumps or the cost of deepening a well. Substantial increases in pumping lift can also cause significant increases in energy costs.

The magnitude of drawdown impact is controlled by five factors: (1) the rate of pumping; (2) the duration of pumping; (3) the depth of the well screens (water-intake depth of well); (4) aquifer parameters; and (5) aquifer boundary conditions. Aquifer parameters, such as specific yield and hydraulic conductivity, are controlled by layering and thickness of the water bearing materials such as gravel, sand, silt, and clay. The composition and flow characteristics of an aquifer can vary widely. This FSA concludes a drawdown of 5 feet or more in any groundwater well caused by the project's pumping of groundwater is a significant impact that would require mitigation.

As presented in **Soil and Water Table 7** below, there is approximately 80 to 137 feet of water above the well intakes in the MSWD Wells. A 5 foot drop in water levels in these wells would not create the need for installing deeper wells or lowering the well pumps.

SOIL & WATER Table 7
Relation of Water Depth to the Mission Springs Water District Well Construction

MSWD Well No.	Total Casing Depth (ft bgs)[1,2]	Well Screen Interval (ft bgs)[1]	Pump Depth Setting (ft bgs)[1]	1991/1998/2004 Depths to Groundwater (ft bgs)[1]	Range in Height of the Water Column above the Well Pump (ft)
22	800	390 - 780	493	378/388/400	115 - 93
24	800	406 - 790	529	369/378/392	160 - 137
25	462	330 - 455	420	---	---
26	575	225 - 553	245	---	---
27	400	180 - 380	262	147/160/173	115 - 89
28	900	590 - 890	632	516/526/540	116 - 92
29	1,070	410 - 930 970 – 1,050	403	288/304/315	115 - 88
30	1,100	640 – 1,080	655	559/562/575	96 - 80
31	1,000	270 - 470 650 - 670 920 - 940 960 – 1,000	250	137/153/164	113 - 86

Notes:
1. Sources: Slade2000; Psomas2004.
2. ft bgs – feet below ground surface

However, in private wells where well pumps are likely placed much closer to the air-water interface, a water level drop of 5 feet or more could require the lowering of well pumps.

To evaluate potential project-related pumping impacts and effects of recharge, the applicant developed a two-dimensional groundwater-flow model. Staff evaluated the model and found that the model appears properly constructed using an accepted computer code, reasonable parameter values, and appropriate boundary conditions.

The model results all meet acceptable mass balance errors and head closure criterion, and considers the sensitivity of model results to uncertainty in transmissivity. Staff's evaluation and important conclusions regarding the model are presented in **Appendix C**.

To determine the specific impacts of pumping by the project, model simulations of drawdown impact require realistic aquifer parameter values. The primary parameter considered by the applicant was transmissivity. Transmissivity is a measure of the volume of water flowing through a cross-sectional area of an aquifer under a given hydraulic gradient (Fetter 1994). The value of transmissivity can vary with location and flow direction in the aquifer. In an isotropic aquifer, the transmissivity values may vary with location but the values will be the same in every direction, whereas in an anisotropic aquifer the transmissivity values can vary both by location and flow direction. There is uncertainty in the magnitude and distribution of transmissivity because the inherent uncertainty of natural heterogeneous systems as well as uncertainty introduced by the imprecise methods employed to estimate the transmissivity values themselves. The transmissivity distribution in the model is based largely on the distribution reported by Tyley (1974), although comparisons between Tyley's values and values from several subsequent studies suggest that actual transmissivity in portions of the MCGS may on the average be about two times greater than described by Tyley.

Due to uncertainty in transmissivity, the project applicant conducted parallel simulations that multiply Tyley's transmissivity values by factors of 0.5 and 2.0, and utilize both isotropic (factor of 1) and anisotropic (factor of 2) conditions. This range in transmissivity values appears to represent the uncertainty reflected in observed transmissivity values and provides a plausible range in MCGS responses to project groundwater pumping.

The applicant's model evaluated changes in groundwater levels considering three different groundwater pumping and recharge scenarios. These scenarios were evaluated using the three different transmissivity values coupled with isotropic conditions (factor of 1) and anisotropic conditions (factor of 2). A summary of the range in model scenarios and drawdown results is presented in **Soil & Water Table 8** below.

SOIL & WATER Table 8

Sensitivity Analysis of Estimated Project-Induced Groundwater Drawdown Using Tyley's 1974 Transmissivity Values[1]

Location and Distance from the Project's Proposed Wells	Transmissivity (T) and Anisotropy (A) (grayed boxes)					Scenario 1 - Assumes: - Pumping at 1,100 AFY - Recharge at 1,100 AFY		Scenario 2 - Assumes: - Pumping at 1,100 AFY - Recharge at 5,500 AF once every 5 years		Scenario 3 - Assumes: - Pumping at 2,059 gpm continuously for 4 months until 1,100 AF is pumped. - No Recharge	
	T = 1/2x	**T = 1x**	T= 2x	A = 1	**A = 2**	Maximum Drawdown (feet)	Time to Maximum Drawdown (years)	Maximum Drawdown (feet)	Time to Maximum Drawdown (years)	Maximum Drawdown (feet)	Time to Maximum Drawdown (years)
Project Pumping Wells (0 miles)						31.3	15	32	20	47.3	0.3
						22.3	10	23.1	15	35.4	0.3
						15.8	7	16.5	30	27	0.3
						11.3	**7**	**12.1**	**30**	**20.4**	**0.3**
						8.0	10	8.8	30	15.5	0.3
						5.8	10	6.8	30	11.8	0.3
MSWD Wells 27 and 31 (1.9 miles)						4.9	20	5.5	20	0.4	1
						2.7	20	3.3	20	0.4	1
						2.8	20	3.4	30	0.6	1
						1.6	**16**	**2.3**	**30**	**0.5**	**1**
						1.6	15	2.3	30	0.6	0.67
						0.9	15	1.8	30	0.5	0.67
MSWD Wells 28 and 30 (3.1 miles)						-3.6	31	-3.6	33	0.1	1
						-0.9	32	1.4	5	0	---
						-1.8	31	-2.1	32	0.1	1
						-0.4	**31**	**1.6**	**5**	**0.2**	**1**
						-0.9	31	1.6	5	0.3	1
						-0.2	31	1.8	5	0.4	1
MSWD Well 22 (3 miles)						1.2	---	1.9	---	0	---
						1.2	---	1.9	---	0.1	---
						0.8	---	1.6	---	0.1	---
						0.8	**---**	**1.6**	**---**	**0.1**	**---**
						0.6	---	1.5	---	0.3	---
						0.6	---	1.6	---	0.3	---
MSWD Well 24 (3.1 miles)						1.6	---	2.3	---	0	---
						1.4	---	1.3	---	0	---
						1.0	---	1.8	---	0.1	---
						0.9	**---**	**1.7**	**---**	**0.1**	**---**
						0.7	---	1.6	---	0.3	---
						0.6	---	1.6	---	0.3	---
MSWD Well 29 (3.2 miles)						1.9	---	2.6	---	0	---
						1.5	---	1.7	---	0	---
						1.2	---	2.0	---	0.1	---
						1.0	**---**	**1.7**	**---**	**0.1**	**---**
						0.8	---	1.6	---	0.2	---
						0.6	---	1.5	---	0.2	---
MSWD						4.1	---	4.8	---	0.2	---

Well 32 (2.3 miles)						2.3	---	3.1	---	0.2	---
						2.4	---	3.1	---	0.4	---
						1.4	**---**	**2.0**	**---**	**0.3**	**---**
						1.4	---	2.1	---	0.4	---
						0.8	---	1.7	---	0.4	---
CVWD Wells (3 miles)						3.9	---	4.4	---	0.1	---
						2.0	---	2.7	---	0.1	---
						2.3	---	3.0	---	0.2	---
						1.3	**---**	**1.9**	**---**	**0.2**	**---**
						1.4	---	2.0	---	0.3	---
						0.8	---	1.6	---	0.3	---

Notes:
1. Source: URS 2008c.

Model results indicate that both public and private wells are affected by the project's pumping of groundwater. The maximum simulated drawdown at the municipal wells located closest to the project (5.5 feet at MSWD wells 27 and 31 after 20 years of continuous pumping) was simulated assuming conditions staff believes are highly conservative, and thus over-predict the expected water level changes (i.e., ½ Tyley and anisotropy of 1) and drought conditions for five years. Hence, the 5 feet threshold is only slightly exceeded even under the most conservative assumptions. Under slightly less conservative conditions (drought for 5 years) and transmissivity values equal to Tyley and anisotropy of 2, the 5 feet significance threshold is never exceeded. Similarly, using 2 times Tyley's transmissivity values and anisotropy of 2 the 5 feet significance threshold is never exceeded.

The analysis of drawdown impacts on local wells is based primarily on the location of municipal wells. It is possible there could be significant impacts on private wells currently unknown in the MCGS. The applicant can determine whether there are any private well owners within 3 miles of the project wells and whether groundwater pumping causes a significant impact. Staff recommends implementation of Condition of Certification **SOIL&WATER-6** to identify whether there would be an impact on private wells. If wells are impacted, the applicant would be required to compensate the well owner for increased energy costs due to pumping and any necessary improvements to mitigate case specific impacts. Staff recommends the applicant reimburse well owners for increased energy costs in accordance with the criteria outlined in Condition of Certification **SOIL&WATER-7.**

In addition, based on the groundwater modeling completed by the project applicant, the Mesquite Hummocks Conservation Area (**Soil and Water Figure 1**), which is approximately 6 miles southeast of the project wells, could be affected by an estimated decline in water levels. For example, the simulated maximum drawdown at the CVWD wells located 3 miles from the project site range from 0.8 to 4.4 feet (**Soil & Water Table 8**). As discussed in the **Biological Resources** section of this FSA, staff believes that any change in groundwater levels at the Mesquite Hummocks Conservation Area would constitute a significant impact. Refer to the **Biological Resources** section for a discussion of the Mesquite Hummocks habitat.

The WSP proposes recharge of groundwater to replace water pumped from the MCGS and mitigate potential environmental impacts, including those at the Mesquite

Hummocks Conservation Area. The applicant has funded the purchase of 8,350 AF of freshwater for initial recharge of the MCGS at the Mission Creek Spreading Grounds under terms of a thirteen-year agreement (L&W2008c). DWA has purchased the water from North Kern Water Storage District on behalf of the applicant and arranged for an exchange of this water (hereafter referred to as North Kern water) with the Metropolitan Water District of Southern California (MWD). MWD has agreed to deliver the same volume of water through their Colorado River Aqueduct. The delivery schedule for this water is currently under development.

Under these agreements, 108% of the water pumped from the project wells would be recharged to the MCGS. The extra 8% would make up for any water incidental losses during delivery (LW2008b). The transfer of this water from North Kern has been subject to review under CEQA (LW2008d).

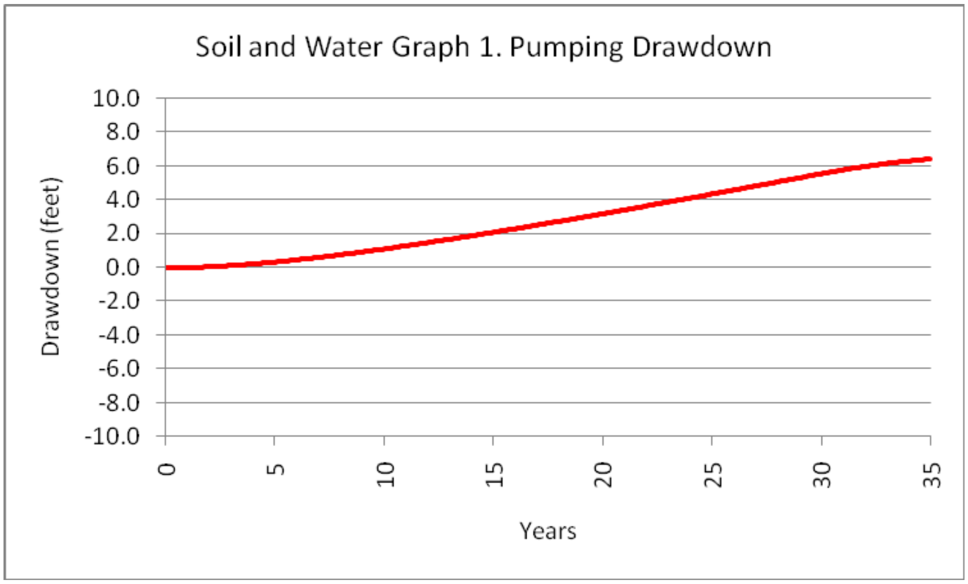
Although recharge in an amount equal to or greater than project pumping is proposed, there would be a difference in the timing and location of recharge and project pumping. The project would be pumping groundwater approximately 3.5 miles south (downgradient) of the proposed recharge at Mission Creek Spreading Grounds, and about 4 miles from the central portion of the Mesquite Hummocks Conservation Area to the southeast. If recharge does not occur sufficiently early before project pumping begins, a lag time would occur between any beneficial increase in groundwater levels and drawdown caused by the project's groundwater pumping. Staff conducted additional modeling to determine if and how recharge could be managed to avoid potential impacts on the Mesquite Hummocks Conservation Area. The results of this modeling are discussed below.

RECHARGE SCHEDULING EFFECTS ON SIMULATED DRAWDOWN

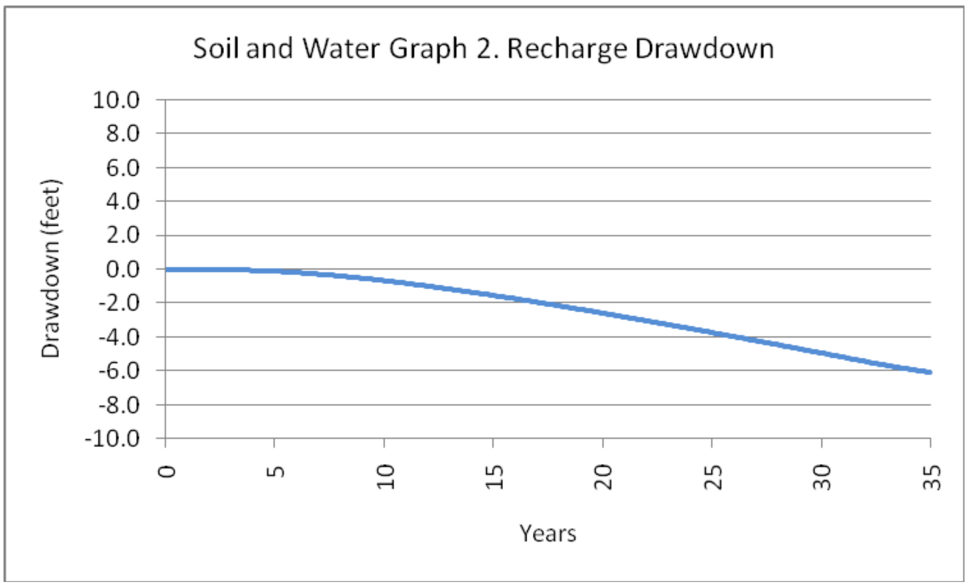
As discussed previously, the applicant developed a two-dimensional groundwater flow model to evaluate project impacts. The modeling done by the project applicant was based on the concept of superposition. Superposition allows the modeler to isolate and focus on a limited number groundwater basin factors. One of the principle advantages of superposition modeling as used in the FSA is that the effect of one stress can be isolated from the effects of all other stresses. Hence, parts of a complex problem can be added to derive the solution to a more complex problem. As a result, superposition allows for identification of these changes in the environment that are due to the project.

Superposition theory further indicates that doubling an input doubles the magnitude of the response. For example, doubling the recharge or pumping rate doubles the magnitude of the water level increase or decrease, respectively. Similarly, halving the recharge or pumping rate halves the water level increase or decrease, respectively. However, these changes in the magnitude of recharge and pumping will not affect the timing of the response (i.e., the month where the maximum or minimum water level changes occur). The timing of the water level change is determined by the relative timing of the recharge and pumping stresses (i.e., when recharge and pumping start and end).

Staff utilized the groundwater model developed by the applicant to determine a schedule for intentional recharge activities that minimizes the water level decline beneath the Mesquite Hummocks Conservation Area owing to pumping. First, Staff isolated the recharge effect (i.e., the simulated monthly water level rise beneath the Mesquite Hummocks Conservation Area) by running the model with recharge but without pumpage (**Soil and Water Graph 1**).

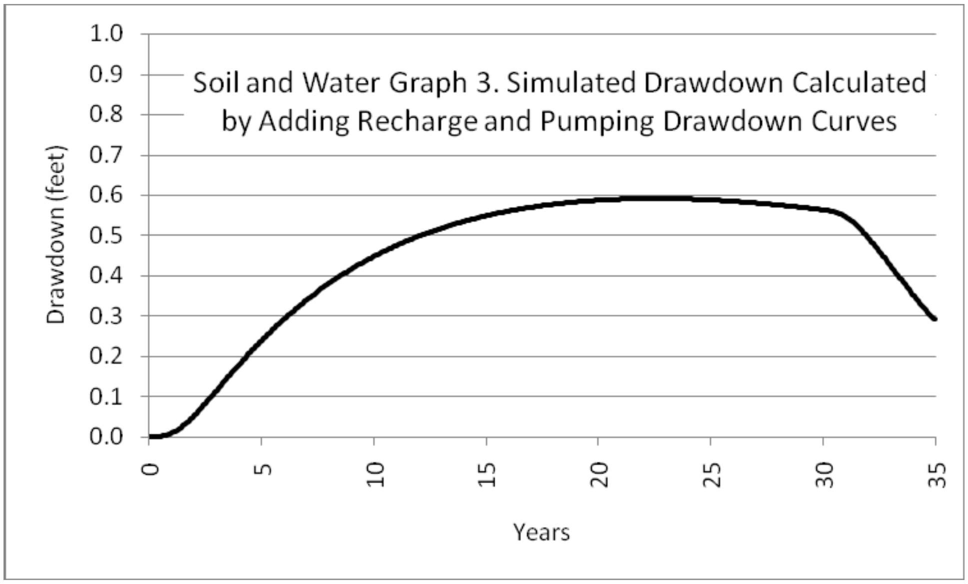


Similarly, staff isolated the pumping effect (i.e., the simulated monthly water level decline beneath the Mesquite Hummocks Conservation Area) by running the model with pumping but without recharge (**Soil and Water Graph 2**).



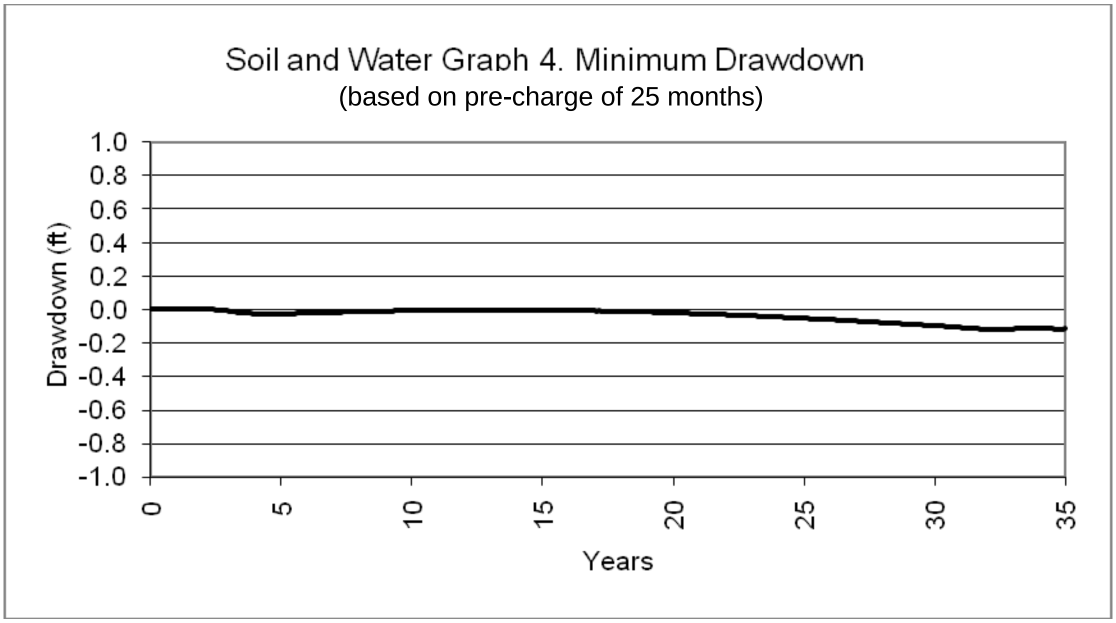
Model results are for the following conditions: Tyley transmissivity distribution, anisotropy of 2, recharge for 30-yrs at an annual rate of 1,186 AFY (assumed to reach the water table one-year after application to the spreading ground), and pumping 30-yrs at an annual rate of 1,100 AFY. Results are average simulated water level changes at four locations within the Mesquite Hummocks Conservation Area.

For the more complex problem of simultaneous recharge and pumping, the drawdown response was calculated as the sum of the two curves above (**Soil and Water Graph 3**).



Note: In order to refine the optimal timing of stresses, monthly results were used by modifying the annual URS model to use 12 time steps per annual stress period and specified that MODFLOW report the simulated water levels at approximately monthly intervals. Graphs 1, 2 and 3 show the results using the shorter time steps.

The influence of recharge schedule and the long-term drawdown response beneath the Mesquite Hummocks Conservation Area can be assessed by shifting the recharge response curve in **Soil and Water Graph 2** either forwards or backwards prior to adding it to the pumping response curve in **Soil and Water Graph 1**. Using this approach and the model results in **Soil and Water Graph 1**, **2**, and **3** staff determined recharge needs to begin 25 months prior to pumping to produce a minimum water level decline of 0.0 feet during the analysis period (**Soil and Water Graph 4**). The 25 months includes the assumed 4-month delay for percolating recharge to reach the water table. The 4 month delay is based on estimate of percolation rates produced by the DWA and Krieger & Stewart (**Appendix D**). Hence, introduced recharge needs to intercept the water table 21 months prior to project pumping to produce no drawdown on average beneath the four Hummocks locations considered (25 – 4 = 21). This recharge schedule relative to the planned pumping schedule is herein referred to as “pre-charge.”



Note: negative drawdown corresponds to a water level increase.

Staff also assessed the sensitivity of the recharge schedule to transmissivity as to the effects in the mesquite hummocks conservation area and summarized the results below in **Soil and Water Table 9**.

SOIL & WATER Table 9
Sensitivity of Recharge to Transmissivity and Anisotropy

Northerly (y) to Easterly (x) Transmissivity Ratio	Transmissivity		
	1/2 T	T	2 T
1:1 (isotropic)	110 months	60 months	32 months
2:1 (anisotropic)	42 months	25 months	16 months

The following assumptions were used in developing the sensitivity analysis: (1) pumping 1,100 AFY; (2) recharge of 1,186 AFY, (3) a percolation rate of 4 ft/day; and (4) depth to water table of 450 feet.

This analysis was conducted to provide insight into the sensitivity of model results using the transmissivity range considered by the project applicants. Staff recognizes that Tyley (1974) has indicated his individual transmissivity values could be off by an order of magnitude, and more recent information suggests that the representative transmissivity values for significant portions of the basin may be on the average double the values reported by Tyley. Staff therefore concurs with the applicant that, in a substantial portion of the basin, Tyley's transmissivity distribution probably represents a conservative case (LW20089d), and representative transmissivity values are probably greater than Tyley's. However, due to spatial variability in the basin-wide transmissivity distribution, and lack of observed subsurface geology, groundwater levels, and aquifer properties (i.e., transmissivity and specific yield) beneath the Mesquite Hummocks Conservation Area, staff recommends employing a conservative approach and using the Tyley transmissivity values to estimate the pre-charge schedule. If higher transmissivity values (i.e., double the transmissivity values reported by Tyley), better represent basin-wide water-transmitting conditions, including the area beneath the Mesquite Hummocks Conservation Area, then model results indicate the recommended 25-month pre-charge schedule will provide a long-term net increase in water levels beneath the Mesquite Hummocks Conservation Area.

Staff analysis also shows that if the pumping and recharge rates are halved (550 and 593 AFY, respectively), the recommended schedule does not change. Conservatively, a pre-charge time of 25 months would avoid a drawdown impact beneath the Mesquite Hummocks Area due to project specific pumping. By requiring pre-charge of the MCGS, the model results indicate no impact to this sensitive habitat due directly to proposed project pumping.

Staff believes that if groundwater pumping and pre-charge is not properly managed the project would result in significant impacts to the Mesquite Hummocks. In addition, groundwater modeling shows that if recharge of imported water is not timed appropriately, there could be significant impacts on the Mesquite Hummocks. Staff believes that Condition of Certification **SOIL&WATER-8** should be implemented to ensure pumping of each of the five wells is metered, groundwater use is limited to 1,100 AFY, and require advance groundwater recharge of 25-months prior to commencing project operations. It would also require that in any given month, the amount of water that may be consumed is the total amount of water that has been recharged 25-months or more prior to that month, minus the cumulative amount of water previously pumped for project process needs. Condition of Certification **SOIL&WATER-9** provides the applicant the opportunity to conduct an investigation of the hydrogeologic conditions in the Mesquite Hummocks Conservation Area. Results of this investigation may demonstrate a more appropriate transmissivity value than Tyley's T in the Mesquite Hummocks Conservation Area. Based on this more appropriate transmissivity value, the pre-charge time may be adjusted accordingly.

Condition of Certification **SOIL&WATER-10** would require initial recharge of the North Kern water be conducted at the Mission Creek Spreading Grounds and an accounting of all water recharged. Condition of Certification **SOIL&WATER-11** would further require that if the applicant wishes to recharge other water before or after recharge of the North Kern water they must submit a Water Supply Plan detailing the source and legal entitlement to the water, demonstrate CEQA compliance for the water source, and a schedule for delivery to the Mission Creek Spreading Grounds. Staff believes compliance with these conditions would mitigate potential impacts to the Mesquite Hummocks.

Water Quality

Groundwater from the MCGS is a unique resource. It has won several awards for taste in the Berkeley Springs International Water Tasting Competition (MSWD2008a). The current recharge of imported Colorado River water likely has some affect on the water quality of the MCGS. From 2002 to 2007, an average of 15,619 AF per year of Colorado River water was imported and percolated into the MCGS. The project would be additionally contributing up to 1,100 AF per year through the Implementation Program. This could amount to up to 7% of the total water imported to the sub-basin on an annual basis, depending on the actual volume of groundwater that would be used by the project.

Importation of the Colorado River water for groundwater replenishment is an accepted and long-standing practice in the upper Coachella Valley. CVWD and DWA have been recharging Colorado River water in the Whitewater River Sub-basin of the Upper Coachella Valley Groundwater Basin since 1973.

Since 2002, when the Mission Creek spreading grounds were constructed, approximately 55,932 AF of Colorado River water has been recharged through these spreading grounds (**Soil and Water Table 2**). The MCGS has an effective groundwater storage capacity of at least 1.2 million AF and a total storage capacity on the order of 2.6 million AF with an aquifer thickness of 1,200 feet or more. Approximately 2.2% of the total storage capacity of the MCGS has been supplemented by Colorado River water imports under the existing replenishment program. Over 30 years, the project would import up to 33,000 AF of Colorado River water under the Implementation Program. This volume of imported water represents up to 1.3% of the total storage capacity of the MCGS.

Percolation of the imported water for the WSP would occur at the Mission Creek spreading grounds, already in use for percolating imported Colorado River water under the Replenishment Program. Water imported under the Replenishment Program is water that is transferred on a one-to-one basis for SWP water under a July 1983 agreement between the DWA and the MWD. This agreement recites that the exchange results in a higher water quality supply for the MWD. This agreement and implementation of the recharge program appear to recognize that the recharge of Colorado River water is critical as a water supply and that any potential impacts on water quality are mitigated by enhancing sustainability of the MCGS.

TDS concentrations are an indicator of water salinity and a measure for acceptance as a drinking water source. Water with TDS concentrations greater than 2,000 mg/l is generally considered undrinkable. In California, the recommended Secondary Maximum Contaminant Level (SMCL) or ‘Consumer Acceptance Contaminant Level’ is 500mg/L. While the upper and short term ranges can be 1,000 and 1,500 mg/L, respectively. The TDS concentrations in Colorado River water are within the TDS range (200 – 800 mg/l) naturally occurring in the MCGS. The 2005 MSWD Urban Water Management Plan mentions that there could be impacts to the MCGS water quality from Colorado River water recharge, but these potential impacts are not further analyzed. A summary of water quality parameters from the MSWD wells and Colorado River water is presented in **Soil and Water Table 11** below.

SOIL & WATER Table 11
Water Quality Results from 1998

MSWD Well No.	Total Dissolved Solids (mg/l)[2]	Total Hardness (mg/l)	pH	Nitrate (as NO_3) (mg/l)	Iron (mg/l)	Manganese (mg/l)	Character of Water
22	412 - 452	219 - 240	7.2 - 7.8	3.1 - 6	ND[3]	ND	$CaHCO_3$ to $NASO_4$
23	420	252	7.7	1.7	0.195	ND	$CaHCO_3$
24	462 - 470	243 - 246	7.9 - 8.0	4.4 - 4.7	ND	ND	$CaHCO_3$ to $NASO_4$
25	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---
27	217 - 292	110 - 134	7.83 - 8.13	4 - 7.6	ND	ND	$NASO_4$
28	394 - 417	220 - 236	7.6 - 7.8	2 - 6	ND	ND	$CaHCO_3$
29	420 - 483	160 - 202	8.0 - 8.15	2 - 3	ND to 0.242	ND	$NASO_4$
30	436	267	7.9	ND	ND	ND	$CaHCO_3$
31	278 - 293	56 - 91	8.1 - 8.3	1.6 - 2.5	ND	ND	$NASO_4$
Colorado River Water Samples	604 - 666	291 - 316	8.12 - 8.43	0.66 - 1.15	0.022 - 0.038	ND	$NASO_4$

Notes:
1. Source: Slade 2000.
2. mg/l – milligrams per liter
3. ND - not detected above the laboratory reporting limit.

As illustrated in the table above, the water quality parameter results presented in the table are comparable between the MCGS water and the Colorado River water. The average TDS in the MSWD wells as presented in this table is 394 mg/l and the average TDS of the Colorado River water is 635 mg/l. A difference of 241 mg/l exists between the average TDS in the MSWD wells and TDS of the Colorado River water. This suggests there may be some incremental increase in TDS in the MCGS, however, it is unknown what level of mixing may occur. Staff could find no studies which addressed water quality impacts from the DWA recharge program. There is also the possibility of a chemical reaction occurring where mixing may occur. Given the past performance of the recharge program, it does not appear there have been any adverse reactions related to TDS concentrations or other reactions.

In addition to adverse effects of overdraft discussed above, sustained overdraft of a groundwater basin can lead to significant water quality impacts. This can occur due to encroachment of pumping on lower saline portions of an aquifer. Significant declines in water level of an unconfined aquifer can also induce flow from low quality perched groundwater zones or flows from more saline portions of the aquifer such as the southern boundary of the MCGS. It is possible that recharge under the Replenishment Program may provide some level of protection of the groundwater quality. In addition, the DWA-MWD delivery schedule and Condition of Certification **SOIL&WATER- 8** should be implemented to ensure that recharge occurs in advance of project operation pumping. Staff, therefore believes the potential impacts to water quality are less than significant.

Wastewater

The applicant proposes two separate wastewater-collection systems for the CPV Sentinel project. The first is the process wastewater system which collects all wastewater generated from operation of the plant and delivers it to the ZLD system. The ZLD system would recover the wastewater for reuse by CPV Sentinel project, and would concentrate the solids into a salt cake for disposal to a landfill. Plant drainage consisting of leakage and drainage from facility containment areas would be collected in a system of floor drains, sumps, and pipes and discharged to an oil/water separator. The oil-free water would be reused in the cooling tower. Staff recommends implementation of Condition of Certification **SOIL&WATER-11** should be implemented to ensure appropriate management of the ZLD system and appropriate disposal of the solid residue generated by the ZLD system.

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 an onsite septic sewer system (CPVS2007a). **SOIL&WATER-12** should be implemented to ensure that the sanitary waste system is properly constructed, operated, and maintained in accordance with Riverside County Ordinance Code 592.1.

Staff believes there would be no significant water or soil related impacts from wastewater discharge if the applicant complies with Conditions of Certification **SOIL&WATER-11** and **-12.**

Water Supply Plan - Conservation

As discussed above, the applicant proposes to implement what they have identified as the Water Supply Plan (WSP). The WSP includes two projects under the Water Conservation Program that may be identified as a project for CEQA analysis purposes. A project description and analysis of these projects is provided below. The consistency of the Water Conservation Program with applicable LORS is analyzed in '**Compliance with LORS**' section of this document.

<u>Conservation Program</u>. The conservation program would consist of two conservation elements. The first is the conversion of the water supply of the PSNGC from groundwater to tertiary treated recycled water. The second is funding the installation of water saving irrigation controllers in existing homes.

The project owner would pay DWA all the cost for infrastructure necessary to construct and deliver the recycled water from DWA 's South Murray Canyon Drive service main.

The infrastructure will include a turnout and 900-foot long recycled water supply line (purple pipe) to the PSNGC. In addition, secondary treated water from the Palm Springs WWTP would be diverted to the DWA WWTP and treated to tertiary levels. The tertiary water would connect with a water storage reservoir that is currently being used for the golf course irrigation water supply. In accordance with Title 22 of the California Public Health Code, all appropriate testing and permitting would be conducted by DWA. Appropriate signs and warnings would also be placed at the golf course regarding the non-potable nature of the water.

Staff believes there would be no significant impact associated with the water conservation program. Outfitting DWA's existing customers with irrigation controllers that would achieve water conservation and would be a benefit soil and water resources. The installation of the pipeline necessary for the recycled water supply would be performed within an existing road right-of-way and would not cause a disturbance of previously undisturbed ground. The SWPPP would include BMPS for erosion and drainage control to ensure this pipeline would have less than a significant impact to soil and water resources.

Recycled water currently recharging the WRGS at the DWA WWTP percolation ponds would instead be used for irrigation at the golf course, and thereby conserve an equivalent amount of groundwater. No substantial net gain or loss would occur. Water loss due to evaporation would be nearly the same or less. There would, however, be an improvement in water quality. High quality groundwater used to irrigate the golf course would instead be substituted for lower quality recycled water that would enter the groundwater sub-basin under either scenario.

CUMULATIVE IMPACTS AND MITIGATION

Cumulative impacts represent impacts that are created as a result of construction and operation of the proposed project in combination with impacts from other past, present, or reasonably foreseeable future projects. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time in the same area.

Construction and operation of the proposed project would result in both temporary and permanent changes at the project site. These changes could incrementally increase local soil erosion and storm water runoff. Potential project related soil or storm water cumulative impacts could be reduced to a level of insignificance through implementation of the applicant's proposed mitigation measures/BMPs and project DESCP; implementation of the SWPPPs for the Construction and Industrial Activities; NPDES permits; and compliance with all applicable erosion and storm water management LORS.

Water supply uses during construction would be limited in duration and quantity. The applicant estimates that daily water demand during construction would average 25,000 gallons per day (gpd) with a maximum of 250,000 gpd. During operation, the project would be using potable water from the MSWD water main for domestic purposes and groundwater from onsite wells for the power plant processes. The annual potable water use would be approximately 2 AFY, which would not be significant.

Over the next 30 years, the use of the MCGS groundwater is expected to increase and, along with that increased use, the overdraft in the sub-basin is expected to become greater (K&S2008). By the year 2030, the expected MCGS overdraft is approximately 10,000 AF. Without mitigation, the project's pumping of groundwater would contribute to this overdraft. However, the recharge of all process water used on the schedule identified in **SOIL&WATER-8** would ensure that the project does not contribute at any time to significant cumulative impacts. Even though low-income and minority populations exist in the immediate project area, staff has not identified any significant unmitigated adverse soil and water resource impacts with the proposed project or cumulative impacts; therefore, no significant adverse impacts to minority or low-income populations are expected to occur.

WATER RELIABILITY ASSESSMENT

Staff performed a water reliability assessment of CPV Sentinel's 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 and future supplies given existing and future demands. A 30-year analysis of the projected water supply available to meet the project's projected water demand during normal, single dry, and multiple dry water years was performed. The 2005 Urban Water Management Plan prepared for the MCGS by the MSWD was used in this reliability assessment (Psomas2005).

The groundwater that would serve the project would be produced from wells constructed on the project site. Over the life of the project up to 33,000 AF (1,100 AF annually) of groundwater could be consumed by the power plant. Potable water use would be minimal at 2 AFY.

The MCGS is in a condition of overdraft due to sustained groundwater pumping that has exceeded the safe yield of the sub-basin. The California Department of Water Resources (DWR) defines safe yield as, "the maximum quantity of water that can be continuously withdrawn from a groundwater basin without adverse effect" (DWR 2008b). The sub-basin overdraft has been estimated to be 9,000 to 10,000 AFY, depending on non-consumptive water return flows (K&S 2008). Groundwater levels have historically declined at the rate of about 0.5 to 1.5 feet per year since 1952. The estimated change in groundwater storage from 1955 to 2007 is a reduction of 16% (245,640 AF) (K&S2008).

To mitigate overdraft in the MCGS, spreading basins have been constructed in the Mission Creek and Whitewater River groundwater sub-basins to allow for the importation and spreading of Colorado River water (**Soil & Water Figure 1**). As illustrated in **Soil and Water Table 2**, the maximum DWR Table A allocations have been delivered once since 2002, when the Mission Creek spreading grounds were constructed. **Soil & Water Table 12** below shows the net difference between the volume of water pumped from the MCGS and the volume of water imported to the sub-basin on an annual basis.

SOIL & WATER Table 12
Allocations and Deliveries of State Water Project Water
To the Mission Creek Sub-basin

Year	Volume of Groundwater Pumped (AF)[1, 2]	Amount Delivered to the Spreading Basin (AF)[2]	Net Difference Between Pumped and Delivered Volumes (AF)
2002	15,708	4,733	**-10,975**
2003	15,263	0	**-15,263**
2004	17,551	5,564	**-11,987**
2005	18,068	24,723	**6,655**
2006	19,106	19,901	**795**
2007	18,456	1,011	**-17,455**
2008	---	---	---
Total	104,152	55,932	**-48,230**

Notes:
1 – Source K&S2008
2 – Source DWR2009a
3- Includes an estimated 1,740 AFY of DWA non-metered groundwater pumped (i.e., owners pumping less than 10 AFY groundwater).
4 - Evaporative losses during delivery and percolation are not accounted in this table.

This table shows extraction rates exceed the volume of water delivered for recharge. Only during the years 2005 and 2006 was more water imported than pumped from the MCGS. These years are when the DWA allocation of SWP water was increased from 38,100 AFY to 50,000 AFY and when 90 and 100% of the water allocation, respectively, was delivered to the DWA. In 2007, the DWA allocation was still 50,000 AFY, but only 60% of that allocation was delivered to the DWA. The result was that 17,455 more AF were pumped from the MCGS than delivered for recharge.

Current environmental controls on the Sacramento-San Joaquin Delta have had a significant impact on delivery of surface water statewide. The Governor’s Executive Order (S-06-08) declaring a drought and requiring emergency conservation measures has and may result in further redirection of water resources, prioritization of water available for transfer, and significant competition for purchase of surplus water. According to the MSWD 2005 Urban Water Management Plan, the capacity to continue groundwater recharge of the sub-basin depends on the availability of future water from the Colorado River and the MWD's exchange agreements with DWA. The importation of water is accomplished through a chain of transfer and exchange agreements, a summary of which is presented in **Soil and Water Table 13** below.

SOIL & WATER Table 13
Summary of Primary Exchange and Transfer Agreements

MWD-DWR 1960 Water Supply Agreement	Contract between the Metropolitan Water Agency of Southern California (MWD) and the California Department of Water Resources (DWR) for water supply.
Oct. 1962 DWA Allocation Agreement	The Desert Water Agency (DWA) entered into an agreement with the Department of Water Resources for an annual allotment of 38,100 AF of State Water Project (SWP) water. At the same time, the Coachella Valley Water District (CVWD) agrees to receive an allotment of 23,100 AF of SWP water. However, the DWA has no physical conveyance facility through which to import this water.
January 1967 DWA-MWD Exchange Agreement	The DWA entered into an agreement with the MWD to exchange SWP for Colorado River water on a one-to-one basis. The exchange of water began in 1973 with the recharge in the Whitewater River spreading grounds. As amended in 1972, the agreement remained effective until January 1990. This agreement as amended was superseded by the July 1983 DWA-MWD agreement.
July 1976 Management Agreement	This agreement established the principles that control the importation of water and the allocation of the water importation costs. The agreement provides for the collection and analysis of data that would be used to integrate management of the natural and imported water supply in the Management Area (the Whitewater River sub-basin from Point Happy to Fingal Point). This agreement also states that the exchange water which will and has been spread and percolated is not considered part of the natural safe yield. Also, the DWA and CVWD will each receive their proportionate share of the imported groundwater.
July 1983 DWA-MWD Amendment	Supersedes the January 1967 exchange agreement as amended because construction of the facilities for direct delivery of SWP did not appear feasible within the terms of the 1967 agreement and sufficient capacities were available to accommodate the existing exchange of Colorado River water for SWP water. This agreement also allows for the exchange of SWP water for Colorado River water for recharge at the Mission Creek spreading grounds after construction of the grounds is complete. This exchange agreement expires 2035.
April 2003 DWA-CVWD Mission Creek Exchange Agreement	Known as the Mission Creek Agreement, essentially to set out the terms for replenishing the MCGS and sharing the costs of the replenishment. This agreement clarifies and augments the earlier exchange and advance delivery agreements and transfers and includes call-back provisions for a portion of the MWD's SWP water allocation.
October 2003 Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement	This settlement agreement involved and number of contacts "attempt to reach an overall quantification, settlement and transfer of various Colorado River water rights" with litigation ongoing. http://www.saccourt.ca.gov/CoordCases/qsacases/qsa_main.asp
December 2004 Settlement Agreement and Addendum	Established a Management Committee for the Sub-basin consisting of a General Manager from the DWA, CVWD, and MSWD. This committee is charged with reviewing the Sub-basin's production and recharge activities of each year and allocating the current year's water available for recharge based on the proportionate use by each agency/district in the previous year. As part of this agreement, a Water Management Plan was created by the MSWD and an annual Engineer's Report is completed by the DWA.

2008 CPV – DWA Water Supply Agreement	This agreement outlines the terms of the Implementation Program, Conservation Program, and voluntary participation in the Replenishment Program. It supersedes the former Ocotillo Agreement of 2001.

Litigation has already occurred over water in the MCGS. In 2004, the DWA, MSWD, and CVWD reached a settlement over management of the groundwater and water importation in the MCGS. As presented in the MSWD 2005 Urban Water Management Plan, the baseline scenario population estimate in the MSWD's service area is expected to more than double between 2005 to 2030 and is estimated to nearly triple under a high growth scenario.[2] Along with this increase in population will be an increase in water demand. Even given this increase in water demand and the increased efforts to secure new sources of water, the 2008 Engineer's Report estimates a net annual deficiency of approximately 10,500 AF in water supply versus demand by the year 2030 (K&S2008). Given these projections, it appears overdraft in the MCGS will continue with or without the proposed project.

As discussed above, given the effective storage volume of the MCGS and current projections in water use through the year 2030, it appears there would be enough groundwater available in the MCGS to supply the project during its 30-year life. However. project pumping would contribute to the projected increase in demand and sub-basin overdraft projected through 2030. The proposed mitigation of this potential impact as proposed in the Implementation Program would result in the project avoiding potential impact to the MCGS.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff's response to agency and public comments are discussed below. Comments were submitted by the MSWD, DWA, and Psomas.

Desert Water Agency Comment-1

In a September 2, 2008 letter to the Energy Commission, the Desert Water Agency provided the following comments supporting the applicant's Water Supply Plan and Water Conservation Program.

- The DWA stated that they believe that the Water Supply plan proposed for the CPV Sentinel project is superior to the alternative proposed by the MSWD. Under the Water Supply Plan, more water would be imported than used by the applicant. In addition, the project owner would pay the Replenishment Assessment, which is used to acquire import water. Even thought the project owner would be paying into the Replenishment Program, the power plant would be using only the water acquired through the Implementation Program not the Replenishment Program water.

[2] The DWA's 2005 Urban Water Management Plan estimates population growth trends of approximately 55 to 68 percent within their service area over the same period. The difference between the MSWD and DWA population growth estimates may be a function of available land for development. Along with an increase in population, comes an increase in commercial and industrial water demand. Under either scenario, the demand on available water supplies is projected to significantly increase over the life of the proposed power plant.

- The DWA also stated that the proposed water conservation program is superior to the conservation efforts by the MSWD. Constructing the 900-foot pipeline would result in less environmental disruption than installing purple pipe over a length of more than 4.5 miles. In addition, if the recharge at the Horton WWTP is removed, significant degradation to groundwater quality would occur. The MCGS and WRGS will benefit because reduced pumping in the WRGS would increase the portion of imported water available for the MCGS. Also, the new irrigation controllers would be available to existing residents in the MCGS, and WRGS within the DWA's boundaries.

DWA Response-1

Water is a scarce resource in the desert. While staff believes the applicant's water supply plan and water conservation program meets LORS requirements and avoids potential CEQA impacts, it is not an ideal plan. The ideal program would use air instead of water for the inlet and inter cooling systems of the turbine. Because air-cooling is not economically feasible for this project, a highly complex set of contractual agreements and regulatory conditions have been created just to supply water for this project. While staff appreciate the diligence and effort of the applicant to respond to staff's concerns and meet regulatory requirements, this project's cooling method is not ideal. However, it does represent the superior option available.

Desert Water Agency Comment-2

In a September 17, 2008 letter to the Energy Commission, the Desert Water Agency states that the Replenishment Assessment would result in new revenue to the DWA that would be applied towards the acquisition of replenishment water from the SWP as new surplus water became available. The DWA stated that application of this revenue would yield between an estimated one-half and one full acre-foot of new water for each acre-foot of water pumped by the CPV Sentinel project.

DWA Response-2

The information provided by the DWA is discussed in the Soil and Water Resources LORS compliance section of this FSA.

Krieger & Stewart Comment-1

Krieger & Stewart Inc submitted a letter report on October 7, 2008 to the Energy Commission. This letter report was prepared at the request of the Desert Water Agency. This letter report provided analysis of: (1) the estimated time infiltration rate at the Mission Creek Spreading Grounds; and (2) transmissivity values in the Mission Creek Groundwater Sub-basin. This letter report states that the percolation time for the spread water to reach groundwater was approximately 7 months when spreading operations began in 2002 and is now approximately 2 to 4 months. The letter report also states that Tyley's evaluation of transmissivity was based on sparse data in 1967, before the MSWD wells were installed and could be used to estimate transmissivity values. The letter report also states that the Tyley transmissivity values were rough estimates based of specific capacity tests or drill logs. The letter report uses the same methods to evaluate transmissivity as used by Tyley, and presents transmissivity values in the MSWD wells that are significantly higher than the Tyley transmissivity values at the same location. The letter report states that the MSWD wells were installed using superior drilling techniques that have higher yields and therefore are more representative than the wells installed before 1970.

Krieger & Stewart Response-1

Staff has reviewed this letter report, and in conjunction with other data available to staff, concludes that Tyley's transmissivity values are a conservative case. Staff has provided the project applicant in this FSA the ability to conduct a hydrogeologic study of transmissivity in the Mesquite Hummocks Conservation Area. If in this study the applicant demonstrates that Tyley's transmissivity values are significantly lower than the apparent actual transmissivity conditions in the vicinity of the Mesquite Hummocks Conservation Area, then the pre-charge time may be adjusted based on this new study.

Mission Springs Water District Comment-1

The MSWD submitted letters dated August 19 and September 17, 2008 and a Board Resolution dated August 26, 2008 to the Energy Commission, which affirmed their willingness to supply water for the project. The letters also affirmed their ability to supply water for the project and presented the following alternative water supply plan.

- As a water provider in the MCGS, MSWD is willing to supply water for the project now and into the future.
- MSWD has implemented an aggressive sewer/septic program designed to add 7,000 more service connections and 750,000 gallons of effluent to the Horton WWTP. This would be enough to supply the projects peak water needs.
- Use of recycled water from the Horton WWTP would prevent the use of high quality groundwater by the power plant and put to use Horton's effluent, which has no use now.
- Flow to the Horton WWTP is expected to grow by 65% by the year 2014.
- Upgrading the Horton WWTP with an additive component for tertiary treatment is expected start in 2009 and to take 18 months to complete at a cost of approximately 14 to 17 million dollars.
- The current effluent flow from the Horton WWTP could be augmented by supply from wells 28 and 30, which later could provide redundancy to the project's water supply (water quality in these wells is degraded by uranium).
- MSWD is aware that this alternative water supply could result in increased capital costs to CPV Sentinel project by 2 to 3%. MSWD is prepared to share in some of the costs associated with the tertiary component at the Horton WWTP and/or the recycled (purple pipe) water line to the power plant.
- The recycled water conversion project for the PSNGC would not benefit the MCGS. However, using the Horton WWTP effluent combined with supply from wells 28 and

30 would provide an uninterruptible and reliable supply of water for the project. Converting the golf course to recycled water does not conserve water but allows the DWA to offset better quality water use with poorer quality water.

- The irrigation controllers would benefit mostly those outside the MCGS due to the diminished water use in the MSWD's service area.

Under this proposed alternative, recycled water could be supplied by the Horton WWTP and augmented as necessary by groundwater from MSWD wells 28 and 30. The applicant would have to share in the costs for tertiary upgrades to the Horton WWTP and pay for some or all of the purple pipe from the treatment plant to the proposed power plant.

MSWD Response-1

This alternative is discussed in detail and evaluated in the **Alternatives section** below.

Psomas Comment-1

On September 15, 2008, Psomas submitted a letter to the Energy Commission. This letter provided comments on the substance and terms of the agreements between the project applicant and the DWA, comments on the PSA, and comments on the applicant's PSA comments. The concerns Psomas expressed regarding the substance and terms of the agreements between the applicant and the DWA are summarized below:

- Whether the Ocotillo agreement gives the applicant pumping rights in the Mission Creek Groundwater Sub-basin.
- Whether recharge would occur in the MCGS (Mission Creek spreading grounds) or WRGS.
- Whether there is a reliable source of the water to supply the project over the life of the project.
- Whether the timing and volume of water imported for recharge will be sufficient to avoid potential impacts caused by the project's pumping of groundwater and whether the timing would be annual to match the annual groundwater use or be over some other longer delivery schedule.
- Whether the water imported by the project owner would be additional water to that imported by the DWA under the Replenishment Program.
- The use and meaning of the term "Temporary Deficit Water."

Psomas Response-1

All of these concerns expressed by Psomas were also concerns of staff and have been addressed in the FSA in staff's analysis and through Conditions of Certification.

Psomas Comment-2

Psomas submitted comments related to the PSA. These comments were:

- Comment 61. The California Department of Water Resources' (DWR) definition of overdraft should be used. In addition, groundwater overdraft may not be considered detrimental. Overdraft may be part of the overall groundwater management of the basin and is a local responsibility, therefore, the decision whether a basin is in a condition of overdraft is the responsibility of the local groundwater or water management agencies. In some cases, local agencies may choose to deliberately extract groundwater in excess of recharge in a basin (known as "groundwater mining") as part of an overall management strategy.
- Comment 123: CEC staff should consider recharge to the MCSB as part of Alternatives 1, 2, and 3. This is necessary to account for the loss of recycled recharge at the Horton WWTP. Inclusion of recharge to the MCGS to Alternatives 1, 2, and 3 will slightly alter the analysis.
- Comment 140: CEC staff left out an important element in Alternatives 1, 2, and 3, namely, recharge matching withdrawals by CPV.

Psomas Response-2

While groundwater mining maybe a water management strategy, for the purposes of LORS compliance and CEQA analysis it is not a principle staff can use in their analysis is, in fact, a strategy that staff would highly discourage. With regards to the recharge element, staff has included this in the alternatives discussion presented below.

Psomas Comment-3

Psomas also had submitted several comments regarding the applicant's comments on the PSA.

Psomas Response-3

Staff has read and noted these comments, and where appropriate, revised staff's analysis to include the concerns expressed in the comment.

COMPLIANCE WITH LORS

Staff has reviewed the LORS and policies presented in **Soil & Water Table 1** and believes the project as proposed complies with these LORS provided that the applicant's WSP is implemented and the applicant is required to comply with the conditions of certification. Without fully implementing the WSP as proposed and fulfilling each of the conditions of certification, staff believes that one or more LORS would be violated. A discussion of selected LORS is presented below.

CLEAN WATER ACT

Staff has determined that the CPV Sentinel project would satisfy the requirements of the General National Pollutant Discharge Elimination System permit with the adoption of Conditions of Certification **SOIL&WATER-1** and **-4**, which require compliance with the SWRCB's statewide general permits for construction and industrial stormwater management.

WARREN-ALQUIST ACT

The Warren-Alquist Act promotes all feasible means of water conservation. The proposed project would use high-quality water that would be offset by conservation of an equal amount of groundwater.

SWRCB RESOLUTION 75-58 AND ENERGY COMMISSION'S 2003 INTEGRATED ENERGY POLICY REPORT

LORS and water policies applicable to this project stem from, among other things, Article X, section 2 of the California Constitution, which declares that "*the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented…*" In order to better define what "unreasonable use" means in terms of power plant cooling, the SWRCB issued Resolution 75-58, "Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling" (Resolution 75-58). It sets forth, in priority order, a list of preferable water sources for power plant cooling as follows: (1) wastewater being discharged to the ocean, (2) ocean, (3) brackish water from natural sources or irrigation return flow, (4) inland wastewaters of low TDS, and (5) other inland waters.

The resolution also states that fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. Since adopting Resolution 75-58 in 1976, the SWRCB has more recently confirmed the ongoing applicability of its policy for cooling of modern power plants and clarified a basic principle by stating, "*The policy requires 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*" (SWRCB 2002a).

Based, in part, on the State Constitution and SWRCB Policy 75-58, the Energy Commission adopted its own policy for water conservation in the cooling of power plants. The Energy Commission's 2003 IEPR specifies that "*the Energy Commission would approve the use of fresh water for cooling purposes by power plants which it licenses only where alternative water supply sources and alternative cooling technologies are shown to be 'environmentally undesirable' or 'economically unsound'*"

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

PROPOSED WATER SOURCE IS CONSIDERED FRESH INLAND WATER

The examination of alternative water supplies and technologies begins with a determination of whether a project will use fresh water for cooling. The IEPR itself does not define what constitutes fresh water. Resolution 75-58, upon which the IEPR water policy is based, defines fresh inland waters as "*those inland waters which are suitable for use as a source of domestic, municipal, or agricultural water supply…*" (State Water Resources Control Board Resolution 75-58, p. 3.) Thus, fresh water is not given a narrow definition but is broadly defined by how it is used, evincing an intent to be as inclusive as possible. The groundwater proposed to be used by CPV Sentinel meets the definition of fresh inland water under Resolution 75-58 because it is used for agricultural and domestic use in the area.

Another indication of the suitability of this water as a domestic source is its compliance with the Drinking Water Standards found in Title 22 of the California Code of Regulations. CPV Sentinel proposes to use groundwater that has a TDS of 100 - 200 mg/l (CPVS 2007a). This TDS level is well within the secondary maximum contaminant level (MCL) for TDS in drinking water of 1000 mg/l and well below the recommended limit of 500 mg/l (Cal. Code Regs., tit. 22, §§ 64431, 64449). Secondary MCLs are based on aesthetics and intended to protect odor, taste and appearance. Exceeding these levels does not restrict the use of this water for drinking.

Resolution 75-58 is clearly intended to broadly protect beneficial uses of the State's water resources. In this vein, the SWRCB states that "*in considering issuance of a permit or license to appropriate water for power plant cooling, the Board will consider the reasonableness of the proposed water use when compared with other present and future needs for the water source and when viewed in the context of alternative water sources that could be used for the purpose*" (Resolution 75-58, pgs. 5 & 6). Although no appropriative right is at issue in this case, increasing groundwater demands and decreasing availability of imported supplies for recharge for this region of the state dictate that the Energy Commission consider the reasonableness of allowing CPV Sentinel to use groundwater of a quality suitable for domestic use when a source of lower quality reclaimed water that cannot be used for domestic purposes is available from MSWD's Horton WWTP. Staff considers MSWD's reclaimed water to be a reasonable alternative to the proposed use of 100% groundwater when accompanied with a water importation plan to replace the groundwater recharge that the effluent currently serves.

In addition, staff is concerned about the potential degradation of groundwater quality that could result from the proposed project. The applicant proposes to address the water supply impacts of its project by replacing the 100 - 300 TDS groundwater produced by onsite project wells for cooling with Colorado River Aqueduct water of 500 – 700 TDS under the proposed Implementation Program Staff has not yet considered the effects of site-specific conditions such as the characteristics of the Mission Creek aquifer and the locations of project-related groundwater withdrawal and recharge, but it is possible that the project could result in groundwater degradation, which is antithetical to the intent of the 2003 IEPR Water Policy. In some areas there will likely be limited to no impact because of similarity in water quality. Recharge will occur about 3.5 miles upgradient of the site. Given the high water quality at the site (100 - 300 mg/L TDS) there is a possibility there could be an impact on water quality in the vicinity of the site.

Based on these concerns, Energy Commission staff has analyzed three alternatives to using 100% groundwater.

WATER SUPPLY AND COOLING ALTERNATIVES

In order to determine whether alternative water supply sources and alternative cooling technologies are “environmentally undesirable” or “economically unsound, staff analyzed water supply and cooling options for the project as proposed. In the AFC, the applicant briefly reviewed several water supply and cooling options, and concluded that the alternatives that could accomplish conservation of fresh water were economically unsound. Staff has expanded upon the applicant’s analysis in order to analyze the alternatives in comparison to the proposed project more consistently with the criteria normally considered by staff for determining conformity with the Energy Commission’s water conservation policy (IEPR 2003) and other related LORS. And in the event the Energy Commission desires to consider alternatives, or if staff’s proposed mitigation measures for the applicant’s WSP are not fully implemented, staff desired to determine if potential significant impacts to Biological Resources and Water Resources could be mitigated to less than significant levels by adopting an alternative water supply or cooling method. Staff has compared the environmental and economic merits of the proposed project with two water supplies and one cooling alternative for the CPV Sentinel project described as follows:

<u>Proposed Project</u> – The Proposed Project consists of the supply of onsite project groundwater using wet cooling. The applicant proposes to construct wells on the project site to supply groundwater for CPV Sentinel’s process needs. No offsite pipelines would be needed for water supply to the project except for the potable water supply line which is common for all alternatives. The project owner would be required to participate in DWA’s groundwater replenishment program by paying a groundwater Extraction Fee. In addition, the project owner would import water for recharge under the WSP. This water would replace any groundwater pumped by the project. The applicant also proposes to offset the imported water use by a water conservation program in the Whitewater Groundwater Sub-basin consisting of converting water supply to PSNGC from groundwater to reclaimed water, and funding the installation of irrigation management controllers for existing customers in DWA’s service area.

<u>Alternative 1 - Reclaimed Water Augmented by Project Groundwater & Wet Cooling</u> - Alternative 1 would include the supply of tertiary-treated reclaimed water from MSWD’s Horton WWTP supplemented with project groundwater using wet cooling. Wastewater treatment at the Horton WWTP would be upgraded from secondary to tertiary treatment, and would be supplied to the project via a 5-mile long pipeline along Dillon Road. CPV Sentinel would have the first priority for reclaimed water as supplied by MSWD. Project groundwater would makeup the balance of process water supply until all demands could be met by reclaimed water. Staff has assumed that the applicant would fund the capital improvements including the tertiary upgrade and the pipeline for delivery of MSWD’s

reclaimed water. In addition, Alternative 1 would include the importation of water for recharge in the MCSB for replenishing the project water use including the Horton WWTP effluent that is currently used for groundwater recharge and any supplemental water needed from project wells.

Alternative 2 - Reclaimed Water Augmented by MSWD's Groundwater & Wet Cooling – Alternative 2 would consist of the supply of tertiary-treated reclaimed water from MSWD's Horton WWTP and MSWD's groundwater using wet cooling. Wastewater treatment at the Horton WWTP would be upgraded from secondary to tertiary treatment, and would be supplied to the project via a 5-mile long pipeline along Dillon Road. CPV Sentinel would have the first priority for reclaimed water as supplied by MSWD. The distinction between Alternative 1 and Alternative 2 is that under the latter, groundwater used to augment reclaimed water in the early years of project operation would be supplied from MSWD's Wells 28 and 30 until all process water demands could be met by reclaimed water. Staff has assumed that the applicant would fund the capital improvements including the tertiary upgrade, the pipelines for delivery of both MSWD's reclaimed water and groundwater from Wells 28 and 30, and the cost of constructing one new MSWD well to replace the supply from Wells 28 and 30. In addition, Alternative 1 would include the importation of water for recharge in the MCSB for replenishing the project water use including the Horton WWTP effluent that is currently used for groundwater recharge and any supplemental water needed from project wells.

Alternative 3 - Dry Cooling – Alternative 3 would entail the supply of project groundwater for process needs while using dry cooling to conserve water that would have otherwise been used for the LMS 100 intercooler with wet cooling. Process water as supplied from project onsite groundwater wells would also serve inlet air fogging and service water needs.

Water Supply Availability

Project Groundwater – Groundwater that could be developed by new wells on the CPV Sentinel site appears available and of sufficient quantity to meet the peak instantaneous demand for the project of up to 2,059 gpm and an annual volume of up to 1,100 AFY. This assumes that the project groundwater use is replenished by the importation and recharge of an equivalent or greater quantity of water such that the project does not contribute to overdraft of the MCSB.

MSWD's Groundwater – Groundwater as currently produced from MSWD's Well Numbers 28 and 30 is available and of sufficient quantity to meet the peak instantaneous demand for the project of up to 2,059 gpm and an annual volume of up to 1,100 AFY. This assumes that the supplemental water that would be used from MSWD's wells would be replenished by the importation and recharge of an equivalent or greater quantity of water such that the project does not contribute to overdraft of the MCSB.

MSWD's Tertiary-treated Reclaimed Water – Reclaimed water from MSWD's Horton WWTP is not available currently, but could be near the time that CPV Sentinel would become operational (MSWD 2008b). The quantity of reclaimed water would not be sufficient to meet all project process water demands initially, but is expected to be sufficient to meet the peak instantaneous demand by about the year 2022, or about 12 years following the proposed 2010 commercial operation date of Units 1 – 5 as shown in **Soil and Water Resources Table 14.** Although reclaimed water would not meet the project's instantaneous demand until about 2022, due to the fact that CPV Sentinel will operate as a peaking plant for on-peak and possibly partial peak hours of the day providing time for the continuous supply to replenish onsite storage, the reclaimed water supply would meet most of the project's daily demands. As shown below, the reclaimed supply utilizing the onsite storage would be capable of supplying the project's peak demand for 10.5 hours currently in 2008, for 16.2 hours by 2014, and by interpolation between these values, for about 12 hours in 2010 when the project would likely begin commercial operation. The availability of reclaimed water assumes that it would be replenished by the importation and recharge of an equivalent or greater quantity of water such that the project does not contribute to overdraft of the MCSB.

MSWD's projected increases in its reclaimed water supply are primarily attributed to the conversion of about 7,000 existing water customers to sanitary sewer service from their current septic systems, and would not depend on new development to any significant degree. Staff has analyzed two groundwater options for augmenting the supply of reclaimed water using either project groundwater or MSWD's groundwater supplied from its Wells 28 and 30. The schedule for which reclaimed water is predicted to be available and the extent of groundwater that could be needed to augment reclaimed water if the project were to operate at peak capacity for 24 hours/day, is shown in **Soil and Water Table 14.**

Soil and Water Table 14
Predicted Schedule for the Availability of Reclaimed Water & Quantity of Groundwater Needed to Augment the Reclaimed Water Supply

Source of Water	2008	2014	2020	2026
Reclaimed Water	1.3 mgd 900 gpm	2.0 mgd 1,390 gpm	2.7 mgd 1,875 gpm	3.4 mgd 2,360 gpm
Daily Operating Hours Of Supplying the Peak Demand of 2,059 gpm	10.5 hours	16.2 hours	21.9 hours	24 hours
Groundwater	1,159 gpm	669 gpm	184 gpm	0
Total Supply	2,059 gpm	2,059 gpm	2,059 gpm	2,059 gpm

The applicant's approach to considering the direct supply of reclaimed water from MSWD's Horton WWTP was to depend entirely on the supply of reclaimed water, and to provide approximately 30 million gallons of storage onsite to maintain project process water demands when they exceeded the capacity of the supply. Staff's approach for CPV Sentinel would be to fully utilize the supply of reclaimed water when needed, and to augment the supply with groundwater when project demands exceed the reclaimed water supply. This would avoid the additional cost and land requirements of a 30 million gallon reclaimed water storage tank. Instead, the onsite water storage tanks could remain the same capacity as currently proposed for the project. The proposed two 1,128,000-gallon tanks would provide 16 hours of onsite storage to support peak process water demands of 2,059 gpm, while retaining 240,000 gallons for fire water reserve (2 hours at 2,000 gpm).

Comparison of Water Quality

One of the primary indicators used by staff for comparing the quality of various water supplies is Total Dissolved Solids (TDS). TDS is an indication of water salinity, and is detectable by taste in drinking water. Water with a TDS above 500 mg/l exceeds the preferred maximum contaminant level (MCL) of the Secondary Drinking Water Standards, can stress some crops that rely on such water for irrigation, and can degrade other sources of surface water and groundwater.

Of the alternative water supplies reviewed by staff, the groundwater that would be produced from project wells would be the highest quality water that could serve CPV Sentinel, and based on limited data, appears to be the highest quality water available in the MCGS among all sources of groundwater and imported water supplies. **Soil and Water Table 15** lists the TDS for various water supplies in comparison to each other.

Soil and Water Table 15
Comparison of TDS for Sources of Water in the Mission Creek Basin

Constituent	Project Groundwater	MSWD's Wells 28 and 30	MSWD's Reclaimed Water	Colorado River Aqueduct Water
TDS	100 – 250	394 - 436	Est. 300 - 500	500 – 700

Process Water Demands

The proposed process water demands are as shown in **Soil and Water Resources Table 16.**

SOIL AND WATER RESOURCES Table 16
Peak Instantaneous and Peak Annual Water Demands

	Peak Instantaneous Demand (gpm)	**Peak Annual Demand @ 34% Capacity Factor (acre feet/year)**
CTG Inlet Air Fogging	238	130
CTG NOx Injection	443	243
Cooling Tower Evaporation	1,546	848
Cooling Tower Blowdown	262	144
Recovery from Intercooler	-138	-76
Recovery from Reverse Osmosis	-243	-133
Recovery from Crystallizer	-19	-10
Recovery from Inlet Air Fogging	-31	-17
Total	2,059	1,129

Peak Annual Demand = gpm x 60 minutes/hour x 24 hours/day x 365 days/year x 1 AF/325,851 gallons x 34% cap. factor
Ref: AFC Table 2.4-1

After accounting for a 2-week annual maintenance outage, the peak annual demand would be about 1,100 acre-feet/year

Practical Aspects, Concerns, Risks and Environmental Issues

Proposed Project

Staff is not aware of any issues affecting the practicality of the proposed project. The primary risk identified by staff is that if the project cannot secure additional water for importation, exchange, and storage before its initial 8,350 AF is exhausted, and with sufficient lead time prior to project pumping to avoid impacts to the mesquite hummocks, that the project would be required to not operate in accordance with Condition of Certification **SOIL&WATER-7**. The project could resume operations at such time as it can meet the groundwater use and water supply requirements of Conditions of Certification **SOIL&WATER-6**, **-7**, **-8,** and **-9**.

In addition, MSWD has expressed several concerns which are listed below and are followed by the applicant 's and/or staff's responses:

Long-term effects on the MCGS - MSWD is concerned about the long-term effects of CPV Sentinel withdrawing a significant quantity of groundwater over the life of the project. Staff believes this concern would be alleviated by the applicant's proposed mitigation to import a quantity of water equivalent to or greater than the project's groundwater use as would be required under Conditions of Certification **SOIL&WATER-7**, **-8**, and **-9**.

Establishment of Water Right - MSWD would not like to see CPV Sentinel or any other user establish a new water right to groundwater in the already declining MCGS. The applicant has indicated that it does not intend to establish a new water right. Instead, it intends to exercise its right to import, store and recover water it has applied at the Mission Creek Spreading Grounds.

Management of the MCGS - MSWD considers their agency as having the best interests for considering the long-term management of the MCGS in coordination with DWA. With the implementation of staff's recommended conditions of certification, the project would conform to LORS and would not cause a significant adverse impact.

Project Contribution to the MCGS Decline - MSWD believes the project could contribute to more withdrawal from the MCGS while the effects of future growth in the region could compound the groundwater decline. Staff believes this concern would be alleviated by the applicant's proposed mitigation to import a quantity of water equivalent to or greater than the project's groundwater use as would be required under Conditions of Certification **SOIL&WATER- 7**, **-8**, and **-9**.

Apportionment of DWA's Recharge Water - MSWD expects that future development will be greater within the area overlying the Whitewater Sub-basin, than the area overlying the MCGS, which would lead to a lesser portion of recharge over time among the two sub-basins. DWA's formula for applying recharge is factored according to the production of groundwater in each sub-basin and according to the SWP supply in any year. Staff believes that since project pumping would be metered and accounted for in DWA's replenishment program including the apportionment of recharge water, that the project-related effects would contribute to a greater portion of recharge over time to the MCGS.

Alternative 1 - Reclaimed Water Augmented by Project Groundwater & Wet Cooling

Other than the need to augment reclaimed water with groundwater during the initial years of CPV Sentinel's operation, which staff has addressed already, staff is not aware of any issues affecting the practicality or presenting risks to this alternative. MSWD has advised staff that its design for the tertiary upgrade to the Horton WWTP is nearly complete, and that the upgrade could be accomplished by the time CPV Sentinel would be ready for commercial operation in 2010 (MSWD 2008b). Staff also recognizes that this alternative was not previously recognized within the negotiations conducted between the applicant and MSWD, but has been provided indication by MSWD that it is viable (MSWD 2008c). Since preparing the PSA, staff has considered the potential impact of the loss of groundwater recharge attributable from the exiting use of Horton WWTP effluent, if it were to be used by CPV Sentinel, and believes that this alternative would need to include provisions for an equivalent or greater quantity of water imported for recharge. The applicant has also indicated its concern that reclaimed water would be less reliable than project groundwater (LW2008_, page 34, Comment 133). Recognizing that the treatment of wastewater can be occasionally upset and could affect the production of reclaimed water for likely no more than a few days (an occurrence that in staff's experience may occur on the order of once every 5 – 10 years), and that conveyance of water via an approximately 5-mile long pipeline could add some minimal levels of risk t o this alternative compared to the proposed project that would not require a process water supply pipeline, staff does not consider these risk factors to be significant. Production of reclaimed water and the dependence of industrial and irrigation users of such water occurs broadly over the state, including the dependence of power plants the Energy Commission has licensed. If the project were to use reclaimed water, it could also rely on project groundwater as a backup to reclaimed water since this alternative includes provisions for groundwater to be used as a supplemental water supply.

Alternative 2 - Reclaimed Water Augmented by MSWD's Groundwater & Wet Cooling

Practical considerations and risks for Alternative 2 would be similar to Alternative 1. As for water quality, groundwater from MSWD's Wells 28 and 30 has some concentration of uranium, but at levels below the MCLs. At this time, staff is not aware that the project's use of MSWD's groundwater would pose any health hazard or would require any special pretreatment. Staff also recognizes that this alternative was not previously recognized within the negotiations conducted between the applicant and MSWD, but has been provided indication by MSWD that it is viable (MSWD 2008c). Since preparing the PSA, staff has considered the potential impact of the loss of groundwater recharge attributable from the exiting use of Horton WWTP effluent, if it were to be used by CPV Sentinel, and believes that this alternative would need to include provisions for an equivalent or greater quantity of water imported for recharge. Staff's discussion under Alterative 1 above regarding risk associated with the reliability of reclaimed water would also apply to this Alternative 2.

Alternative 3 - Dry Cooling

The project proposes to use a new style of CTG, the General Electric LMS100, that is unique in its design because it is the first power plant CTG that uses a compressor intercooler to improve power production and efficiency. Currently, there are no operating LMS100s in the state; but two projects recently approved by the Energy Commission (Starwood and Panoche Energy Center) and others currently before the Commission are planning to use the LMS100 and all propose use of evaporative (wet) cooling. Approximately 70 percent (773 AFY) of the CP Sentinel’s proposed maximum 1,100 AFY annual water demand would be used for evaporative cooling. If the project used dry cooling, the plant’s annual water demand could then be reduced by approximately 70 percent.

Dry/air cooling is generally feasible for both STGs and CTGs. STG cooling efficiency is generally reduced only on very hot days when the ambient air temperature is too hot to provide adequate steam condenser cooling. The LMS100 intercooler can also be air-cooled, but the intercooler performance threshold temperature (mid-80 degree range) is lower than that for a steam cycle condenser, so power output and fuel efficiency can be reduced to a greater degree. According to GE data, on the hottest days the loss of performance for an air-cooled LMS100 might be nine percent of its production potential, while a dry-cooled STG under the same conditions might only lose two to five percent of its production potential (as compared to use of wet/evaporative cooling). In addition, dry cooling would require an additional auxiliary load to power the cooling fans, thereby adding to the plant’s power production net loss during peak temperatures (GE 2006).

Land-use and space considerations must also be taken into account when evaluating the potential for use of dry cooling. The area required for each dry cooling tower could increase four-fold over the area required for a wet cooling tower. For example, while the footprint for a wet cooling tower might require 2,500 square feet, the footprint for an equivalent dry cooling tower might require 10,500 square feet (about ¼ acre) for each LMS100. In the case of CPV Sentinel, the area required to construct dry cooling towers for each of the eight LMS100 CTGs would exceed the space available on the proposed site (see **Project Description Figure 3**).

There are other environmental issues that could also be considered when comparing wet vs. dry cooling (such as visual and noise impacts). However, in the case of CPV Sentinel, staff believes that dry cooling is not necessary because if an alternative is needed to reduce or avoid a significant adverse impact or to conform to LORS, there is a degraded source of reclaimed water supply available from MSWD’s Horton WWTP that can be used with wet cooling.

Economic Comparison

Soil and Water Resources Table 17
Economic Comparison of Proposed Project and Alternatives

	Proposed Project	Alternative 1	Alternative 2	Alternative 3
	Project Groundwater & Wet Cooling	Reclaimed Water Augmented by Project Groundwater & Wet Cooling	Reclaimed Water Augmented by MSWD's Groundwater & Wet Cooling	Project Groundwater & Dry Cooling
Capital Costs				
	None	None	5 miles @ $600K/mile	None
Groundwater Supply Pipeline (offsite)			$3,000,000	
		5 miles @ $600K/mile	5 miles @ $600K/mile	None
Reclaimed Water Supply Pipeline (offsite)		$3,000,000	$3,000,000	
Reclaimed Water Supply Pumping Station		$500,000	$500,000	
Tertiary Treatment Upgrade of Horton WWTP		$2,500,000	$2,500,000	
Addition of 1 New MSWD Well to Replace 28 & 30			$1,300,000	
	8 @ $440K each	8 @ $440K each	8 @ $440K each	8 @ $3,400K each
Cooling Towers	$3,520,000	$3,520,000	$3,520,000	$27,200,000
				3 acres @ $1,000K/acre
Additional Land Acquisition for Dry Cooling				$3,000,000
Pre-treatment of Cooling Water	$2,000,000	$4,000,000	$6,000,000	$600,000
Zero-Liquid Discharge Wastewater Treatment	$3,000,000	$5,000,000	$5,000,000	
DWA's Compensation Program	900 LF @ $330/LF			900 LF @ $200/LF
- Reclaimed Water Pipeline to Palm Springs NGC	$300,000			$180,000
(Reclaimed Pipeline conserves 900 - 1,100 AFY)				
Reclaimed Water Sys Enhancement (DWA Tertiary Upgrade)	$1,000,000			
Subtotal of Capital Costs	$9,820,000	$18,520,000	$24,820,000	$30,980,000
Equivalent Annual Cost of Capital Items	1,041,698	1,964,588	2,632,887	3,286,335

(i = 10%, 30 years)				
Annual O&M Costs				
	No Cost	No Cost	$350/AF (incl in reclaimed)	No cost
Groundwater Purchase				
		1,100 AFY @ $450/AF	1,100 AFY @ $450/AF	
Reclaimed Water Purchase		$495,000	$495,000	
	1,100 AFY @ $500/AF	1,100 AFY @ $500/AF	1,100 AFY @ $500/AF	
Imported Water Purchase for Implem. Plan	$550,000	$550,000	$550,000	
Reclaimed Water Pumping O&M and Energy		$400,000	$400,000	
Groundwater Pumping O&M and Energy	$150,000	$50,000	$50,000	$100,000
Cooling & Water Treatment Chemicals	$150,000	$350,000	$350,000	$50,000
Cooling Energy	$100,000	$100,000	$100,000	$800,000
				10% Loss = 80,000 KW x 2890 Hr x $0.100/KWH
Lost Power Production using Dry Cooling				$23,120,000
Irrigation Controller Program ($300K annually capped at $2.5MM)	$300,000			
(4,800 Controllers would conserve 0.10 AFY each or up to 480 AFY)				
Subtotal of Annual O&M Costs	$1,250,000	$1,945,000	$1,945,000	$24,070,000
Total of Capital and O&M - Annual Basis @ 34% CF	$2,291,698	$3,909,588	$4,577,887	$27,356,335
	800,000 KW x 2,980 Hr	800,000 KW x 2,980 Hr	800,000 KW x 2,980 Hr	720,000 KW x 2,890 Hr
Annual Energy @ 34% Cap. Factor (KWH)	2,384,000,000	2,384,000,000	2,384,000,000	2,081,000,000
Incremental Cost of Production ($/KWH)	$0.00096	$0.00164	$0.00192	$0.01315
Total of Capital and O&M - Annual Basis @ 17% CF	$1,666,698	$2,937,088	$3,605,387	$26,881,335
(Reduce Annual O&M by 50%)				
Annual Energy @ 17% Cap. Factor (KWH)	1,192,000,000	1,192,000,000	1,192,000,000	1,040,500,000
Incremental Cost of Production	$0.00140	$0.00246	$0.00302	$0.02584

Staff has estimated the costs of cooling and process water supply for the proposed project and alternatives. The costs are first presented as the capital costs associated with construction of the project to provide the infrastructure needed. Operating and maintenance (O&M) costs as could be expected on an annual basis are then estimated. In order to look at all costs on the same basis, staff then converts the capital costs to an annual equivalent cost over the 30-year life of the project and adds this to the O&M costs. The total annualized capital and O&M costs are then developed for the maximum annual plant capacity factor of 34%, as well as an annual capacity factor of 17%. For the 17% capacity factor, it was assumed that the cost of water purchased, chemicals and energy would be about half of the O&M costs with the plant operating at 34% capacity factor. The capital costs are the same for both capacity factor scenarios.

As a way to consider the financial effect on the project's cost of producing power (cost of production) as associated with the incremental costs for water supply and cooling, the total annualized capital and O&M costs are then divided by the energy production associated with the two capacity factors. Staff considers the incremental cost of production as an indicator of a project's ability to remain competitive for marketing its power and for maintaining a profit margin. While some of the cost components such as for chemicals and energy are only rough estimates, their values are minimal compared to the total costs, and any revisions based on a more detailed analysis would not significantly alter the results The results of the economic analysis are summarized as follows in **Soil and Water Resources Table 18.**

Soil and Water Resources Table 18
Results of the Economic Analysis

	Proposed Project Project Groundwater & Wet Cooling	**Alternative 1** Reclaimed Water Augmented by Project Groundwater & Wet Cooling	**Alternative 2** Reclaimed Water Augmented by MSWD's Groundwater & Wet Cooling	**Alternative 3** Project Groundwater & Dry Cooling
Capital Costs	$9,820,000	$18,520,000	$24,820,000	$30,980,000
% of Total Project Capital Cost of $440 MM	2.2%	4.2%	5.6%	7.0%
Total Annualized Capital and O&M Costs @ 34%` Cap. Factor	$2,291,698	$3,909,588	$4,577,887	$27,356,335
Increase above Proposed Project	Base Case	$1,617,890	$2,286,189	$25,064,637
Incremental Cost of Production ($/KWH) @ 34% Cap. Factor	$0.00096	$0.00164	$0.00192	$0.01147
Increase above Proposed Project	Base Case	$0.00068	$0.00096	$0.01051
Total Annualized Capital and O&M Costs @ 17%` Cap. Factor	$1,666,698	$2,937,088	$3,605,387	$26,881,335
Increase above Proposed Project	Base Case	$1,270,390	$1,938,689	$25,214,637
Incremental Cost of Production ($/KWH) @ 17% Cap. Factor	$0.00140	$0.00246	$0.00302	$0.02255
Increase above Proposed Project	Base Case	$0.00107	$0.00163	$0.02115

The most significant cost distinction between the alternatives is the inclusion of lost power generation and revenues associated with Alternative 3 – Project Groundwater & Dry Cooling. This financial loss would be due to the reduced operating efficiency and generation output during periods of higher ambient air temperatures when an air-cooled condenser would not accomplish the desired heat rejection rate of 135 MM BTU/hour/unit. The increase in incremental cost of production comparing Alternative 3 with the proposed project is on the order of 1.1 to 2.2 cents per KWH (rounded to the nearest tenth) for 34% and 17% capacity factor respectively. Staff believes that Alternative 3 is not within a reasonable range of the proposed project's costs.

As for the reclaimed water alternatives, staff believes that either Alternative 1 or 2 are within a reasonable economic range of the proposed project. The increase in incremental cost of production comparing Alternative 1 with the proposed project is only on the order of 0.07 to 0.11 cents per KWH (rounded to the nearest one hundredth of a cent) for 34% and 17% capacity factors respectively. The increase in incremental cost of production comparing Alternative 2 with the proposed project is only on the order of 0.11 to 0.16 cents per KWH for 34% and 17% capacity factors respectively. Staff believes that either of the reclaimed water alternatives is economically sound.

APPLICANT'S PROPOSED WATER CONSERVATION PROGRAM

The Water Conservation Program would consist of two water conservation projects. The applicant has entered into an agreement with DWA to fund the conversion of the PSNGC from groundwater use to recycled water use. The applicant also has entered into an agreement with DWA to implement an irrigation controller program for existing residences and businesses. The water conservation benefits of each of these projects and the Replenishment program participation are analyzed below.

Palm Springs National Golf Course (PSNGC) Conversion to Recycled Water

The PSNGC currently uses between approximately 950 to 1,469 AFY of groundwater from onsite wells, with an average use of approximately 1,154 AFY. Initially the conversion project will replace about 1,000 AFY of this groundwater use based on the expected effluent rate of DWA's WWTP at the time the applicant plans to begin commercial operation in 2010 . The project owner would also ensure that recycled water use is increased as soon as increased volume is available from the DWA WWTP, such that the entire groundwater use is ultimately replaced at the PSNGC. Over the estimated 30-year life of the CPV Sentinel project, this would result in water conservation of approximately 34,620 AF based on the current average groundwater use. Staff has recommended Condition of Certification **SOIL&WATER-14** to ensure that the PSNGC water supply conversion to recycled water is implemented and the results of the water conservation are reported to the CPM over the life of the project.

Irrigation Controller Program

The second part of the conservation program would include applicant funding of the purchase of 4,800 irrigation controllers designed to increase water use efficiency and result in water use reductions. The DWA has already has initiated an "Irrigation Management Controllers Retrofit Program" under which new residential service connections within the DWA service area are provided with water conserving irrigation controllers or existing service connections can purchase the controllers at $159 each. These controllers use evapotranspiration and the ambient temperature to avoid excessive outdoor water irrigation (LW2008b). The project owner would be funding the purchase of these controllers for retrofitting existing residences to reduce groundwater use in the Upper Coachella Valley Groundwater Basin. The applicant has shown that based on studies from CVWD, which is implementing a similar program, that the water savings per household can be as high as 0.148 AFY. The applicant has used a more conservative figure of about 0.1 AFY to estimate water savings of about 480 AFY. Staff observes that the upper end of possible water conservation could be up to 706 AFY. The program would be voluntary and would be implemented by DWA as a part of their existing irrigation controller program. Staff believes the irrigation controller program, if maintained over the life of the CPV Sentinel Project, would reduce groundwater use in the MCGS, GHGS, and WRGS and result in significant environmental benefits. The net water conservation over an estimated 30-year the life of the project could be on the order of 14,400 to 21,180 AF.

However, an irrigation controller conversion program of this size has not been undertaken before. It is estimated that approximately 500 to 1,200 controllers can be installed each year (approximately 1 to 3 controllers per day for a year). At the approximate rate of installation of 1 to 3 controllers per day, it would take approximately 4 to 9.5 years to complete the installation of 4,800 controllers.

The retrofit program would be voluntary, and the key elements of the program as presented by the project applicant would be: (1) Selection of participants by pre-established selection criteria; (2) Installation by a trained technician; (3) Post installation support for questions and system failures; and (4) Monitoring of results using a group of residential houses and using information collected by the local water purveyor (DWA or MSWD) on the annual water consumption of each participant and each control house, and compute the annual water savings, making adjustments for the annual weather impacts on water use. The results would be reported by the local water purveyor annually to CPV Sentinel (LW2008b).

The applicant has proposed in their WSP that they would prepare and submit to the Energy Commission annual reports that document the freshwater conserved by the proposed conservation program (LW2008b). The applicant proposes that these reports terminate after demonstration of five consecutive years of increasing cumulative freshwater conservation. Staff has recommended Condition of Certification **SOIL&WATER-15** to assure that the irrigation controller program is maintained over the life of the project to verify estimated water conservation is achieved. The applicant would be required to obtain monitoring data from DWA and report the results of the program over the life of the project.

The irrigation controller part of this water conservation program is proposed for the WRGS, GHGS, and MCGS. The golf course recycled water conversion would occur only in the WRGS. This water conservation program is proposed primarily for the WRGS, one of the four sub-basins in the upper Coachella Valley groundwater basin (**Soil & Water Figure 1**). Therefore, the water conservation program would only partially benefit the overdrafted sub-basin from which the project would be pumping groundwater.   An indirect minor benefit may accrue to the MCGS in that reduced pumping in the WRGS as attributable to the irrigation controller program could result in an incremental increase in replenishment water supplied to the MCGS based on the terms of the Replenishment Agreement. This agreement requires that replenishment water is proportionally allocated between the two sub-basins on the basis of the volume of groundwater pumped.

The applicant’s intent in proposing the Water Conservation Program is to comply with LORS, including the Energy Commission’s water policy, by conserving up to 1,500 AFY. A summary of the water balance that would result from this WSP is presented in **Soil and Water Table 19** below.

SOIL & WATER Table 19
Water Balance of the Proposed Water Supply Plan (AFY)
(assumes the power plant operates at 34% capacity factor)

Water Use and Proposed Mitigation (AF per year)	Mission Creek, Garnet Hill, and Whitewater River Sub-basins		Central Valley (North Kern County Storage District)	
	+	-	+	-
CPV Sentinel (onsite groundwater)	---	1,100	---	---
Replenishment Program (metered fee)[1]	---	---	---	---
Implementation Program (imported water)	1,100	---	---	1,100
Residential Irrigation Controller Retrofit Program (water conservation)[2]	480 to 706	---	---	---
Palm Springs Golf Course (groundwater to recycled water conversion)[3]	1,154	---	---	---
Subtotals	2,734 to 2,960	**-1,100**	0	1,100
TOTALS	**1,634, to 1,860**		**- 1,100**	
NET BALANCE	**534 to 760**			

Notes:

1. The metered fee collected by the DWA is used to purchase surface water for recharge of the MCGS. Since the inception of this program, more groundwater volume has been pumped from the MCGS than surface volume has been purchased and recharged to the MCGS except during the years 2005 and 2006. Because future deliveries cannot reliably be predicted, the potential volume of water recharged through the Replenishment Program is left blank. In addition, the project applicant's payment of the metered fee is voluntary.
2. The irrigation controller program would be implemented in the Whitewater River, Garnet Hill, and Mission Creek groundwater sub-basins, and is expected to achieve conservation in the range of 0.10 – 0.14 AF/residence for up to 4,800 residences.
3. Initially, 1,000 AF of recycled water would be supplied to the golf course and with expected population growth, it is projected that additional recycled water would be produced and the golf course would completely be converted to only recycled water use by the year 2015. The golf course water use has ranged from 950 – 1,469 AFY, with an annual average of 1,154 AFY.

It should be noted that the water conserved, by converting the golf course to recycled water, is seen as an improvement in water quality and a net gain from the evaporative loss that would otherwise occur at the wastewater treatment plant's percolation basin. The total annual amount of water conserved from the golf course conversion to recycled water and the irrigation controller program would be more than 1.5 times (1,634 to 1,860 AFY) the maximum volume of water that would be used by the power plant, and more than triple the estimated average annual volume of water that would be used by the power plant. The net result would be water conservation of 534 to 760 AFY (16,020 to 22,800 AF over the life of the project) in excess of project water use. Staff has recommended Condition of Certification **SOIL&WATER-16** to establish a performance standard for the applicant's water conservation program combining both the PSNGC water conversion to recycled water and the irrigation controller program, requiring annual reporting to the CPM, and requiring the applicant to develop additional conservation measures in the event the proposed Water Conservation Program is not successful.

Replenishment Program

The applicant's WSP also proposes participation on a voluntary basis in the Replenishment Program. While the project would not be using groundwater from the MCGS, the project owner would be paying an Extraction Fee in lieu of the replenishment assessment for the benefit of the MCGS. Under the terms of this agreement, the project owner's water use is considered to come from their imported freshwater supply rather than the native groundwater and, therefore, the project owner is not required to pay the Replenishment Assessment.

The Replenishment Program was originally created by statute in 1961 and requires the DWA agency to document the volume of groundwater extracted by any pumper in the MCGS of more than 10 AFY and requires the DWA to charge those pumpers a fee to purchase and import water for replenishment.[3] In 2003, an agreement was entered into between the DWA and CVWD to set out the terms for replenishing the MCGS and sharing the costs of this replenishment. This agreement, known as the Mission Creek Agreement, resulted in the development of the Replenishment Program. All groundwater pumpers in the MCGS that produce more than 10 AFY are required to participate in the Replenishment Program. This program requires metering and payment of a fee based on the amount of groundwater extracted. The revenue generated by these fees is then used to purchase and import available surface water for basin recharge. The fee for the fiscal year 2008/2009 is $72 per acre-foot (K&S2008).

It is important to note that payment of this replenishment fee by a groundwater pumper does not necessarily result in an equivalent amount of water purchased and imported into the basin to replace the water that was pumped. The annual supply of water available to purchase has historically, on average, been insufficient to match the annual volume of water pumped. Nonetheless, given this limitation, the DWA has consistently used the funds from the Replenishment Program in efforts to obtain increasing amounts of water to satisfy growing demand. For example, in 2005, the DWA obtained allocation rights to an additional 11,500 AF of water annually for replenishment of the MCGS. The revenue accumulated from the project owner's participation in the Replenishment Program would be used to purchase surplus SWP water as it became available (DWA2008b). The DWA estimates that for every acre-foot of water that would be

[3] The DWA is one of 13 Special Act Districts created by California legislation with specific groundwater management authority to require pumpers to report their extraction volumes and require these pumpers to pay a fee for the purchase of replenishment water (DWR2003).

pumped by the project, one-half to one full acre-foot of surplus water could be purchased under the Replenishment Program (DWA2008b). Because there is not a direct correlation between payment of the replenishment fee and water purchased by DWA, staff did not include the Replenishment Program in its analysis of project impacts.

Please see below for staff's conclusions regarding LORS conformance.

CONCLUSIONS

With the implementation of staff's recommended conditions of certification, staff concludes that the project would not cause any unmitigable significant impacts and would conform to LORS.

The circumstances that led to the development of the applicant's proposed Water Supply Plan (WSP) are unique to this case. As a result, staff believes that although its recommendation is that the Energy Commission find the project with respect to Soil and Water Resources would not cause a significant adverse water resources impact and would conform to LORS, the complexities of this case deserve to be highlighted. Staff has looked carefully at both the potential for the project to cause significant adverse impacts combined with the adequacy of mitigation, and the project's conformance with LORS, including the Energy Commission's 2003 Integrated Energy Policy Report (IEPR) water conservation policy.

With respect to the potential for significant impacts associated with the project's extraction of groundwater, staff believes the applicant's proposal to import new water into the Mission Creek Groundwater Sub-basin (MCGS) for recharge at 108% of the project's use would avoid contributing to the depletion of groundwater in a basin that is already in overdraft. In addition, to ensure that there are no temporary effects on other groundwater users in the basin, staff has proposed a number of conditions of certification that require recharge activities to occur on a schedule that results in no change in groundwater levels at residential wells and the 330-acre Willow Hole Conservation Area, which hosts several state and federally-protected plant and animal species.

The Energy Commission's 2003 IEPR policy on water use for power plant cooling, states that the Energy Commission will approve the use of fresh water for cooling purposes by power plants which it licenses only where alternative water supply sources and alternative cooling technologies are shown to be 'environmentally undesirable' or 'economically unsound'. In evaluating compliance with this policy, staff first assessed whether the proposed project will use fresh water. Based on guidance provided in the State Water Resources Control Board's policies and Title 22 of the California Code of Regulations, staff concluded that it will use fresh water. Next, staff determined that that reclaimed water from the Mission Spring Water District's Horton wastewater treatment plant is neither environmentally undesirable nor economically unsound. Staff also reviewed the option for dry cooling and concluded that at this time it appears economically unsound due to the lower cooling efficiency and loss of power generation.

Staff then looked to previous powerplant siting case decisions of the Energy Commission to determine whether additional evaluation of the conformity of the project with the policy was appropriate. Based on the Commission's decisions in the recent Panoche Energy Center (06-AFC-5) and the Starwood-Midway Project (06-AFC-10) Projects, staff concluded that the Energy Commission has also considered the intent of the policy in determining a project's conformity with the policy. The Energy Commission's findings in both of these cases appeared to conclude that a project proposing to use a fresh water source that is of higher quality than the most degraded source reasonably available to the project, can comply with the policy where the project also includes measures that would accomplish conservation of water of a greater quantity and higher quality than the project would use. Water conservation quantities required in the Final Decisions for Panoche Energy Center and Starwood-Midway cases relative to the project's maximum annual water use were 109% and 100+% respectively.

The CPV Sentinel project as proposed would accomplish conservation of an even greater quantity of water than the project would use (approximately 150% of the project's maximum water use, and 300% of the project's average water use). However, staff remains concerned that water conserved under the WSP is not of a higher quality than the project's source of supply. Given this, staff notes that the WSP would result in conservation of fresh water far in excess of that conserved in the two previous siting cases discussed. Given that the Energy Commission has found that conservation of a higher quantity and quality of water can be used to support a finding of compliance with the policy, staff concluded that it is reasonable to find that conservation of a significantly greater quantity of water than used by the project can also support a finding of conformity with the policy.

Staff has attempted to arrive at a solution that would meet the spirit of the 2003 IEPR policy. Building from principles articulated in prior siting case decisions that the policy can be applied more broadly than its express terms, staff has determined that the proposed WSP associated with the CPV Sentinel project is a preferable option for water supply and for achieving conservation relative to the alternatives. However, staff's recommendation to the Energy Commission depends on the assumption that the recommended conditions of certification contained in the Final Staff Assessment would be adopted in the Final Decision. This would ensure that the applicant's proposed water conservation measures are fully implemented, and the water savings identified above are achieved.

Staff also recommends that the 2003 IEPR Policy be revisited during the next IEPR proceeding to enable the Commission to provide staff with additional direction on the application of the policy in future powerplant siting cases. If the Energy Commission believes it is appropriate to allow use of fresh water for cooling when alternatives are viable, clarifications about the types of benefits that can support a finding of conformity of a project with the policy would be helpful to both staff and developers. The staff has been a strong proponent of the Commission's water conservation policy for powerplant cooling since its adoption in the 2003 IEPR and wants to ensure it is appropriately following the Commission's policy guidance in this critical area in the future.

PROPOSED CONDITIONS OF CERTIFICATION

NPDES STORMWATER PERMIT – CONSTRUCTION ACTIVITY

SOIL&WATER-1: The project owner shall comply with the requirements of the general National Pollution Discharge Elimination System (NPDES) permit for discharge of stormwater associated with construction activity. The project owner shall develop, obtain compliance project manager (CPM) approval of, and implement a Storm Water Pollution Prevention Plan (SWPPP) for the construction of the CPV Sentinel site, laydown area, and all linear facilities including the recycled water supply pipeline to PSNGC.

Verification: At least 60 days prior to site mobilization, the project owner shall submit to the CPM a copy of the construction SWPPP for review and approval prior to site mobilization. The project owner shall retain a copy on site. The project owner shall submit copies to the CPM of all correspondence between the project owner and the Colorado Region Regional Water Quality Control Board (RWQCB) 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 (SWRCB), and the board's confirmation letter indicating receipt and acceptance of the notice of intent.

COUNTY GRADING AND FLOODING PERMIT REQUIREMENTS

SOIL&WATER-2: The project owner shall complete all necessary plans, reports, documents, and monitoring necessary to satisfy the Conditions of Approval related to grading and flooding outlined in Draft Public Use Permit Number 897 issued by the County of Riverside, dated August 11, 2008, and Riverside County's Ordinance 754.2. Prior to initiation of construction activities, the project owner shall submit to the County of Riverside all necessary documentation, plans, and fees **normally** required for County's determination of compliance with Conditions of Approval, with copies to the CPM. The project shall not commence construction until the county of Riverside provides its written evaluation as to whether the proposed grading and flood control construction and operation activities complies with all county requirements and the CPM provides approval for construction. The project owner shall ensure compliance with all county standards and requirements for grading, erosion control, and flooding for the life of the project and shall provide the CPM with two (2) copies of all monitoring or other reports required for compliance with the County of Riverside requirements.

Verification: The project owner shall do all of the following:

1. No later than sixty (60) days prior to the start of grading the project owner will provide to the County of Riverside and CPM a copy of all necessary information to satisfy the Conditions of Approval for grading and flooding and acquire a grading permit from the County of Riverside. The submittal must be reviewed by the County of Riverside and approved by the CPM.

2. No later than sixty (60) days prior to the start of facility construction the project owner will provide to the County of Riverside and CPM a copy of all necessary information to satisfy the Conditions of Approval for grading and flooding and acquire

a building permit from the County of Riverside. The submittal must be reviewed by the County of Riverside and approved by the CPM.

3. No later than 30 days prior to project operation, the project owner will facilitate inspections and provide documentation to the County of Riverside and CPM demonstrating that all necessary grading and flooding improvements have been completed and are operational. The submittal must be reviewed by the County of Riverside and approved by the CPM.

PROJECT GROUNDWATER WELLS

SOIL&WATER-3: The project owner shall construct and operate up to five onsite groundwater wells that produce water from the Mission Creek Groundwater Sub-basin (MCGS). The project owner shall ensure that the wells are completed in accordance with all applicable state and local water well construction permits and requirements. Prior to initiation of well construction activities, the project owner shall submit a well construction packet to the County of Riverside, in accordance with the County of Riverside Ordnance 682, containing all documentation, plans, and fees normally required for the county's well permit, with copies to the CPM. The project shall not construct a well or extract and use any groundwater therefrom until the County of Riverside issues its written evaluation as to whether the proposed well construction and operation activities comply with all applicable county well requirements, and the CPM provides approval to construct the well. The project owner shall provide documentation to the CPM that the well has been properly completed. In accordance with California's Water Code section 13754, the driller of the well shall submit to the Department of Water Resources (DWR) a Well Completion Report for each well installed. The project owner shall ensure the Well Completion reports are submitted. The project owner shall ensure compliance with all county water well standards and requirements for the life of the wells and shall provide the CPM with two (2) copies of all monitoring or other reports required for compliance with the County of Riverside water well standards and operation requirements, as well as any changes made to the operation of the well.

Verification: The project owner shall do all of the following:

1. No later than thirty (30) days prior to the construction of the onsite water supply wells, the project owner shall submit two (2) copies to the CPM of the water well construction packet submitted to the County of Riverside.

2. No later than fifteen (15) days prior to the construction of the onsite water supply wells, the project owner shall submit two (2) copies of the written concurrence document from the County of Riverside indicating that the proposed well construction activities comply with all county well requirements and meet the requirements established by the county's water well permit program.

No later than 60 days after installation of each well at the project site, the project owner shall ensure that the well driller submits a Well Completion Report to the DWR with a copy provide to the CPM. The project owner shall submit to the CPM together with the

Well Completion Report a copy of well drilling logs, water quality analyses, and any inspection reports that may be:

A. Submit copies to the CPM of any proposed well construction or operation permit changes within ten (10) days of submittal to or receipt from the County of Riverside.

B. Submit copies of any water well permit-related well monitoring reports required by the County of Riverside to the CPM in the annual compliance report.

C. No later than fifteen (15) days after completion of the onsite water supply wells, the project owner shall submit documentation to the CPM and the RWQCB that well drilling ac available for each well installed.

During well construction and for the operational life of the well, the project owner shall:

D. Submit copies to the CPM of any proposed well construction or operation changes.

E. Submit copies of any water well monitoring reports required by the County of Riverside to the CPM in the annual compliance report.

F. No later than fifteen (15) days after completion of the onsite water supply wells, the project owner shall submit documentation to the CPM and the RWQCB that well drilling activities were conducted in compliance with Title 23, California Code of Regulations, Chapter 15, Discharges of Hazardous Wastes to Land, (23 CCR, sections 2510 et seq.) requirements and that any onsite drilling sumps used for project drilling activities were removed in compliance with 23 CCR section 2511(c).

NPDES STORMWATER PERMIT – INDUSTRIAL ACTIVITY

SOIL&WATER-4: The project owner shall comply with the requirements of the general NPDES permit for discharges of storm water associated with industrial activity. The project owner shall develop, obtain CPM approval of, and implement an industrial SWPPP for the operation of the project.

Verification: At least 60 days prior to commercial operation, the project owner shall submit to the CPM a copy of the industrial SWPPP for operation of the project for review and approval prior to commercial operation. The project owner shall retain a copy on site. The project owner shall submit copies to the CPM of all correspondence between the project owner and the RWQCB regarding the general NPDES permit for discharge of storm water 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 SWRCB.

POTABLE WATER USE

SOIL&WATER-5: The project owner shall use potable water supplied by one of the following: (1) Mission Springs Water District (MSWD); or (2) onsite wells. The annual use of potable water shall not exceed 2-acre-feet per year. If MSWD or onsite wells are the source of potable water, the project owner shall monitor and record in gallons per day the total volume of potable water supplied to the CPV Sentinel project. 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 metering allowing the project owner to document project water use as required. The metering devices shall be operational for the life of the project.

1. Beginning with the commencement of commercial operation, 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 cubic feet per month, 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 beginning of the one-year term will correspond to the date established for the annual compliance report submittal.

2. At least sixty (60) days prior to commercial operation of CPV Sentinel project, the project owner shall submit to the CPM a copy of the water supply agreement, if applicable, and evidence that metering devices have been installed and are operational. Potable water use reporting may be based on metering from the supplier.

EVALUATION OF IMPACTS TO PRIVATE WELLS

SOIL & WATER-6: The project owner shall take the following steps to assess potential impacts to private well owners and to mitigate any such impacts.
The project owner will determine whether there are any private wells within a 3 mile radius of the project. If there are any such wells, the project owner will conduct groundwater modeling analysis to determine what type of impacts may result at these wells based on the site-specific conditions and well construction details. The project owner shall use the URS model developed during the AFC process for this project, and shall base its conclusions on the following values: transmissivity equal to Tyley’s T and anisotropy equal to 2.

If this analysis indicates that the project will create a drawdown of five feet or more at any private well at any time over the project life of 30 years, the project owner shall provide the following mitigation to the well owner:

1. Payment or reimbursement (at the affected well owner's option) for increased energy costs calculated pursuant to **SOIL&WATER-7** due to the project’s impacts; and

2. Payment or reimbursement of an amount equal to the cost of lowering the well owner's pump setting necessary to accommodate the decline in water level caused by the project, unless the project owner can demonstrate to the satisfaction of the CPM that the existing pump setting is sufficiently deep that lowering is unnecessary. In the event that the pump setting cannot be lowered without deepening the well, the project owner shall pay or reimburse the private well owner an amount equal to the customary local cost of deepening the well. If the well cannot be deepened, the project owner shall pay or reimburse the private well owner an amount equal to the customary local cost of installation of a new well.

<u>Verification:</u> No later than thirty (30) days prior to start of project construction the project owner shall provide documentation showing the results of the mail notification and identification of any impacted well owners. If any private well owners are identified and if so the analysis showing what types of impacts. This documentation should be provided to the CPM for review and approval prior to implementing appropriate measures or methods of mitigation for impacts.

No later than 60 days prior to project operation the project owner shall provide documentation showing that any mitigation for private well impacts was undertaken and satisfied based on the requirements of the CPM and the property owner.

MITIGATION OF ENERGY USE IMPACTS ON PRIVATE WELLS

SOIL&WATER-7: Where it is determined that the project owner shall reimburse a private well owner for increased energy costs identified as a result of analysis performed in Condition of Certification **SOIL&WATER-6,** the project owner shall calculate the compensation owed to any owner of an impacted well as described below.

<u>Increased cost for energy</u>	=	change in lift/total system head x total energy consumption x costs/unit of energy
Where:		
change in lift (ft)	=	calculated change in water level in the well resulting from project
total system head (ft)	=	elevation head + discharge pressure head
elevation head (ft)	=	difference in elevation between wellhead discharge pressure gauge and water level in well during pumping.
discharge pressure head (ft)	=	pressure at wellhead discharge gauge (psi) X 2.31

At least 30 days prior commencement of production pumping, the project owner shall submit to the CPM for review and approval the documentation showing which well owners must be compensated for increased energy costs and that the proposed amount is sufficient compensation to comply with the provisions of this condition.

1. Any reimbursements (either lump sum or annual) to impacted well owners shall be only to those well owners whose wells were in service within six months of the Commission decision and within a 3-mile radius of the project site.

2. The project owner shall notify all owners of the impacted wells within one month of the CPM approval of the compensation analysis for increase energy costs.

3. Compensation shall be provided on either a one-time lump-sum basis, or on an annual basis, as described below.

Annual Compensation: Compensation provided on an annual basis shall be calculated prospectively for each year by estimating energy costs that will be incurred to provide the additional lift required as a result of the project. With the permission of the impacted well owner, the project owner shall provide energy meters for each well or well field affected by the project. The impacted well owner to receive compensation must provide documentation of energy consumption in the form of meter readings or other verification of fuel consumption. For each year after the first year of operation, the project owner shall include an adjustment for any deviations between projected and actual energy costs for the previous calendar year.

One-Time Lump-Sum Compensation: Compensation provided on a one-time lump-sum basis shall be based on a well-interference analysis, assuming the maximum project-pumping rate of 1,100 AFY. Compensation associated with increased pumping lift for the life of the project shall be estimated as a lump sum payment as follows:

1. The current cost of energy to the affected party considering time of use or tiers of energy cost applicable to the party's billing of electricity from the utility providing electric service, or a reasonable equivalent if the party independently generates their electricity;
2. An annual inflation factor for energy cost of 3 percent; and
3. A net present value determination assuming a term of 30 years and a discount rate of 9 percent;

Verification: The verification for compensation required for increased lift shall be as follows:

1. No later than 30 days after CPM approval of the well drawdown analysis, the project owner shall submit to the CPM for review and approval all documentation and calculations describing necessary compensation for energy costs associated with additional lift requirements.
2. The project owner shall submit to the CPM all calculations, along with any letters signed by the well owners indicating agreement with the calculations, and the name and phone numbers of those well owners that do not agree with the calculations.

Compensation payments shall be made by March 31 of each year of project operation or, if lump-sum payment is selected, payment shall be made by March 31 of the first year of operation only. Within 30 days after compensation is paid, the project owner shall submit to the CPM a compliance report describing compensation for increased energy costs necessary to comply with the provisions of this condition.

PROJECT GROUNDWATER USE

SOIL&WATER-8: The CPV Sentinel project shall use groundwater produced by the on-site wells identified in **SOIL&WATER-3** for all non-potable plant construction and process uses during operation including cooling and landscape irrigation.

a. Prior to the use of groundwater for commercial operation, the project owner shall install and maintain metering devices as part of the water supply and distribution system to document project process water use as required to monitor and record in hundreds of cubic feet per month the total volume(s) of water supplied to the CPV Sentinel project from this water source. The metering devices shall be operational for the life of the project. Each of the five wells to be constructed will be metered separately or provisions will be made to ensure water use from each well can be identified and documented.

b. The amount of groundwater that can be used for project process needs shall be limited as follows:

   1. No more than 1,100 acre-feet may be consumed in any calendar year; and

   2. In any given month, the amount of water that may be consumed is the total amount of water that has been recharged (pursuant to **SOIL&WATER-10**) 25 months or more prior to that month, minus the cumulative amount of water previously pumped for project process needs since the commercial operation date.

c. The project owner shall submit to the CPM an annual summary of daily groundwater use for project process needs, including monthly subtotals and an accumulation of all project groundwater use since the commercial operation date, and the accumulation of groundwater recharged in accordance with **SOIL&WATER-10.**

d. If insufficient water has been recharged for project process needs, the CPV Sentinel project shall not operate.

Verification: The project owner shall prepare an annual summary, which will include identification of the well or wells used, daily groundwater usage in gallons per day, maximum and minimum daily usage for each month and annually, 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 maximum and minimum and yearly average water use by source. Calculations shall be performed on a calendar year basis.

At least sixty (60) days prior to commercial operation of the CPV Sentinel project, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational for process water supply and distribution.

TRANSMISSIVITY INVESTIGATION – EVALUATION OF HYDROGEOLOGIC CONDITIONS IN THE MESQUITE HUMMOCKS CONSERVATION AREA

SOIL&WATER-9: The project owner may complete an investigation that determines subsurface geology, groundwater levels, and aquifer properties (i.e., transmissivity and storage properties) in the Mesquite Hummocks Conservation Area located in the Mission Creek Groundwater Sub-basin. This investigation shall consist of the following:

1. Submit a scope of work (the Work Plan) to the CPM. This Work Plan shall contain a detailed discussion proposing the approach, methods, and timeframe for the hydrogeologic investigation.

2. Obtain CPM approval of the Work Plan prior to starting the investigation.

3. Complete the investigation as described in the approved Work Plan.

4. Submit a report of results that documents the methods used, data collected, analyses conducted and study conclusions regarding hydrogeologic conditions in the Mesquite Hummocks Conservation Area.

If the report demonstrates that hydrogeologic conditions and aquifer properties in the Mesquite Hummocks Conservation Area support the hypothesis that transmissivity is greater than mapped by Tyley (1974), the project owner may, upon receipt of written CPM approval, request use this transmissivity value in the calculation of the pre-charge schedule and in the calculation of potential well interference at private wells.

Verification: The project owner shall:

1. At least 60 days before conducting the investigation, the project owner shall submit to the CPM, for approval, a Work Plan describing in detail the scope of work proposed for the hydrogeologic study.

2. At least 12 months before project operation, the project owner shall submit to the CPM a report of results documenting the aquifer properties in the Mesquite Hummocks Conservation Area, and if the transmissivity value is greater than that mapped by Tyley (1974), obtain CPM approval, if desired, to use this transmissivity value in calculating the pre-charge schedule and potential well interference at private wells.

GROUNDWATER RECHARGE

SOIL&WATER-10: The project owner shall ensure that its recharge of groundwater complies with the following:

1. Recharge shall occur at the Desert Water Agency's (DWA's) Mission Creek Spreading Grounds;

2. Water purchased by the project owner for recharge shall be in addition to State Water Project (SWP) supplies acquired by DWA under its entitlements as a State Water Project contractor (including DWA's Table A allocation and any surplus SWP purchases) for its groundwater replenishment program;

3. The initial water used for recharge shall be the 8,350 acre-feet of Exchanged North Kern water (hereafter referred to as North Kern water) water secured from North Kern Water Storage District pursuant to the Water Supply Agreement between CPV Sentinel and DWA, dated August 19, 2008. Recharge of additional water must comply with subdivisions a) and b) of this condition and must be approved pursuant to **SOIL&WATER-11**; and

4. The applicant shall provide to the CPM an annual accounting of cumulative water recharged on a monthly basis throughout the operating life of the project as part of the Annual Compliance Report, and in coordination with the annual reporting requirements in **SOIL&WATER-16**.

Verification: Within 60 days of licensing, the project owner shall submit to the CPM copies of final agreements between it and the seller of the North Kern water, between it and DWA, and between the Metropolitan Water District (MWD) and DWA that ensure that the North Kern water will be delivered to the DWA spreading grounds. If recharge of other water is approved by the CPM pursuant to **SOIL&WATER-11**, the project owner shall within 60 days of that approval, submit to the CPM copies of final agreements between it and the seller of the other water, between it and DWA, and between DWA and MWD (if water is to be delivered through an exchange with MWD) that ensure that the other water will be delivered to the DWA spreading grounds.

APPROVAL OF NEW RECHARGE WATER SOURCES

SOIL&WATER-11:

1. The project owner shall submit a Water Supply Plan identifying additional water for recharge to the CPM for review and approval when the amount of water available for project process needs is reduced to 1,650 acre-feet as calculated in **SOIL&WATER-8**.

2. Any Water Supply Plan submitted pursuant to this Condition shall include the following:

   A. Identification of the water source;

   B. Demonstration of the project owner's legal entitlement to the water;

   C. Demonstration of CEQA compliance; and

   D. An estimated schedule for delivery to the DWA's Mission Creek Spreading Grounds, including applicable agreements with water supply, transfer and conveyance entities.

3. The project shall not utilize water other than North Kern water unless the CPM has approved the Water Supply Plan submitted pursuant to this Condition.

Verification: The project owner shall submit a Water Supply Plan that meets the requirements of this condition.

ZERO LIQUID DISCHARGE SYSTEM REQUIREMENTS

SOIL&WATER-12: 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 CPV Sentinel 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:

1. A flow diagram showing all water sources and wastewater disposal methods at the power plant;
2. A narrative of expected operation and maintenance of the ZLD system;
3. A narrative of the redundant or back-up wastewater disposal method to be implemented during periods of ZLD system shutdown or maintenance;
4. A maintenance schedule;
5. A description of on-site storage facilities and containment measures;
6. A table identifying influent water quality; and
7. A table characterizing the constituent concentrations of the solid waste or brine and specifying the permit limits of the selected landfill.

The CPV Sentinel 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 Chief Building Officer. 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.

COUNTY SEPTIC FACILITY PERMIT REQUIREMENTS

SOIL&WATER-13: The project owner will comply with the requirements of the Riverside County Department of Health and Human Services, Riverside County Ordinance Code 592.1, regarding a Septic Facility Permit for sanitary waste disposal facilities such as septic systems and leach fields.

Verification: The project owner will submit all necessary information and the appropriate fee to the county of Riverside to ensure that the project has complied with the county's sanitary waste disposal facilities requirements. A written assessment prepared by Riverside County of the project's compliance with these requirements must be provided to the CPM 60 days prior to the start of operation.

WATER SUPPLY CONVERSION OF PALM SPRINGS NATIONAL GOLF COURSE

SOIL&WATER-14: In accordance with the Water Conservation Funding Agreement, dated July 15, 2008, the project owner will fund construction of the water supply conversion of the PSNGC from groundwater use to recycled water use, and comply with the following requirements:

1. The project owner shall pay $1,000,000 to the DWA for enhancements and improvements to DWA's reclaimed water system intended to maximize the availability of reclaimed water to DWA costumers;

2. The project owner shall pay $300,000 to DWA for fees and construction costs to enable delivery of the recycled water from DWA's South Murray Canyon Drive service main to the PSNGC.

3. The project owner shall, in each calendar year following the start of commercial operation, ensure that the maximum available supply of DWA's recycled water that can be beneficially used by PSNGC will be delivered and used by PSNGC. At least 1,100 AFY of recycled water supply must be made available to PSNGC for irrigation.

4. The project owner shall obtain records from DWA showing the volume of recycled water used and report daily water use in gallons per day, and monthly and annual totals in acre-feet in the Annual Compliance Report. If any groundwater is used for irrigation of PSNGC, the project owner shall also obtain records showing the daily water use in gallons per day, and monthly and annual totals in acre-feet in the Annual Compliance Report and provide an explanation of why irrigation with groundwater was necessary.

5. In the event the PSNGC no longer requires recycled water service, the project owner shall notify the CPM within 10 days and shall comply with the requirements of **SOIL&WATER-16**.

Verification: The project owner shall do all of the following:

No later than60 days prior to the start of the PSNGC water supply conversion project construction the project owner will provide the CPM with an agreement and schedule demonstrating the PSNGC conversion project will be constructed and operational prior to pumping groundwater for use on the CPV Sentinel project. The conversion project agreement and schedule must be reviewed and approved by the CPM prior to conversion project construction. The CPV Sentinel project may not operate until the PSNGC conversion project is operational.

No later than 90 days prior to the start of conversion project operation, the project owner will provide to the CPM a copy of the agreement between DWA and PSNGC that ensures they will take delivery of recycled water for all their irrigation needs as soon as it is available. The CPV Sentinel project may not operate until the PSNGC conversion project is operational.

The project owner shall prepare an annual summary to be included in the annual compliance report, which will include the monthly range and monthly average of daily recycled and groundwater use 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. Calculations shall be on a calendar year basis.

IRRIGATION CONTROLLER PROGRAM

SOIL&WATER-15: In accordance with the WSP, the project owner will fund installation by DWA of irrigation controllers in existing residences and businesses in DWA's service area to achieve fresh water conservation consistent with the WSP. The program will include provisions for education and outreach, demonstration programs, and installation of the controllers by DWA. The project owner shall:

1. Contribute funding sufficient for DWA's installation of 4,800 irrigation controllers in its services area at existing businesses or residences to conserve between 480 to 706 acre-feet of groundwater per year. Installation shall be completed no later than the end of the 7th year following the start of construction;

2. Contribute funding for DWA to provide long-term maintenance or periodic replacement of the irrigation controllers to ensure that they are effective for a minimum of 30 years;

3. Cause DWA to complete an evaluation of the effectiveness of the irrigation controller program using methods similar to those used by CVWD in their Final Report dated June 21, 2007 or other methods to be approved by the CPM; and

If the installation of irrigation controllers does not result in fresh water conservation of at least 480 acre-feet each year, the project owner shall comply with **SOIL&WATER-16**.

Verification: The project owner shall do all of the following:

1. No later than thirty (30) days after the CPV Sentinel project certification, the project owner will provide to the CPM an executed agreement with DWA to fund an irrigation controller management program with the following elements included: purchasing and installing at least 4,800 irrigation controllers for water conservation to DWA's existing residential and business customers. The agreement will include a commitment from DWA showing they will conduct the necessary education and outreach, and demonstration projects to ensure that 4,800 controllers are installed within 7 years following start of CPV Sentinel construction.

2. No later than one year after funding implementation of the irrigation controller program the project owner shall develop and submit to the CPM for approval a methodology and outline for a report to evaluate the effectiveness of the irrigation controller program and estimate the water savings in the Upper Coachella Valley Groundwater Basin.

3. Each year after initiating the irrigation controller program, and annually thereafter, the project owner shall analyze the effectiveness of the irrigation controller program using the approved methods and report on the total water conservation achieved. The report should be included in the Annual Compliance Report for approval by the CPM.

4. Submit to the CPM, as part of the Annual Compliance Report documentation, the following:

    - The annual invoice paid to the DWA, in accordance with the Water Conservation Funding Agreement. This shall include proof of invoice payment to the DWA;
    - The estimated total and average water conservation achieved based on the number of controllers;
    - The accounting of the project owner's contributions to DWA's Irrigation controller Program over the life of the program; and
    - A plan for maintaining and replacing as necessary the irrigation controllers over 30 years starting with CPV Sentinel's first year of commercial operation;

    Calculations shall be on a calendar year basis.

REPORTING AND VERIFYING THE FRESH WATER CONSERVATION PROGRAM BENEFITS

SOIL&WATER-16: The project owner shall perform the following:

1. Provide annual reporting to ensure that the fresh water conservation benefits to be achieved by implementation of **SOIL&WATER-14** and **SOIL&WATER-15** shall meet the following requirements:

    A. Achieve 1,000 AFY in fresh water conservation benefits by the end of the first full calendar year following the project commercial operation date, increasing by 100 AFY annually over the subsequent 5 years to 1,500 AFY by the end of the 6th full calendar year following the commercial operation date.

B. Achieve minimum water conservation benefits of 1,500 AFY for each year following the 6h full calendar year following the commercial operation date for the life of the project.

2. If the fresh water conservation benefits of the water supply conversion of the PSNGC and the irrigation program projects cannot be sustained for any reason according to 1) and 2) above, the project owner shall submit a revised Water Conservation Plan within 6 months of the annual report, obtain CPM approval of the revised plan, and implement additional fresh water conservation projects on the schedule identified in the approved plan that will achieve fresh water conservation that will include the makeup of any deficits in meeting the water conservation requirements of 1) and 2) of this condition.

Verification: For each year following the commercial operation date, the project owner shall provide an Annual Compliance Report, an accounting of fresh water conservation benefits for the previous calendar year, and a summary of annual fresh water conservation quantities since inception. If the water conservation benefits are not in conformance with the fresh water performance measures included in this condition, the project owner shall submit:

1. A revised Water Conservation Plan within 6 months of the annual report;

2. Obtain CPM approval of the revised plan; and

3. Implement additional fresh water conservation projects on the schedule identified in the approved plan that will achieve fresh water conservation that will include the makeup of any deficits in meeting the water conservation requirements of 1) and 2) of this condition.

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SOIL AND WATER RESOURCES - APPENDIX A

Acronyms Used in the Soil and Water Resources Section

AF	acre-feet
AFY	acre-feet per year
BMP	Best Management Practices
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CPM	Compliance Project Manager
CVWD	Coachella Valley Water District
CWA	Clean Water Act
CWC	California Water Code
DESCP	Drainage, Erosion, and Sediment Control Plan
DTSC	Department of Toxic Substances Control
DWA	Desert Water Agency
DWR	Department of Water Resources
FEMA	Federal Emergency Management Agency
FSA	Final Staff Assessment
gpd	Gallons per day
gpm	gallons per minute
IEPR	Integrated Energy Policy Report
LORS	laws, ordinances, regulations, and standards
MCGS	Mission Creek Groundwater Sub-basin
mg/l	milligrams per liter
MSWD	Mission Springs Water District
MW	megawatt
MWD	Metropolitan Water District of Southern California
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
Porter-Cologne	Porter-Cologne Water Quality Control Act
PSA	Preliminary Staff Assessment
RCRA	Resource Conservation and Recovery Act
RWQCB	Regional Water Quality Control Board
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
WQMP	Water Quality Management Plan
WSP	Water Supply Plan
WWTP	wastewater treatment plant
ZLD	zero liquid discharge

WATER BALANCE WITH IMPORTED WATER, Psomas 2004 Data Used

YEAR	INFLOW							OUTFLOW					CHANGE IN STORAGE (35% Non-Consumptive Return)	CHANGE IN STORAGE (50% Non-Consumptive Return)
	Surface Water & Precipitation	35% Non-Consumptive Return	50% Non-Consumptive Return	Flow from the Mission Creek Fault	Imported Water	TOTAL INFLOW (35% Non-Consumptive Return)	TOTAL INFLOW (50% Non-Consumptive Return)	MSWD & Private Pumping	Evapo-transpitation	Surface Water	Flow Across the Banning Fault	TOTAL OUTFLOW		
2002	6,834	5,498	7,854	3,080	4,733	**20,145**	**22,501**	15,708	1,460	70	3,218	**20,456**	**-311**	**2,045**
2003	6,834	5,342	7,632	3,080	0	**15,256**	**17,546**	15,263	1,460	70	3,218	**20,011**	**-4,755**	**-2,466**
2004	6,834	6,143	8,776	3,080	5,564	**21,621**	**24,254**	17,551	1,460	70	3,218	**22,299**	**-678**	**1,955**
2005	6,834	6,324	9,034	3,080	24,723	**40,961**	**43,671**	18,068	1,460	70	3,218	**22,816**	**18,145**	**20,855**
2006	6,834	6,687	9,553	3,080	19,901	**36,502**	**39,368**	19,106	1,460	70	3,218	**23,854**	**12,648**	**15,514**
2007	6,834	6,460	9,228	3,080	1,011	**17,385**	**20,153**	18,456	1,460	70	3,218	**23,204**	**-5,819**	**-3,051**
2008	---	---		---	---	---	---	---	---	---	---	---	---	---
						TOTAL 151,869	**TOTAL 167,492**					**TOTAL 132,640**	**TOTAL 19,229**	**TOTAL 34,852**

WATER BALANCE WITHOUT IMPORTED WATER, Psomas 2004 Data Used

YEAR	INFLOW							OUTFLOW					CHANGE IN STORAGE (35% Non-Consumptive Return)	CHANGE IN STORAGE (50% Non-Consumptive Return)
	Surface Water & Precipitation	35% Non-Consumptive Return	50% Non-Consumptive Return	Flow from the Mission Creek Fault	Imported Water	TOTAL INFLOW (35% Non-Consumptive Return)	TOTAL INFLOW (50% Non-Consumptive Return)	MSWD & Private Pumping	Evapo-transpitation	Surface Water	Flow Across the Banning Fault	TOTAL OUTFLOW		
2002	6,834	5,498	7,854	3,080	---	**15,412**	**17,768**	15,708	1,460	70	3,218	**20,456**	**-5,044**	**-2,688**
2003	6,834	5,342	7,632	3,080	---	**15,256**	**17,546**	15,263	1,460	70	3,218	**20,011**	**-4,755**	**-2,466**
2004	6,834	6,143	8,776	3,080	---	**16,057**	**18,690**	17,551	1,460	70	3,218	**22,299**	**-6,242**	**-3,610**
2005	6,834	6,324	9,034	3,080	---	**16,238**	**18,948**	18,068	1,460	70	3,218	**22,816**	**-6,578**	**-3,868**
2006	6,834	6,687	9,553	3,080	---	**16,601**	**19,467**	19,106	1,460	70	3,218	**23,854**	**-7,253**	**-4,387**
2007	6,834	6,460	9,228	3,080	---	**16,374**	**19,142**	18,456	1,460	70	3,218	**23,204**	**-6,830**	**-4,062**
2008	---	---		---	---	---	---	---	---	---	---	---	---	---
						TOTAL 95,937	**TOTAL 111,560**					**TOTAL 132,640**	**TOTAL -36,703**	**TOTAL -21,080**

WATER BALANCE WITH IMPORTED WATER, Mayer & May 2007 Data Used

YEAR	INFLOW							OUTFLOW					CHANGE IN STORAGE (35% Non-Consumptive Return)	CHANGE IN STORAGE (50% Non-Consumptive Return)
	Surface Water & Precipitation	35% Non-Consumptive Return	50% Non-Consumptive Return	Flow from the Mission Creek Fault	Imported Water	TOTAL INFLOW (35% Non-Consumptive Return)	TOTAL INFLOW (50% Non-Consumptive Return)	MSWD & Private Pumping	Evapo-transpitation	Surface Water	Flow Across the Banning Fault	TOTAL OUTFLOW		
2002	6,388	5,498	7,854	1,790	4,733	**18,409**	**20,765**	15,708	1,460	70	4,602	**21,840**	**-3,431**	**-1,075**
2003	6,388	5,342	7,632	1,790	0	**13,520**	**15,810**	15,263	1,460	70	4,602	**21,395**	**-7,875**	**-5,586**
2004	6,388	6,143	8,776	1,790	5,564	**19,885**	**22,518**	17,551	1,460	70	4,602	**23,683**	**-3,798**	**-1,166**
2005	6,388	6,324	9,034	1,790	24,723	**39,225**	**41,935**	18,068	1,460	70	4,602	**24,200**	**15,025**	**17,735**
2006	6,388	6,687	9,553	1,790	19,901	**34,766**	**37,632**	19,106	1,460	70	4,602	**25,238**	**9,528**	**12,394**
2007	6,388	6,460	9,228	1,790	1,011	**15,649**	**18,417**	18,456	1,460	70	4,602	**24,588**	**-8,939**	**-6,171**
2008	---	---		---	---	---	---	---	---	---	---	---	---	---
						TOTAL 141,453	**TOTAL 157,076**					**TOTAL 140,944**	**TOTAL 509**	**TOTAL 16,132**

WATER BALANCE WITHOUT IMPORTED WATER, Mayer & May 2007 Data Used

YEAR	INFLOW							OUTFLOW					CHANGE IN STORAGE (35% Non-Consumptive Return)	CHANGE IN STORAGE (50% Non-Consumptive Return)
	Surface Water & Precipitation	35% Non-Consumptive Return	50% Non-Consumptive Return	Flow from the Mission Creek Fault	Imported Water	TOTAL INFLOW (35% Non-Consumptive Return)	TOTAL INFLOW (50% Non-Consumptive Return)	MSWD & Private Pumping	Evapo-transpitation	Surface Water	Flow Across the Banning Fault	TOTAL OUTFLOW		
2002	6,388	5,498	7,854	1,790	---	**13,676**	**16,032**	15,708	1,460	70	4,602	**21,840**	**-8,164**	**-5,808**
2003	6,388	5,342	7,632	1,790	---	**13,520**	**15,810**	15,263	1,460	70	4,602	**21,395**	**-7,875**	**-5,586**
2004	6,388	6,143	8,776	1,790	---	**14,321**	**16,954**	17,551	1,460	70	4,602	**23,683**	**-9,362**	**-6,730**
2005	6,388	6,324	9,034	1,790	---	**14,502**	**17,212**	18,068	1,460	70	4,602	**24,200**	**-9,698**	**-6,988**
2006	6,388	6,687	9,553	1,790	---	**14,865**	**17,731**	19,106	1,460	70	4,602	**25,238**	**-10,373**	**-7,507**
2007	6,388	6,460	9,228	1,790	---	**14,638**	**17,406**	18,456	1,460	70	4,602	**24,588**	**-9,950**	**-7,182**
2008	---	---	---	---	---	---	---	---	---	---	---	---	---	---
						TOTAL 85,521	**TOTAL 101,144**					**TOTAL 140,944**	**TOTAL -55,423**	**TOTAL -39,800**

ASSESSMENT OF IMPACTS: OVERVIEW OF MODELING APPROACH, AND METHOD OF REVIEWING URS MODEL - APPENDIX C

Mission Creek is one of several adjacent sub-basins separated by low permeability rocks and faults that in combination with other sub-basins form the greater Upper Coachella Valley Groundwater Basin (California Department of Water Resources, 2004). URS (June, 2007b) developed a two-dimensional groundwater-flow model of the Mission Creek sub-basin to evaluate potential pumping and recharge impacts as part of the proposed CPV Sentinel Power Plant Licensing Case (herein referred to as the “Mission Creek sub-basin model” or “the model”). Specifically, the model was employed to simulate annual groundwater level changes in response to pumping from power plant extraction wells and infiltration of imported surface water delivered to the Desert Water Agency’s Mission Creek Recharge Basin. The recharge basin is located about 3 miles north of the proposed power plant extraction wells. The California Energy Commission requested technical evaluation of the Mission Creek sub-basin model. Specifically, Commission staff requested review of model construction, assumptions, parameters, calibration, sensitivities, results, and validity.[4]

BACKGROUND ON GROUNDWATER-FLOW MODELING

The process of numerical groundwater-flow modeling involves first developing a conceptual model of the physical system and then applying a mathematical model to quantitatively represent it. A conceptual model is a clear, qualitative description of the natural system and how it operates. The Mission Creek sub-basin conceptual model is summarized as follows (California Department of Water Resources, 2004). The sub-basin boundaries are formed by low permeability rocks and faults, which act as partial barriers to water movement and limit the exchange of groundwater between adjoining sub-basins (the Desert Hot Springs sub-basin to the north, Indio sub-basin to the east, and Garnet Hill sub-basin to the south). The Mission Creek sub-basin is bounded on the west by the San Bernardino Mountains, the Banning fault on the south, the Mission Creek fault at the northern and eastern edges, and Indio Hills at the southeast. Within these boundaries, unconsolidated late Pleistocene sedimentary deposits from the main water-bearing units of an unconfined[5] groundwater system.

[4] The terms “verification” and “validation” are often used interchangeably in hydrologic modeling. Some consider a “valid” groundwater-flow model as meaning it has been adequately demonstrated that the model simulates the cause and effect relationships within a specific groundwater basin. For example, the model adequately simulates the magnitude and distribution of water level changes in response to a change in recharge and pumpage. This type of validation is typically accomplished by conducting a postaudit after the modeling study is completed. A postaudit assesses whether conditions predicted by the model are confirmed by new field data that has been collected. This type of validation is beyond the scope of our evaluation; rather, we instead consider a “valid” model as a model constructed with an accepted computer code, reasonable parameter values supported by field data, and appropriately defined and implemented boundary conditions. An application is “valid” when all simulations meet typical measures of numerical accuracy (i.e., acceptable mass balance errors and groundwater level closure criterion) and considers the potential sensitivity of model results to uncertainty in the input parameters.

[5] Groundwater can occur under two different conditions – unconfined and confined (Heath, 1983). In the unconfined condition, water partially fills the water-bearing materials and the upper surface of the saturated zone is free to rise and fall in response to water inflow and outflow. Unconfined aquifers are also referred to as “water table aquifers”. In the confined condition, the water-bearing materials are overlain by relatively low permeability materials, and water completely fills the water-bearing zone.

A mathematical model utilizes equations to simulate the physical processes described by the conceptual model. The potential complexity of processes and variety of boundary conditions require numerical procedures to determine an approximate solution to the mathematical groundwater-flow equations. The Mission Creek sub-basin model utilizes the numerical mathematical model MODFLOW (Harbaugh and others, 2000), which is widely accepted and used and has been verified to produce numerically stable solutions (Anderson and Woessner, 1991).

In applying models to real world groundwater-flow systems, errors can potentially arise from the following sources.

- Conceptual deficiencies (i.e., erroneous basin geometry, incorrect boundary conditions, neglecting important processes, including inappropriate processes, and so forth).
- Numerical deficiencies from errors associated with the equation solvers. These errors introduce problems with computational accuracy and precision.
- Inadequacies in parameterization (water transmitting and storage properties) and poorly defined stresses (inflows and outflows like recharge and pumping).

The most common errors in model construction are attributed to conceptual deficiencies, inadequate parameterization and poorly defined stresses. The focus of this evaluation is on: (1) the modeling approach employed to simulate pumping and recharge impacts; (2) the assumptions, parameter values, and boundary conditions incorporated into model construction; and, (3) the simulation results and their inherent sensitivity due to uncertainty in model input.

APPROACH EMPLOYED TO SIMULATE IMPACTS

The Mission Creek sub-basin model is characterized as a "superposition" model. Simply stated, the theory of superposition indicates that solutions to parts of a complex problem can be added to solve the more complex composite problem. For example, when applying superposition to a system, doubling an input will double its response, halving the input will halve its response, and so forth. If the model is constructed using the correct boundary conditions and parameters, it will accurately simulate the net changes in groundwater levels and flow resulting from an incremental change in recharge and/or pumpage.

The principal advantages and constraints of using superposition are lucidly described by Reilly and others (1987). The principal advantages relevant to this evaluation are:

- The effects of a specified stress on the groundwater system can be evaluated even if other stresses are unknown.
- The effects of a change in stress on the system can be evaluated even if the original conditions or subsequent period of equilibrium conditions are unknown (i.e., no information on initial conditions).

Confined aquifers are also referred to as "artesian aquifers" because the water levels in wells rise above the top of the water-bearing zone. If the water level in the well stands above land surface, it is referred to as a "flowing artesian well".

- The effect of one stress on the system can be isolated from the effects of all other stresses.

The principal constraint to using superposition is that the mathematical equation describing the groundwater problem must be linear – both the equations describing groundwater conditions within the model domain and the equations that describe boundary conditions.

In the real world system, the magnitude and rate of observed groundwater level and flow are determined by physical aquifer properties and the cumulative contribution of individual water sources (inflows) and sinks (outflows). In contrast, a superposition model and its associated results show the net change in magnitude and rate of groundwater level and flow resulting from the incremental change in water inflow and outflow. The initial head distribution and specified boundary conditions are therefore defined in terms of changes rather than actual observed values. Initial heads within the model domain are all specified as being equal (typically, but not necessarily, the initial heads are set to zero so that simulated groundwater level changes correspond with drawdown). Fixed-head boundaries use water levels specified equal to the initial groundwater levels so that the initial gradient along the boundary is zero. Constant-flux boundaries are specified as no-flow (zero-flux) boundaries, corresponding to no net change in flow.

In the Mission Creek sub-basin model, the prescribed recharge and pumping represent net increases in sub-basin recharge and pumping. Simulated recharge at the Desert Water Agency's Mission Creek Recharge Basin represents an increase in water inflow above what would be observed without the additions contributed as a result of power plant operations. Similarly, simulated pumpage from power plant wells represent the increase in groundwater consumption above what would be observed without the power plant's operations. Accordingly, water level changes simulated by the superposition model are additive to the water level changes in the sub-basin that would occur without the power plant operations.

MODEL CONSTRUCTION

Assumptions

We reviewed the modeling assumptions and found them generally consistent with published descriptions of the conceptual model for the sub-basin and the objectives specified for the numerical groundwater-flow model.

- Groundwater in the Mission Creek sub-basin is unconfined.
- Vertical groundwater flow can be ignored, and the Mission Creek sub-basin can be represented as a two-dimensional system where flow is exclusively in the horizontal (x-y) plane.
- Recharge and pumping affect the entire thickness of the aquifer.
- The spatial distributions of water transmitting and storage properties described by Tyley (1974) adequately represent the real world system, and are the same (i.e., are constant) everywhere within the boundaries indicated for the different values. See

"Parameters" section below for additional discussion on the water transmitting (transmissivity) and storage (specific yield) properties specified in the model.

- Water removed from storage is discharged instantaneously with decline in head, and the storage coefficients do not vary with time.
- The saturated groundwater system is 1,000 feet thick. Parts of the greater Upper Coachella Valley Groundwater Basin are actually much deeper than 1,000 feet, but Tyley (1974) reasoned the practical limits on pumping lifts and compression of the aquifer materials at depth restrict the effective water-bearing zone to about 1,000 feet. A recently constructed test well reported by URS (July, 2008) indicated the aquifer deposits beneath the proposed project site are greater than 1,400 feet thick, and the static water level was almost 330 feet below land surface (indicating a saturated thickness of almost 1,100 feet). From the perspective of the two-dimensional model, any thickness can be assumed as long as the transmissivity distribution is accurately represented in the model.[6]
- The Mission Creek sub-basin is represented by linear mathematical equations, thereby allowing superposition to be applied.[7]
- Evaporation of water from the Desert Water Agency's Mission Creek Recharge Basin is negligible. The assumption of negligible surface water evaporation has no direct influence on model validity. However, it is an important assumption when interpreting model recharge rates because significant evaporation conceivably can occur, and in practice the volume of water delivered to a recharge basin is greater than the recharge volume specified in the model.[8]
- Water levels in the San Bernardino Mountains (western model boundary) and Indio Hills (eastern model boundary) are independent of hydrologic conditions in the Mission Creek sub-basin. See "Boundary Conditions" section below for additional discussion on groundwater flow across these fixed-head boundaries.

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[6] In MODFLOW, transmissivity is calculated from the specified aquifer thickness and specified hydraulic conductivity.

[7] Some of the mathematical equations that describe groundwater flow are linear – others are not. The equations utilized to describe unconfined groundwater-flow are not linear, but when the saturated interval is thick relative to the water level changes considered it is common practice to assume the unconfined system approximately behaves linearly. In the Mission Creek sub-basin model, the maximum reported water level changes are on the order of one to ten feet, which represents 0.1- to 1-percent of the assumed 1,000 feet thick saturated interval. As a rule of thumb, superposition can be applied if the basin-wide drawdown of the unconfined aquifer is 10 percent or less (Reilly and others, 1987).

[8] Annual ETo reported by DWR at their CIMIS station 118 (Cathedral City) averages 4.76 feet per year. University of California Cooperative Extension Leaflet 21427 suggests multiplying ETo by 1.1 to estimate evaporation from open water surfaces, which results in an average annual open water surface evaporation rate of 5.2 feet per year. Percolation rates reportedly range from 2.12 to 2.55 feet per day, and the flooded basin bottom has a bottom area of almost 47 acres (URS, Comments on Preliminary Staff Assessment, Appendix B "Calculation of Evaporation Losses from Project-Specific Recharge Operations", August 21, 2008). On the basis of these percolation rates and flooded basin bottom area, 1,100 acre-feet of water will percolate into the subsurface within 94 to 11 days. During this time, approximately 6 to 7 acre-feet of water may evaporate. Over the lifetime of the project (30 years), 180 to 210 acre-feet of the delivered surface water may be lost to evaporation rather than percolating into the subsurface.

- Groundwater fluxes across the Mission Creek Fault to the north and Banning Fault to the south are assumed constant and independent of water level changes in the Mission Creek sub-basin and adjoining Desert Hot Springs (north) and Garnet Hill (south) sub-basins. See "Boundary Conditions" section below for additional discussion on groundwater flow across fault boundaries.
- The model simulations are assumed to converge when the residuals in hydraulic head and volumetric fluxes meet the user's specified criteria. The recommended error criterion for groundwater levels should be one to two orders of magnitude smaller than the accuracy level desired, and the error in the water balance is ideally less than 0.1-percent, but an error of about 1-percent is usually considered acceptable (Anderson and Woessner, 1991). The model simulations reported employed a water level closure criterion of 0.01 foot and have mass balance errors less than 1 percent.

Parameters

The two aquifer properties specified in the model are hydraulic conductivity and specific yield (MODFLOW calculates transmissivity from the product of hydraulic conductivity and specified saturated zone thickness). Transmissivity is a measure of the rate of flow through a vertical strip of aquifer of unit width under a unit hydraulic gradient. It is specified in the model using the product of spatially varying hydraulic conductivity and assumed saturated aquifer thickness of 1,000 feet. The storage coefficient is the volume of water an aquifer releases or takes into storage per unit surface area per unit change in groundwater level. In unconfined aquifers, the storage coefficient is the specific yield, which is a measure of the water drained from the saturated aquifer material under the force of gravity. In the Mission Creek sub-basin model, the hydraulic conductivity and specific yield values essentially mimic the transmissivity and storage coefficient distribution mapped by Tyley (1974).

Transmissivity

The transmissivity distribution in the Mission Creek sub-basin model is based largely on Tyley (1974). Tyley (1974) and subsequent investigations summarized by URS (July, 2008) approximated transmissivity from specific capacity[9] data. Tyley (1974) also reportedly considered the material descriptions in well drillers' logs, aquifer tests, and model calibration to develop his transmissivity distribution.

There is uncertainty in the magnitude and distribution of transmissivity owing to the inherent uncertainty of natural heterogeneous systems as well as uncertainty in the transmissivity values themselves. For example, Tyley (1974) concluded that his transmissivity values from drillers' logs represent only an order-of-magnitude estimate.

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[9] Specific capacity is the yield of water from a well, typically in gallons per minute, divided by the associated water level drawdown, in feet. Specific capacity is influenced by the pumping rate, duration of pumping, well construction, well age, and other factors. These factors are not considered by the method employed to approximate transmissivity from specific capacity.

Additionally, approximating transmissivity from specific capacity data includes the uncertainty in specific capacity data and uncertainty in the method employed to approximate transmissivity.[10]

The transmissivity distribution in the Mission Creek sub-basin reported by Tyley (1974) ranges from 2,000 gallons per day per foot (267 square feet per day) to 200,000 gallons per day per foot (26,700 square feet per day). Comparisons between these transmissivity values and several subsequent studies suggest that actual transmissivity in the sub-basin may be greater than described by Tyley (1974):

- Tyley's (1974) transmissivity values are generally lower than calibration results from a model developed and reported by PSOMAS (2007). The PSOMAS model utilizes transmissivity values ranging from 2,703 (20,220 gallons per day per foot) to 61,000 square feet per day (456,300 gallons per day per foot). These transmissivity values are ~~(~~10.1 to 2.3 times greater than Tyley's values specified in the Mission Creek sub-basin model~~)~~.
- URS (July, 2008) reports transmissivity data that when considered in their entirety (i.e., no data are excluded) are 0.06 to 3.69 times Tyley's (1974) values (on the average, their reported transmissivity data is 1.7 times greater than Tyley's values specified in the Mission Creek sub-basin model).
- URS (July, 2008) reported results of a controlled pumping test near the proposed power plant site. The test results indicate a transmissivity of about 424,000 gallons per day per foot (56,680 square feet per day), which is 8.5 times greater than Tyley's (1974) values specified in the Mission Creek sub-basin model at the corresponding pumping test location (50,000 gallons per day per foot or 6,680 square feet per day).

The Mission Creek sub-basin model sensitivity analyses also assumes transmissivity varies depending on the flow direction (anisotropic conditions). Transmissivity in the northerly (y) direction is assumed double the transmissivity in the easterly (x) direction, which is generally consistent with model calibration results reported by PSOMAS (2007). The PSOMAS (2007) model utilizes a transmissivity value for the northerly direction that is 1.3 to 2.0 times greater than transmissivity in the easterly direction.

Due to uncertainty in transmissivity, the model simulations reported by URS (July, 2008) consider both isotropic and anisotropic conditions and a range in transmissivity values. Under isotropic conditions, the transmissivity in the northerly and easterly directions are the same, whereas under anisotropic conditions the transmissivity in the northerly and easterly directions are different. Uncertainty in the transmissivity distribution is considered by conducting parallel simulations using northerly to easterly transmissivity ratios of 1.0 (isotropic) and 2.0 (anisotropic) conditions. In the simulated anisotropic transmissivity distribution, the transmissivity in the northerly direction is double the

[10] Tyley (1974) approximated transmissivity from specific capacity data using a multiplier of 1,800 (Thomasson, 1960). The theoretical range in the multiplier is 1,500 to 2,000 (1,800 plus or minus about 15-percent), and the range observed by Thomasson (1960) was 1,300 to 2,200 (1,800 plus or minus about 25-percent). Razack and Huntley (1991) analyzed 215 specific capacity and transmissivity data pairs from a basin and concluded that the actual transmissivity could only be approximated from specific capacity data within a factor of 4 at a 90-percent confidence level.

transmissivity in the easterly direction. Uncertainty in transmissivity values were also considered by conducting parallel simulations that multiply transmissivity values by factors of 0.5 and 2.0.

Storage Coefficient

Tyley (1974) used the material descriptions in well drillers' logs to estimate specific yield values that range from 0.08 to 0.18. His map showing the spatial distribution of specific yield is utilized to prescribe the specific yield distribution in the Mission Creek sub-basin model. However, there is uncertainty in the magnitude and distribution of specified yield in the sub-basin.

Tyley (1974) notes his analysis was insensitive to potential errors in specific yield values because in low-pumping areas, like the Mission Creek sub-basin at the time, the choice of storage coefficients did not introduce large errors. In other words, his analysis was not very sensitive to the specific yield values, and therefore his estimates were not as precise as they could have been if more significant pumpage and water level declines had occurred. Since Tyley's (1974) study, pumping levels in the Mission Creek sub-basin and corresponding water level declines have increased substantially. Pumping levels have increased from an average of about 140 AF per year during the period 1936-1967, to over 16,500 AF per year in 2006 (PSOMAS, 2007). Water level declines have similarly increased from about 0.2 foot per year during the 1936-67 period (Tyley, 1974), to a spatially averaged rate of 0.4 to 0.7 feet per year during the period 1968-2006.[11] Analyses during this more intensive period of groundwater use could provide different and possibly more reliable specific yield estimates. For example, the PSOMAS model (2007) utilized specific yields ranging from 0.024 to 0.25, which are 0.3 to 1.4 times greater than Tyley's (1974).

The sensitivity of the Mission Creek sub-basin model to specific yield was not reported by URS. We conducted a preliminary test of model sensitivity using URS' Scenario 1 (Tyley's [1974] transmissivity distribution and an anisotropy ratio of 2.0). We adjusted the specific yield values by factors of 0.5 and 1.5 (specific yield values that ranged from 0.04 to 0.27), and determined that the resulting differences in simulated maximum water level changes ranged from 0.1 to 0.8 feet, which seem modest relative to the model's greater sensitivity to transmissivity. Using the same scenario, URS adjusted the transmissivity by factors of 0.5 and 2.0 and reported that the maximum water level changes ranged from 1 to 21 feet. Similarly, URS conducted model runs assuming anisotropic and isotropic conditions, and reported that the maximum water level changes ranged from about 0 to 7 feet. These tests do not consider the possible additive effects of uncertainty in transmissivity and specific yield. We recommend the uncertainty in simulated water level changes to uncertainty in transmissivity and specific yield, both separately and in combination, be quantified.

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[11] PSOMAS (2007) utilized a groundwater-flow model to estimate a cumulative storage decline during the period 1968-2006 averaging about 5,310 acre-feet per year. Assuming a sub-basin area of 76 square miles (California Department of Water Resources, 2004), and uniform specific yield ranging from 0.15 to 0.25, this simulated storage decline translates into a spatially averaged water level decline of approximately 0.4 to 0.7 feet per year. Most of the decline has occurred since the 1980's.

Boundary Conditions

The model utilizes three types of boundary conditions: free-surface, constant-flux, and fixed-head (constant head and general-head).

- The free-surface boundary condition simulates the water table which intercepts percolating recharge and rises and falls in response to simulated recharge and pumping conditions.
- The constant-flux boundary simulates conditions along the northerly and southerly model boundaries that correspond to the Mission Creek Fault and Banning Fault, respectively. In the real world, these faults are partial barriers to groundwater flow, and water flows from the north across the Mission Creek Fault into the Mission Creek sub-basin, and to the south across the Banning Fault into the Garnet Hill sub-basin (Tyley, 1974; PSOMAS, 2007; Mayer and others, 2007). Previous estimates of outflow across the Banning Fault range from 2,000 to 6,900 AF per year (URS, June 2008).
- Groundwater flow across the northerly and southerly boundaries is assumed to be constant and independent of the water level differences across the faults. In the superposition model, these constant flux boundaries are represented by no-flow (zero-flux) boundaries to simulate the condition of no net change in flow. The assumption of constant fluxes ignores possible changes in flow as a result of the drawdown from proposed project pumping, but the effects of this assumption are probably small. Calculations reported by URS (June, 2008) concluded that the expected relative change in outflow into the Garnet Hill sub-basin as a result of proposed project pumping is about 0.2 percent, which corresponds to approximately 4 to 14 AF per year.
- Two types of fixed-head boundaries are employed in the model: a constant head boundary along the eastern edge of the model, and a general-head boundary along the western edge of the model. Both types (constant head and general head) represent an inexhaustible supply or infinite sink for water, which in some real world situations may be unrealistic. In the model simulations reported, the quantity of inflow and outflow across these boundaries was relatively small (the contribution of boundary inflow or outflow in all simulations was 1.3 percent or less of specified pumping and recharge). If the model is employed to simulate additional scenarios, it is necessary to review their simulated volumetric budgets and verify that the water contribution from fixed-head boundaries is negligible and confirm the model results are realistic.
- The fixed-head boundaries at the westerly and easterly model boundaries assume that boundary groundwater levels are not significantly influenced by pumping and recharge within the sub-basin. The simulated groundwater inflow or outflow across these boundaries therefore changes in response to water level changes within the sub-basin, but the boundary groundwater levels remain constant.

Calibration

The purpose of calibration is to establish that the model reproduces observed real-world groundwater levels and flows. During model calibration, model parameters like transmissivity and specific yield are systematically adjusted in an attempt to improve the match between simulated and observed groundwater levels and flows. The result is an improved description of the magnitude and distribution of transmissivity and specific yield.

All calibrated models are influenced by uncertainty because we cannot define the distribution of transmissivity and specific yield exactly. There is also uncertainty in the definition of boundary conditions, and uncertainty in the magnitude and timing of stresses like recharge and pumpage. For this reason, a sensitivity analysis is performed to assess and quantify the effect of uncertainty on model calibration and predicted water levels simulated by the model.

No effort was made to calibrate the Mission Creek sub-basin model. Instead, URS assumed Tyley's (1974) analysis of specific capacity data, well driller logs, aquifer test results, and his own analog-model calibration effort provide sufficient representation of transmissivity and specific yield. Subsequent data reported by URS (July, 2008) suggests actual transmissivity values may be greater than reported by Tyley (1974), and URS appropriately performed a sensitivity test to assess its effect on simulated drawdown. As discussed above, no sensitivity test was conducted on specific yield, but our preliminary tests suggest its effect is modest relative to transmissivity. Model sensitivity to boundary fluxes appears to be negligible because the simulated fluxes are small relative to simulated recharge and pumping volumes.[12]

RESULTS

URS (July, 2008) reports model results for three water management scenarios, each scenario having six model runs. The three water management scenarios considered are as follows.

Scenario 1: Annual pumpage and recharge of 1,100 AF per year for 30 years.

Scenario 2: Annual pumpage of 1,100 AF per year, and every five years annual recharge of 5,500 AF per year, continuing for a total of 30 years.

Scenario 3: Pumpage of 1,100 AF over a 4 month period (2,059 gallon per minute pumping rate) and no recharge.

Each scenario was simulated with six different transmissivity distributions. The different model runs are tabulated below, and are intended to capture potential uncertainty in the magnitude of transmissivity and the degree of anisotropy.

[12] In the sensitivity tests conducted by URS (July, 2008), the general-head boundary conductances did not change proportionally to the transmissivity adjustments. Specifically, when transmissivity values were adjusted by factors of 0.5 and 2.0, the corresponding transmissivity of the adjacent general head boundary was not changed. In contrast, the conductances of the constant head boundaries did change when transmissivity was adjusted. In one simulation (Scenario 1), increasing the transmissivity by a factor of 2 increased the inflow from the constant head boundaries by a factor of about 50. However, this increased flow is negligible relative to the volume of simulated recharge and pumping (0.008-percent).

0.5 x Transmissivity – Anisotropic (2.0)	0.5 Transmissivity – Isotropic (1.0)
1.0 x Transmissivity – Anisotropic (2.0)	1.0 Transmissivity – Isotropic (1.0)
2.0 x Transmissivity – Anisotropic (2.0)	2.0 Transmissivity – Isotropic (1.0)

The expected groundwater level changes are simulated by the model using double Tyley's (1974) transmissivity values in the northerly (y) direction and Tyley's reported values in the easterly (x) direction (anisotropy of 2.0). It is noteworthy that data reported by URS (July, 2008) and summarized above suggest that transmissivity values, and particularly the values in the vicinity of the power plant, may be greater than reported by Tyley (1974). If this is indeed true, the expected drawdown is probably better represented by the model runs using the larger transmissivity values.

Drawdown Results and General Uncertainty

Table 1(a) summarizes URS' (July, 2008) Scenario 1 results for three transmissivity distributions assuming an anisotropy ratio of 2.0. The maximum simulated drawdown ranges from -14.5 to 11.3 feet.[13] Decreasing the transmissivity by a factor of two (T x 0.5) increases the drawdown to -28.7 to 22.3 feet; whereas, increasing the transmissivity by a factor of two (T x 2.0) decreases the drawdown to -7.3 to 5.8 feet. Assuming the range in transmissivity values tested reasonably represent the uncertainty in real world transmissivity values, the differences between simulated water level changes can represent the uncertainty in simulated drawdown. The average difference between the expected drawdown and the drawdown simulated after the transmissivity was adjusted is almost 60-percent. This corresponds to an average uncertainty in simulated drawdown of ± 0.6 foot, excluding the recharge basin and pumping wells.

Table 1(a). Comparison of maximum drawdown.
Scenario 1; Anisotropy = 2

Well name	Transmissivity		
	T x 0.5	T x 1.0	T x 2.0
Well 22	1.2	0.8	0.6
Well 24	1.4	0.9	0.6
Well 27	2.7	1.6	0.9
Well 28	-0.9	-0.4	-0.2
Well 29	1.5	1.0	0.6
Well 30	-0.9	-0.4	-0.2
Well 31	2.7	1.6	0.9
Well 32	2.3	1.4	0.8
CVWD Wells	2.0	1.3	0.8
Recharge Basin	-28.7	-14.5	-7.3
Pumping Well	22.3	11.3	5.8

Source: URS (July, 2008)
- The unshaded column represents the expected drawdown, and the shaded columns represent model sensitivity to adjusted transmissivity.

[13] Model results are reported in terms of drawdown and values less than 0 indicate a water level increase.

Table 1(b) provides a similar summary of URS' (July, 2008) Scenario 1 results for two transmissivity distributions assuming isotropic and anisotropic conditions (anisotropic ratio of 2.0). In general, the simulated water level changes increase for the isotropic model, and the differences between the isotropic and anisotropic model runs, excluding the recharge basin and pumping wells, range from 0.0 to 1.4 feet.

Table 1(b). Comparison of maximum drawdown. Scenario 1; Transmissivity = 1.0 x T

Well name	Anisotropy		Difference
	A =1.0	A=2.0	
Well 22	0.8	0.8	0.0
Well 24	1.0	0.9	0.1
Well 27	2.8	1.6	1.2
Well 28	-1.8	-0.4	-1.4
Well 29	1.2	1.0	0.2
Well 30	-1.8	-0.4	-1.4
Well 31	2.8	1.6	1.2
Well 32	2.4	1.4	1.0
CVWD Wells	2.3	1.3	1.0
Recharge Basin	-21.6	-14.5	-7.1
Pumping Well	15.8	11.3	4.5

Source: URS (July, 2008)
- The unshaded column represents the expected value, and the shaded column represent model sensitivity to isotropy.

In Tables 2, 3 and 4 below, we summarize and organize model results for each of the three scenarios reported by URS (July, 2008). The drawdown from each model run is tabulated for the reported existing wells, the recharge basin, and the power plant pumping wells. The results are organized as follows: minimum simulated drawdown, expected simulated drawdown, and maximum simulated drawdown. The expected drawdown utilizes Tyley's (1974) transmissivity distribution and an anisotropy ratio of 2.0, and the minimum and maximum represent a range in the possible drawdown from different model runs testing different transmissivity values.

For Scenarios 1 and 2, the minimum drawdown is generally simulated using the larger transmissivity values; whereas, depending upon which well location is of interest, the maximum drawdown could either be simulated by decreasing transmissivity by a factor of 0.5 or specifying isotropic conditions, or both. For Scenario 3, the minimum drawdown at existing wells was simulated using the lower transmissivity values. However, using the lower transmissivity values simulated the greatest drawdown at the pumping wells, indicating a deepening of the cone of depression relative to the simulations that employ the larger transmissivity values.

In Scenario 1 (Table 2), the expected maximum drawdown at the non-project related well locations ranges from -0.4 to 1.6 feet. After adjusting the transmissivity distribution, simulated drawdown at the corresponding non-project related well locations ranged from -3.6 to 4.9 feet. The maximum water level rise at the recharge basin ranges from

7.3 to 42.2 feet, with an expected water level rise of 14.5 feet. The maximum drawdown at the pumping wells ranges from 5.8 to 31.3 feet, with an expected drawdown of 11.3 feet.

Table 2. Expected, minimum and maximum Scenario 1 drawdown.

Well name	Minimum	Expected	Maximum
Well 22	0.6	0.8	1.2
Well 24	0.6	0.9	1.6
Well 27	0.9	1.6	4.9
Well 28	-3.6	-0.4	-0.2
Well 29	0.6	1.0	1.9
Well 30	-3.6	-0.4	-0.2
Well 31	0.9	1.6	4.9
Well 32	0.8	1.4	4.1
CVWD Wells	0.8	1.3	3.9
Recharge Basin	-42.2	-14.5	-7.3
Pumping Well	5.8	11.3	31.3

Source: URS (July, 2008)
- The unshaded column represents the expected value, and the shaded columns represent model sensitivity to transmissivity and anisotropy.

Table 3. Expected, minimum and maximum Scenario 2 drawdown.

Well name	Minimum	Expected	Maximum
Well 22	1.5	1.6	1.9
Well 24	1.6	1.7	2.3
Well 27	1.8	2.3	5.5
Well 28	-3.6	1.6	1.8
Well 29	1.5	1.7	2.6
Well 30	-3.6	1.6	1.8
Well 31	1.8	2.3	5.5
Well 32	1.7	2.0	4.8
CVWD Wells	1.6	1.9	4.4
Recharge Basin	-104.5	-46.0	-26.8
Pumping Well	6.8	12.1	32.0

Source: URS (July, 2008)
- The unshaded column represents the expected value, and the shaded columns represent model sensitivity to transmissivity and anisotropy.

In Scenario 2 (Table 3), the expected maximum drawdown at the non-project related well locations ranges from 1.6 to 2.3 feet. After adjusting the transmissivity distribution, simulated drawdown at the corresponding non-project related well locations ranged from -3.6 to 5.5 feet. The simulated water level increases at the recharge basin ranges from 26.8 (minimum case) to 104.5 feet (maximum case), with an expected water level rise of 46.0 feet. Drawdown at the pumping wells ranges from 6.8 (minimum case) to 32.0 feet (maximum case), with an expected drawdown of 12.1 feet.

In Scenario 3 (Table 4), the expected maximum drawdown at the non-project related well locations ranges from 0.1 to 0.5 feet. There is no water level increase beneath the recharge basin because no recharge is simulated, but there is pumping induced drawdown beneath the basin. The water level decline beneath the basin ranges from 0.0 foot (minimum case) to 0.3 foot (maximum case). At the pumping wells, the maximum drawdown ranges from 11.8 feet (minimum case) to 47.3 feet (maximum case), with an expected drawdown of 20.4 feet.

Table 4. Expected, minimum and maximum Scenario 3 drawdown.

Well name	Minimum	Expected	Maximum
Well 22	0.1	0.1	0.3
Well 24	0.0	0.1	0.3
Well 27	0.4	0.5	0.6
Well 28	0.0	0.2	0.4
Well 29	0.0	0.1	0.2
Well 30	0.0	0.2	0.4
Well 31	0.4	0.5	0.6
Well 32	0.2	0.3	0.4
CVWD Wells	0.1	0.2	0.3
Recharge Basin	0.0	0.1	0.3
Pumping Well ~~(8)~~	11.8	20.4	47.3

Source: URS (July, 2008)
- The unshaded column represents the expected value, and the shaded columns represent model sensitivity to transmissivity.

The simulated drawdown summarized above represents net groundwater level changes, and it is important to consider results in the context of absolute changes within the real world system. The superposition model projects the future incremental net increase in drawdown, which is additive to future water level changes. For example, in Scenario 1 the maximum expected drawdown at one non-project related well location (Well 27) is 1.6 feet (Table 2). The maximum drawdown occurs at the end of the 30-year pumping operation, but most of the drawdown (about 1.5 feet) occurs during the first 10 years of pumping, corresponding to an annual rate of decline during the first 10 years of approximately 0.15 feet per year. In the context of the real world system, project pumping during the first 10 years is expected to increase future water level declines at the Well 27 location by 0.15 feet per year relative to the declines that would occur during the same 10-year period in the absence of project pumping. If future intentional recharge activities or groundwater consumption should change, resulting in a reversal in the real world groundwater level decline, during the first 10 years the observed rate of water level rise at the Well 27 location would be 0.15 feet per year less than observed without power plant pumping.

CONCLUSIONS

The Mission Creek sub-basin model described by URS (July, 2008) appears properly constructed using an accepted computer code, reasonable parameter values, and appropriate boundary conditions. The model results reported by URS all meet acceptable mass balance errors and head closure criterion, and consider the sensitivity of model results to uncertainty in transmissivity. Our evaluation can be summarized by the following key points:

1) Superposition can be employed to isolate the impact of a specified stress from all other stresses (i.e., recharge or pumping), and a superposition model can be utilized to evaluate the proposed power plant operations to incremental net water level changes in the Mission Creek sub-basin even if the other stresses are unknown or not considered.

2) The numerical model employed (MODFLOW) is a verified computer code, is widely used, and an appropriate application for this problem.

3) The conceptual model defined by the aquifer parameters and boundary conditions appear consistent with previous studies (California Department of Water Resources, 2004; Tyley, 1974; and others) and subsequent field data reported by URS.

4) Eleven modeling assumptions were reviewed and determined consistent with published descriptions of the conceptual model, the superposition method, and model input data sets.

5) The parameterization is based primarily on a previous U. S. Geological Survey study (Tyley, 1974). Subsequent studies suggest Tyley's (1974) transmissivity values may be lower than the actual transmissivity values in portions of the Mission Creek sub-basin.

6) No effort was made to calibrate the Mission Creek sub-basin model. Instead, URS assumed Tyley's (1974) analysis of specific capacity data, well driller logs, aquifer test results, and his own analog-model calibration effort provide sufficient representation of transmissivity and specific yield. However, the Applicant ran sensitivity analyses at 0.5 and 2.0 times the Tyley transmissivity distribution as well as isotopic (1:1) and anisotropic (2:1) cases.

7) The analysis included an assessment of model sensitivity to parameter uncertainty (transmissivity and anisotropy). Based on the data record compiled by URS (July, 2008), model tests utilizing transmissivity values that range by a factor of 2 and anisotropy ratios that range from 1.0 to 2.0 are a reasonable representation of uncertainty in transmissivity. No sensitivity test was conducted on specific yield, but our preliminary tests suggest its effect is modest relative to transmissivity. Model sensitivity to boundary fluxes appears to be negligible because the simulated fluxes are small relative to simulated recharge and pumping volumes.

8) If the model is used to analyze additional scenarios, it is necessary to (a) determine water level changes do not exceed 10-percent of the saturated interval, in which case assumed system linearity will need to be tested and confirmed; (b) confirm model runs converge and meet acceptable mass balance (less than 1 percent) and head closure (0.01 foot) criteria; (c) confirm the quantity of water added or removed

9) by the fixed-head boundaries is realistic; and, (d) quantify model sensitivity to specific yield, including the potential effect when added to the uncertainty in transmissivity.

ESTIMATES OF PERCOLATION RATES BY THE DESERT WATER AGENCY AND KRIEGER & STEWART, INC. - APPENDIX C

F. Thomas Kieley, III
President
Ronald E. Starrs
Vice President
F. Gillar Boyd, Jr.
Secretary/Treasurer
Patricia G. Oygar
Craig A. Ewing
David K. Luker
General Manager
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DOCKET
07-AFC-3
DATE SEP 1 7 2008
RECD. OCT 0 6 2008

September 17, 2008

John Kessler, Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, California 95814

RE: CPV SENTINEL LLC ENERGY PROJECT – APPLICATION NO. 07-AFC-3

Dear Mr. Kessler:

At the CEC workshop for the CPV Sentinel Project on September 3, you inquired the extent to which CPV Sentinel's payment of an extraction fee, equal to the Replenishment Assessment, was likely to increase the future amounts of water that Desert Water Agency would import via its State Water Contract. I wish to follow up on this point.

The extraction fee would result in new revenues to DWA, and the only purpose to which those revenues would be applied would be the acquisition of replenishment water from the State Water Project. We believe that the revenues could be used to purchase surplus water when and as such water supplies become available. Surplus waters are typically available in years in which the total supply of water exceeds contractor demands and during flood conditions on various river systems such as the Yuba River. Although the frequency of occurrence of these conditions is difficult to predict, it is known that such conditions will occur. We believe that the revenues from the extraction fee could be accumulated over time and then applied to purchase such supplies when and as they occur. The extraction fee would be $72/AF of production by CPV Sentinel this fiscal year and would increase substantially in the future.

We estimate that by accumulating these revenues and applying them to purchase surplus waters would yield between one-half and one full acre-foot of new water for each acre-foot of water pumped by CPV Sentinel. This amount represents an estimate only, but you indicated that such an estimate would be helpful to the CEC's consideration of the CPV application for certification.

Sincerely,

DESERT WATER AGENCY

David K. Luker

David K. Luker
General Manager-Chief Engineer

DKL/jlt

October 7, 2008 101-73.1

John Kessler, Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, California 95814
Email: Jkessler@energy.state.ca.us

Subject: CPV Sentinel, LLC Energy Project (07-AFC-3)
Mission Creek Ground Water Subbasin

Dear Mr. Kessler:

David K. Luker, General Manager of Desert Water Agency, has requested Krieger & Stewart to comment on the estimated time it takes water infiltrated at the Mission Creek Recharge Basins to reach the underlying ground water table and the estimated transmissivity of the Mission Creek Ground Water Subbasin aquifer, particularly within the vicinity of the aforementioned recharge basins and CPV Sentinel, LLC's Energy Project.

A. ESTIMATED TIME TO REACH GROUND WATER TABLE

Figure 1, attached, shows water levels in the Mission Creek Monitoring Well (MCMW) located at the Mission Creek Recharge Basins and in Mission Springs Water District's (MSWD) Well 30, both as related to ground water recharge. Water levels are expressed in measured depth to the water table and recharge is based on Metropolitan Water District month-end water delivery meter readings.

Recharge activities at the Mission Creek Recharge Basins were initiated in November 2002. During 2002, approximately 4,733 acre-feet (AF) were recharged through the Mission Creek Recharge Facilities. Subsequent recharge events occurred in 2004, 2005, 2006, and 2007 wherein approximately 5,822, 24,723, 19,900, and 1,012 AF, respectively, were recharged through the Mission Creek Recharge Facilities.

The first indication of rising water level in the MCMW was on May 29, 2003 (about seven months after initiation of recharge activities), when the water level rose 1.5 feet (ft) from the previous measurement, which was made on April 18, 2003 (about six months after initiation of recharge activities).

Since no water level measurements were made during 2003 before April 18, 2003 or between April 18 and May 29, the water level may have begun to rise sooner. If the slope of the declining water level were projected in a linear fashion based on the two earliest water level measurements (May 27, 1997 and August 29, 2000, see dashed line on Figure 1), it is likely that water levels had begun to rise by the April 18, 2003 water level measurement and perhaps even sooner, specifically six months or less.

Since no water level measurements were made during and immediately following initial recharge, it is impossible to accurately determine when the water level actually began to rise. Further, the unsaturated formations underlying the spreading basins had to be saturated from the basins to the water table. Because of these complications, we elected to ignore the 2002 recharge event in our calculation.

The initial and subsequent recharge events are set forth as follows:

Ground Water Recharge Events

Recharge				Water Level Rise		
Event Number	Date Initiated	Quantity (AF)	Duration (Months)	Date Measured	Elapsed Time (Months)	Increase (Ft)
1	11/2002	4,733	2	05/29/2003	7	1.5
2	10/2004	5,822	3	02/12/2005	4	0.3
3	03/2005	24,723	10	ID	ID	ID
4	03/2006	19,900	8	05/01/2006	2	19.6
5	09/2007	1,012	2	ID	ID	ID

ID = Insufficient Data

Based on the above (taking into account the frequency of MWD meter readings, MCMW water level measurements, and excluding the initial recharge event due to insufficient water level measurement data), we conclude that the time required for water discharged into the Mission Creek Recharge Basins to reach the underlying aquifer ranges between two and four months, depending upon the extent of time between recharge events, based on 2004 and 2006 recharge events.

B. ESTIMATED TRANSMISSIVITIES WITHIN GROUND WATER SUBBASIN

In order to address transmissivity, we have reviewed the data, memoranda, and reports prepared by URS for the CPV Energy Project (2008). We have also reviewed the Slade report (May 2000) and the GTC report (1979), both of which were authored by Slade; United States Geological Survey reports (1971, 1978, and 1992) authored by Tyley, Swain, and Richards and Meadows, respectively; and ground water assessment reports (1978 through 2008) prepared by Krieger & Stewart.

With regard to the Tyley report and Tyley's determination of transmissivity for the Mission Creek Ground Water Subbasin, available data was sparse, so Tyley had to make numerous assumptions and extrapolations. Most, if not all, of the MSWD wells had not been constructed when Tyley conducted his investigation. He essentially completed data collection in 1967, analyzed and processed said data the following two years, and then produced an advance copy of the draft report for review and comment in early 1970.

The wells that Tyley considered in the determination of transmissivity within the Mission Creek Ground Water Subbasin were, for the most part, small, shallow, and of questionable construction. Several of the wells penetrated the water table 60 ft or less and became unusable with the declining water table. Also, some of the wells were constructed by local well drillers who used Indio Hills Mud for drilling fluid rather than commercial grade material such as bentonite, and Indio Hills Mud tended to seal the aquifer formation and reduce specific capacity.

Most of the wells currently operated by MSWD and Coachella Valley Water District (CVWD) were constructed using reverse rotary circulation techniques; however, a few of the wells were constructed using direct circulation techniques. Regardless, both direct and reverse circulation wells were developed more thoroughly and the wells are larger, deeper, and penetrate the ground water aquifer to greater depths, thus more closely reflecting the ground water aquifer characteristics within the upper portion (upper 1,000 ft) of the saturated aquifer and the data from these wells provides more reliable data for estimating transmissivity.

Tyley's preferred method of determining transmissivity was to use the modified non-equilibrium (Jacob) equation to estimate transmissivity at a well (in this case, this involves multiplying the specific capacity of a well by a factor of 1,800). In the absence of specific capacity information, Tyley estimated, based on available well logs, conductivity by zone and thereafter converted that to average transmissivity for the well. Since Tyley extrapolated westerly estimated transmissivities from limited, sparse data, his transmissivity estimates, although best under the circumstances, appear to be conservatively low.

Using the same procedure as Tyley, the estimated average transmissivities within the Mission Creek Subbasin range between 22,000 and 366,000 gallons per day per foot (gpd/ft) (based on average specific capacities ranging between 12.2 and 203.2 gallons per minute per foot of drawdown (gpm/ft dd) as shown in Table 1), from the wells shown on Figure 2 (MSWD Wells 22, 24, 27, 28, 29, 30, 31, 32, and 34; CVWD Wells 3408, 3409, and 3410; and CPV Well PW-1). The well with the lowest average specific capacity of those evaluated was MSWD Well 34 at 12.2 gpm/ft dd. The well with the highest specific capacity of those evaluated was MSWD Well 29 at 203.2 gpm/ft dd. The estimated maximum transmissivities, based on the maximum specific capacities of the same wells (with unreasonably high outliers omitted), range between 47,000 and 530,000 gpd/ft. The specific capacities were based on pumping data collected between May 1970 and December 2007.

Our estimated transmissivity ranges are shown on Figure 3, using Tyley's original transmissivity distribution patterns to show approximate regions with similar transmissivities. As shown thereon, MSWD Wells 27, 31, and 32 and CVWD Well 3410 fall within the 300,000 transmissivity zone (with CVWD Well 3410 close to the boundary with the 200,000 zone); MSWD Wells 22, 24, and 29 and CVWD Wells 3408 and 3409 fall within the 200,000 transmissivity zone (with CVWD Well 3409 close to the boundary with the 300,000 zone); MSWD Wells 28 and 30 and the CPV PW-1 Well fall within the 100,000 transmissivity zone; and MSWD Well 34 falls on the boundary between the 20,000 and 40,000 transmissivity zones. MSWD Well 34 is currently not in operation. Although MSWD Well 34 operated initially with a specific capacity of approximately 26 gpm/ft dd, corresponding to a transmissivity of about 47,000 gpd/ft, the specific capacity declined precipitously over time to less than 5 gpm/ft dd, at which point the pump, damaged by cavitation, was removed from service. Based on the calculated transmissivities at the above-noted well locations, some adjustments to the original Tyley transmissivity distribution are warranted. Regardless, based on data available subsequent to Tyley's investigation, Tyley's transmissivity figures can safely be increased by a factor of 1.5 to 2.

In summary, water infiltrated at the Mission Creek Recharge Basins will reach the underlying ground water table in two to four months based on two specific recharge events (2004 and 2006), and estimated transmissivity within the Mission Creek Ground Water Subbasin Aquifer is 1.5 to 2 times Tyley's estimates based on data which became available subsequent to Tyley's investigation. We have increased Tyley's transmissivity estimates from 200,000 gpd/ft to 300,000 gpd/ft, from 100,000 gpd/ft to 200,000 gpd/ft, from 50,000 gpd/ft to 100,000 gpd/ft, from 25,000 gpd/ft to 40,000 gpd/ft, and from 10,000 gpd/ft to 20,000 gpd/ft based on such data.

Sincerely,

KRIEGER & STEWART

Robert A. Krieger

Robert A. Krieger

RAK/blt
101-73P1-JK-L1

Attachments: Table 1 – Summary of Calculated Specific Capacity and Transmissivity Data
Figure 1 – Water Recharge Quantities and Water Well Hydrographs
Figure 2 – Well Locations
Figure 3 – Transmissivity Values

cc: David K. Luker, Desert Water Agency
Kris Helm, Consultant

TABLE 1
SUMMARY OF CALCULATED
AVERAGE SPECIFIC CAPACITY AND TRANSMISSIVITY DATA

Well No.	Specific Capacity (gpm/ft dd)		Transmissivity (gpd/ft)	
	Max	Avg	Max	Avg
MSWD 30	87.0	64.5	156,600	116,189
MSWD 28	68.3	58.8	122,940	105,777
MSWD 22	160.9	113.0	289,620	203,394
MSWD 24	159.9	111.3	287,820	200,393
MSWD 29	293.1	203.2	527,580	365,813
MSWD 27	203.7	145.3	366,660	261,460
MSWD 31	206.5	165.4	371,700	297,731
MSWD 32	254.6	195.9	458,280	352,678
MSWD 34	26.0	12.2	46,782	21,948
CVWD 3408	112.8	109.9	203,040	197,730
CVWD 3409	89.8	88.0	161,640	158,400
CVWD 3410	111.1	111.1	199,980	199,980
CPV PW-1	85.8	85.8	154,440	154,440

Note: Transmissivity above has been derived by multiplying specific capacity by 1800, the same factor used by Tyler (1974).

XZ
101-73P1 Pumping Data.xls (10/7/2008)

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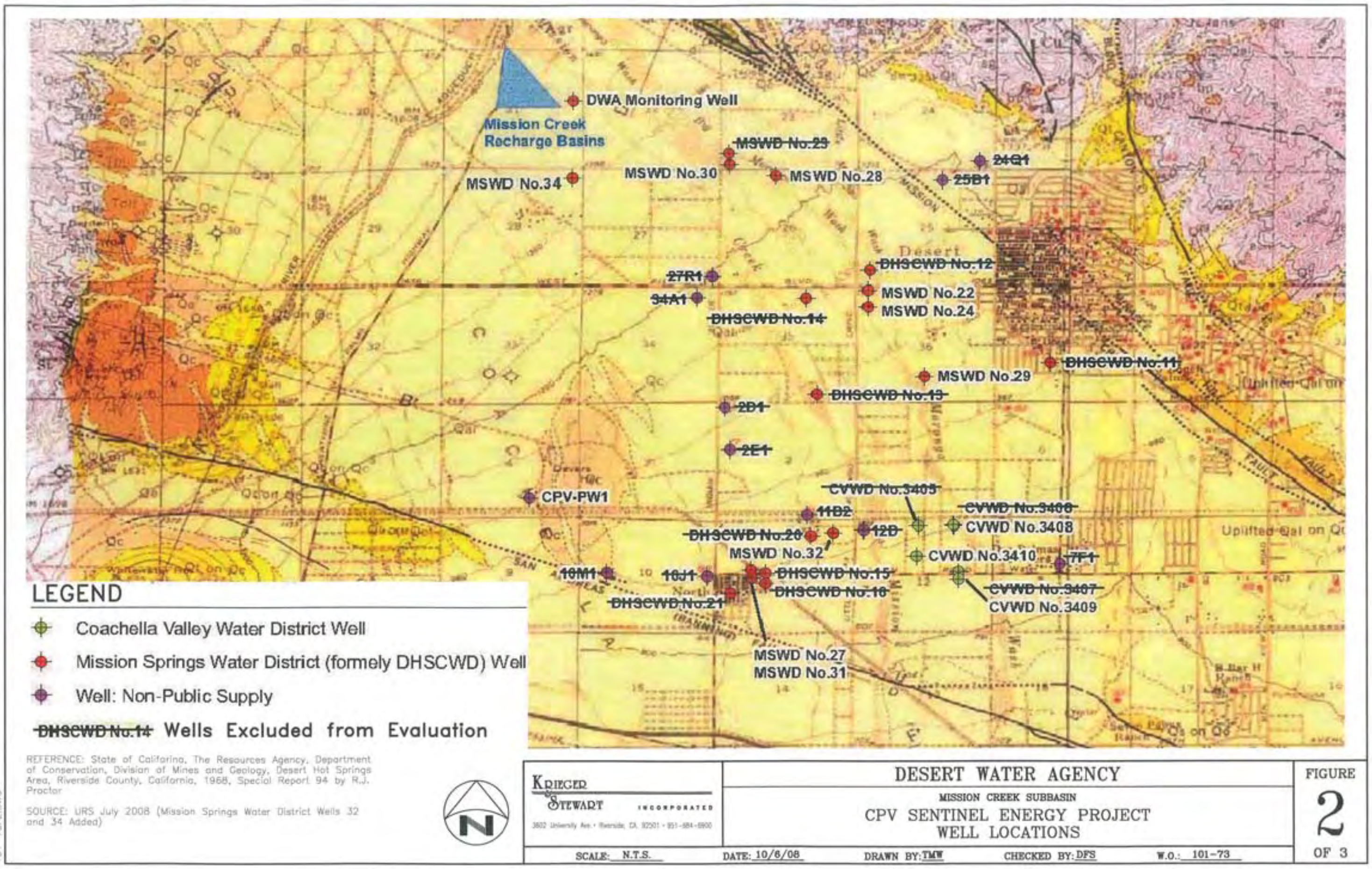

DWA Monitoring Well
Mission Creek Recharge Basins
~~MSWD No.23~~
MSWD No.30
MSWD No.28
MSWD No.34
~~24Q1~~
~~25B1~~
~~DHSCWD No.12~~
MSWD No.22
MSWD No.24
~~27R1~~
~~34A1~~
~~DHSCWD No.14~~
~~DHSCWD No.11~~
MSWD No.29
~~DHSCWD No.13~~
~~2B1~~
~~2E1~~
CPV-PW1
~~CVWD No.3405~~
~~11B2~~
~~CVWD No.3406~~
CVWD No.3408
~~DHSCWD No.20~~
~~12D~~
MSWD No.32
CVWD No.3410
~~7F1~~
~~10M1~~
~~10J1~~
~~DHSCWD No.15~~
~~DHSCWD No.16~~
~~CVWD No.3407~~
CVWD No.3409
~~DHSCWD No.21~~
MSWD No.27
MSWD No.31
LEGEND
Coachella Valley Water District Well
Mission Springs Water District (formely DHSCWD) Well
Well: Non-Public Supply
~~DHSCWD No.14~~ Wells Excluded from Evaluation
REFERENCE: State of California, The Resources Agency, Department of Conservation, Division of Mines and Geology, Desert Hot Springs Area, Riverside County, California, 1968, Special Report 94 by R.J. Proctor
SOURCE: URS July 2008 (Mission Springs Water District Wells 32 and 34 Added)
N
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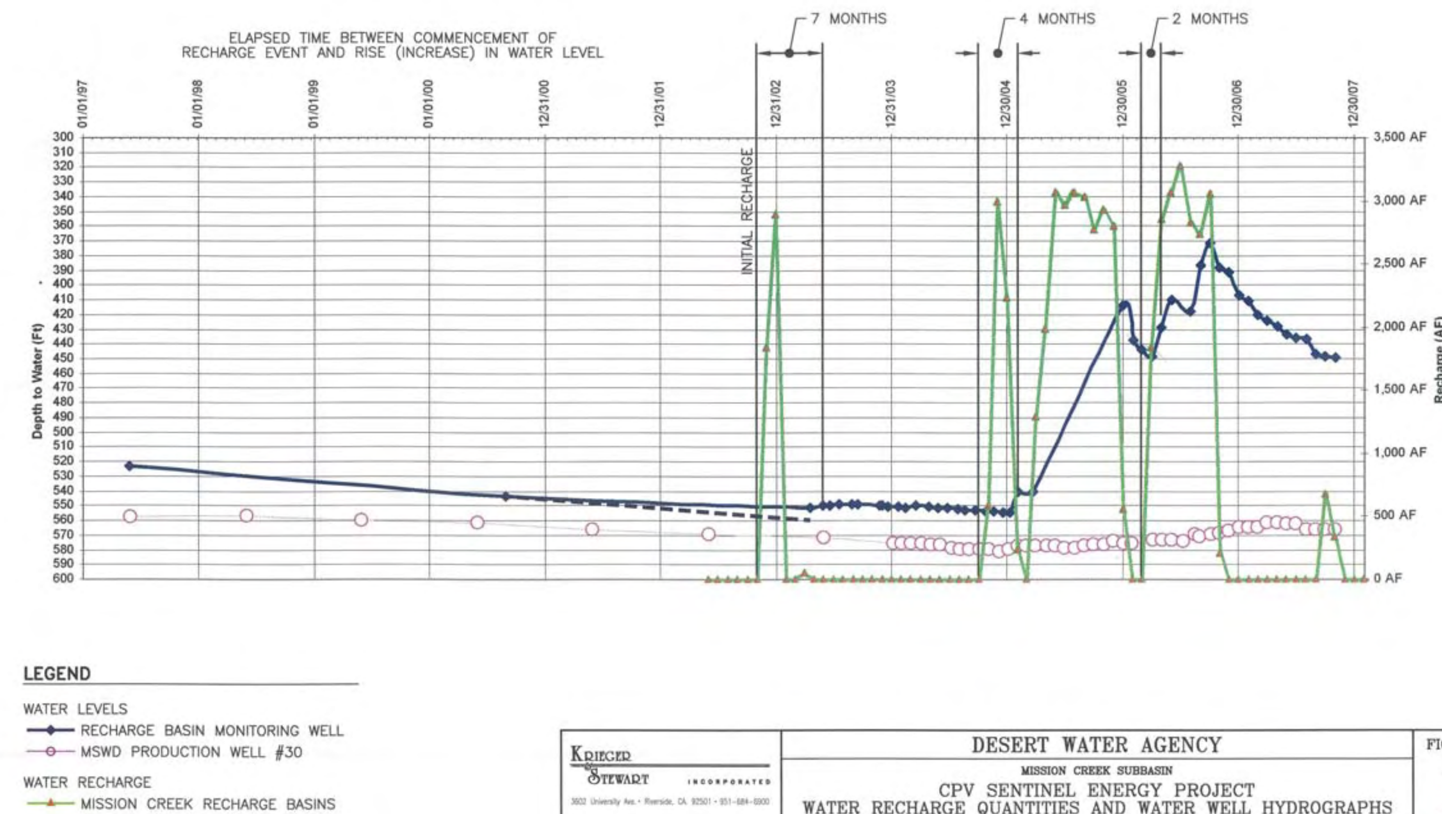
DESERT WATER AGENCY
MISSION CREEK SUBBASIN
CPV SENTINEL ENERGY PROJECT
WELL LOCATIONS
FIGURE 2 OF 3
SCALE: N.T.S.
DATE: 10/6/08
DRAWN BY: TMW
CHECKED BY: DFS
W.O.: 101-73



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DESERT WATER AGENCY

MISSION CREEK SUBBASIN

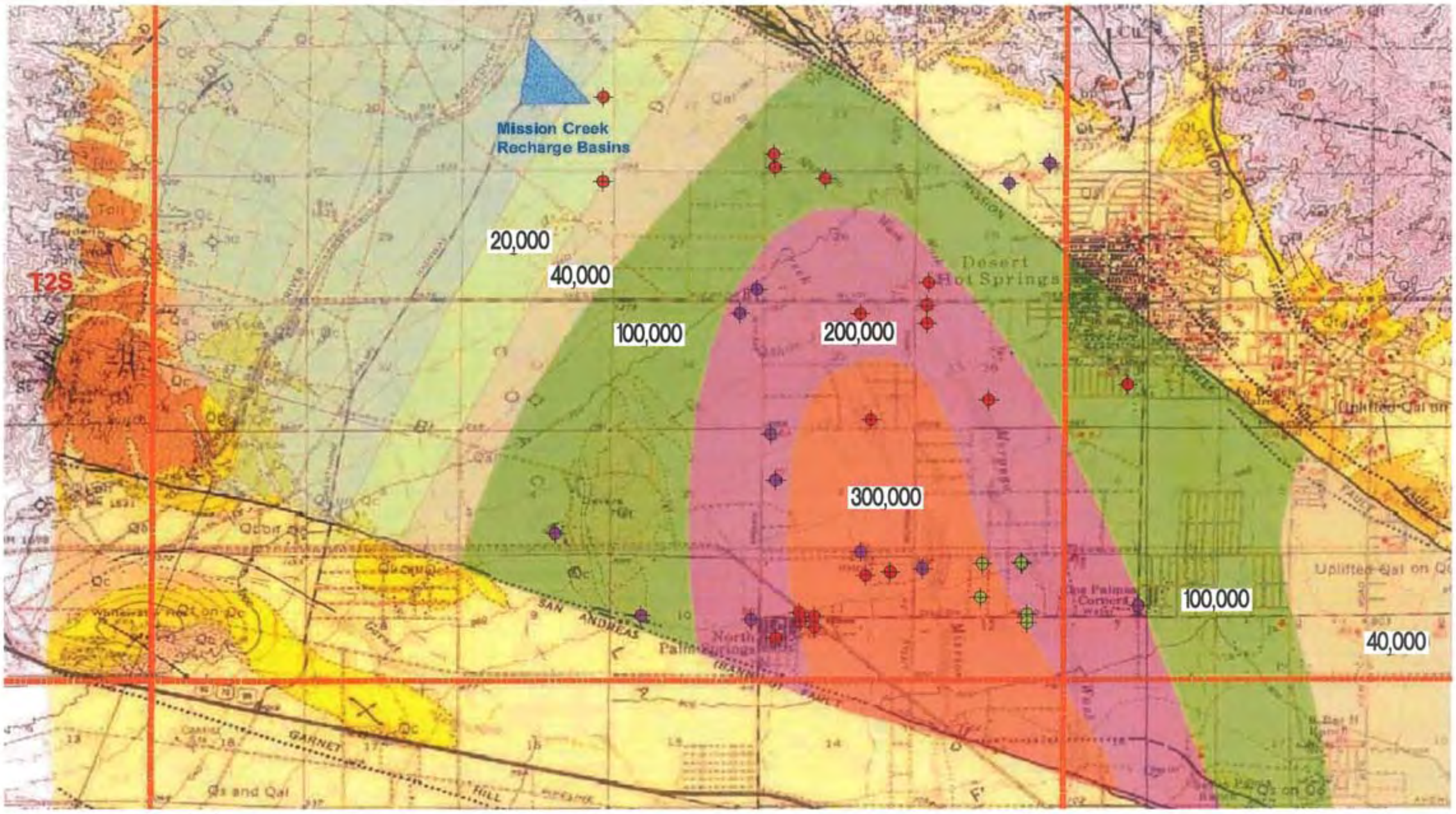
CPV SENTINEL ENERGY PROJECT

WATER RECHARGE QUANTITIES AND WATER WELL HYDROGRAPHS

FIGURE 1 OF 3

SCALE: N.T.S. DATE: 10/6/08 DRAWN BY: TMW CHECKED BY: DFS W.O.: 101-73

101-73F1.DWG



101-73F2.DWG

REFERENCE: State of Califorina, The Resources Agency, Department of Conservation, Division of Mines and Geology, Desert Hot Springs Area, Riverside County, California, 1968, Special Report 94 by R.J. Proctor

SOURCE: URS July 2008

Transmissivity Distribution Is Based on Tyley (1974). Transmissivity Values Are Based on Specific Capacity Data for Wells Constructed within Last 40 Years.

N

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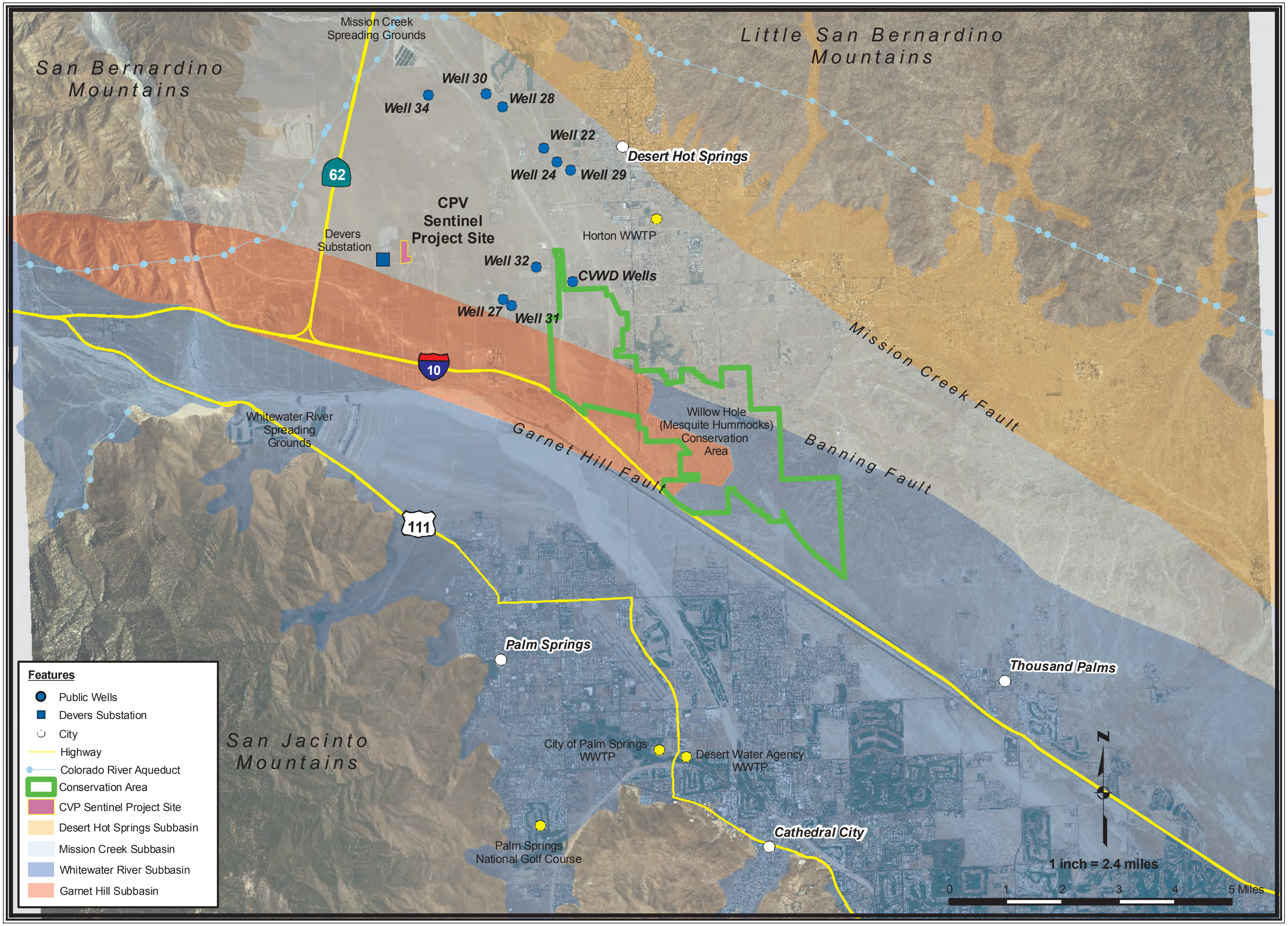
DESERT WATER AGENCY
MISSION CREEK SUBBASIN
CPV SENTINEL ENERGY PROJECT
TRANSMISSIVITY VALUES

FIGURE 3 OF 3

SCALE: N.T.S. DATE: 10/6/08 DRAWN BY: TMW CHECKED BY: DFS W.O.: 101-73

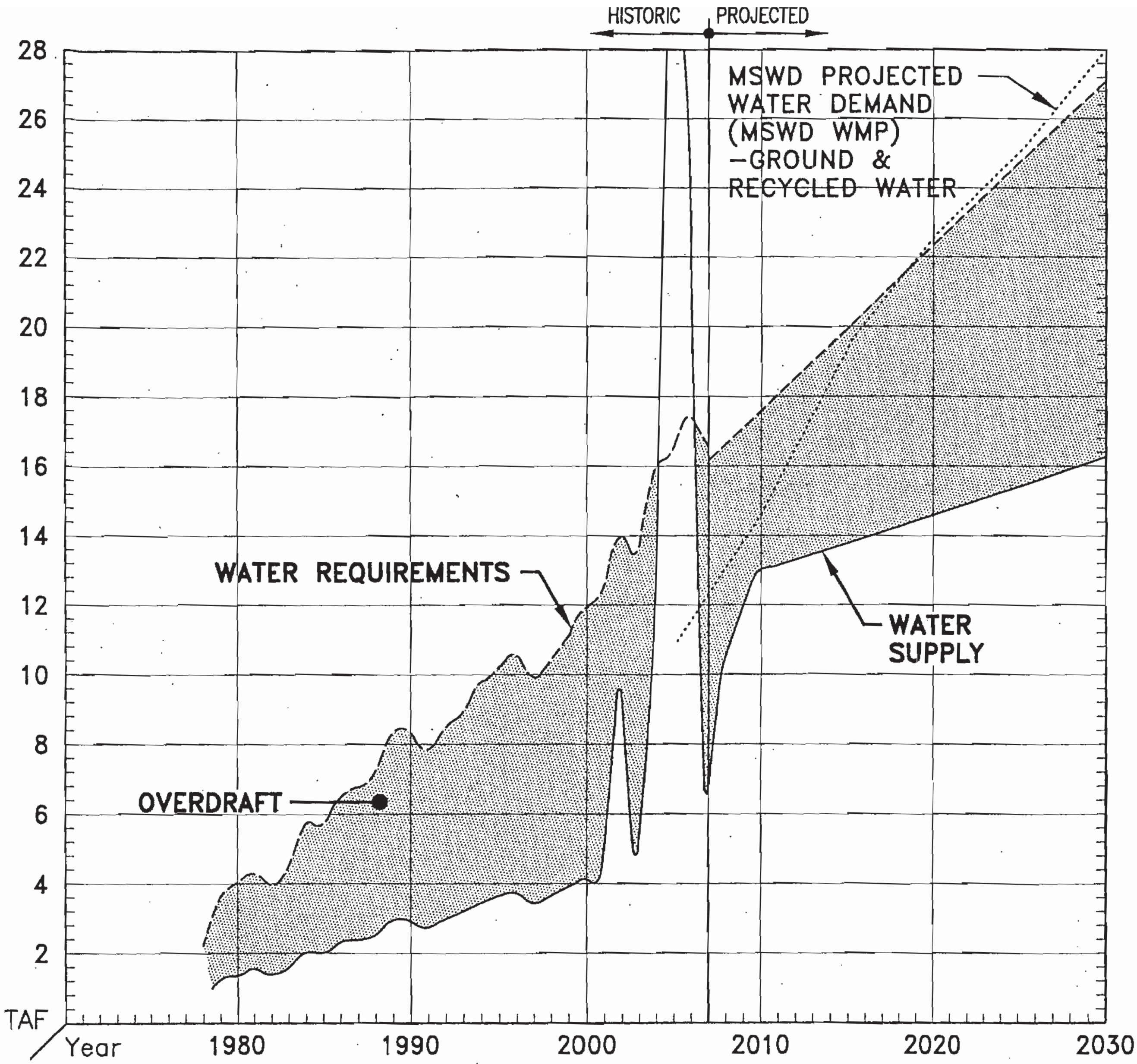
SOIL & WATER - FIGURE 1
CPV Sentinel Energy Project Vecinity



CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, OCTOBER 2008
SOURCE: California Energy Commission - Tele Atlas Data - 2005 NAIP DOQQ- Mission Springs Water District

SOIL & WATER - FIGURE 2

CPV Sentinel Energy Project - Water Requirements and Supplies for the Mission Creek Subbasin



YEARS	1980	1990	2000	2010	2020	2030
NET INFLOW (ACRE FEET)	1,400	2,900	4,100	12,700	14,300	15,900
NONCONSUMPTIVE RETURN	1,400	2,900	4,100	5,900	7,500	9,100
ARTIFICIAL RECHARGE	0	0	0	6,800	6,800	6,800
NATURAL INFLOW	5,500	5,500	5,500	5,500	5,500	5,500
NATURAL OUTFLOW	(5,500)	(5,500)	(5,500)	(5,500)	(5,500)	(5,500)

NOTES:

1. PROJECTED WATER REQUIREMENTS ARE BASED ON OVERALL TREND (LINEAR REGRESSION).
2. NONCONSUMPTIVE RETURN IS BASED ON 65% CONSUMPTIVE USE (35% NONCONSUMPTIVE RETURN).
3. PROJECTED ARTIFICIAL RECHARGE IS BASED ON PROBABLE DELIVERIES FROM STATE WATER PROJECT USING ESTIMATES BASED ON 2007 (DRAFT) STATE WATER PROJECT RELIABILITY REPORT.

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: Engineers Report - Ground Water Replentishment and Assessment Program for the Mission Creek Subbasin - Desert Water Agency 2008/2009 - Plate 3

TRAFFIC AND TRANSPORTATION

Testimony of Mark R. Hamblin

SUMMARY OF CONCLUSIONS

Staff has analyzed the traffic related information provided in the Application for Certification and other sources to determine the potential for the CPV Sentinel Energy Project to have significant traffic and transportation impacts, and has assessed the availability of mitigation measures that could reduce or eliminate the significance of these impacts.

The effective implementation of the mitigation measure(s) identified by the applicant and staff's recommended conditions of certification would prevent adverse significant traffic and transportation impacts, and ensure that the project complies with applicable laws, ordinances, regulations, and standards pertaining to traffic and transportation.

INTRODUCTION

In the Traffic and Transportation section, staff addresses the extent to which the proposed CPV Sentinel Energy Project (CPV Sentinel) may affect the traffic and transportation system within the vicinity of the project site. This analysis focuses on whether construction and operation of the project would cause traffic and transportation impacts under the California Environmental Quality Act (CEQA) and whether the project would be in compliance with applicable laws, ordinances, regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Traffic and Transportation Table 1 provides a general description of adopted federal, state, and local LORS pertaining to traffic and transportation relevant to the proposed project.

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.
CFR, 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 Code of Regulations (CCR), Title 24, Part 9, Chapter 5, Section 503.1	Title 24 is a compilation of building standards contained in national model codes adopted by state agencies, and building standards authorized by the California legislature. Part 9 contains fire safety-related building standards. Section 503.1 includes fire apparatus ingress/egress access for development projects.
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 licensing and regulations pertaining to size, weight and load upon 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 regulations for the care and protection of state and county highways, and provisions for the issuance of written permits.
Local	
County of Riverside General Plan , Circulation Element - Policies C 2.1, C 2.4, C 3.6, C 3.13, C 3.15 (August 2003)	The Circulation Element provides direction and guidance relating to the transportation network that serves the county. It identifies the circulation system and describes policies, design elements, operating characteristics and obstacles.
Riverside County Code – Title 10 Vehicles and Traffic, and Title 12 Streets, Sidewalks and	Title 10 includes standards for vehicle and traffic operations, parking, and oversized and overweight vehicles, and transportation demand management program measures for development projects. Title 12 provides provisions implementing sections 941(d) and 948 of the state's Streets and Highways Code pertaining to a county

Public Places	maintained road system, and the recording of conveyances to the county of real property interests for road uses and purposes. Includes permit requirements for work in a county public right-of-way, includes encroachment, excavation, utility maintenance and relocation.
Riverside County Zoning Ordinance – Section 18.12 Off-Street Vehicle Parking	This section provides for off-street parking and loading spaces for all land uses in the unincorporated area of the county of Riverside and to assure the provision and maintenance of safe, adequate and well-designed off-street parking facilities. It is the intent of this section that the number of required parking and loading spaces will meet the needs created by the particular use.
Riverside County Ordinance No. 461 - Standard No. 136 - Collector Rural Road	Provides road improvement standards and specifications, includes collector rural road serving ½ acre gross minimum lot size.
Riverside County Ordinance 499.11 - Encroachments In County Highways	States that no person, including firm, corporation, public utility company, public agency or district, or political subdivision, shall make any excavation or backfill in, or construct, install, or maintain any improvement, structure, or encroachment in, on, over, or under, any county highway or the right-of-way thereof without first obtaining from the County Transportation Director a permit.
Riverside County Ordinance No. 673 - Transportation Uniform Mitigation Fee Program within the Coachella Valley	Established a Transportation Uniform Mitigation Fee, where the proceeds are placed in a trust fund established by the Coachella Valley Association of Governments and used to construct the transportation improvements needed by the year 2030 to accommodate traffic generated by the development of land in the County and in the entire Coachella Valley.
City of Palm Springs Municipal Code – Chapter 14.16 Encroachments	Chapter 14.16 includes permit requirements for work in the city public right-of-way, includes encroachment, excavation, utility maintenance and relocation.

SETTING

CPV Sentinel is to be built in the western Coachella Valley within the unincorporated area of Riverside County, California between the cities of Desert Hot Springs and Palm Springs. The area is characterized by relatively flat desert terrain with scattered low density rural residential land, wind generated energy production and transmission uses. To the south and west are two major highways: U.S. Interstate 10 (I-10) and State Route 62 (SR-62).

The area is served by the Southern Pacific railroad and Amtrak. The North Palm Springs Train Station to the south of I-10 is about three miles from the project site. The station has a spur line for loading and unloading of materials and equipment.

Local bus service between Desert Hot Springs and Palm Springs is provided by the SunLine Transit Agency (SunBus). The SunBus route between the cities is on Palm Drive, four miles from the project site. Currently, there are no transit stops on Palm Drive in the unincorporated area.

State Route 62 and Dillon Road within the vicinity of the project are shown as Class 1 bicycle trails on Riverside County's Western Coachella Valley Area Plan Trails and Bikeway System.

The project site is approximately 7.5 miles from Palm Springs International Airport. It provides both scheduled airline and general aviation access to the Coachella Valley and surrounding desert region. Southern California Edison maintains a heliport at the north end of their Devers Substation, east of the project site.
The incorporated city of Palms Springs is approximately six miles south of the proposed project site. Open space and mountainous areas comprise almost half of the city's total area and provide natural recreation opportunities and habitat areas. The urban area is comprised of diverse residential neighborhoods served by many major amenities typically found in cities with much larger populations; such as an art museum, a convention center, an international airport, a regional medical center, and a broad range of public services.

The incorporated city of Desert Hot Springs is approximately three miles north-northeast of the project site. The city encompasses over 23 square miles. The city is comprised of an established residential community and vacation resorts centered on the city's unique hot water mineral springs. The city also provides community-scale commercial and business areas. The city is a transitional area between a more intense tourist commercial base to the south and southeast and the more rural and quasi-industrial windfarm development to the west. New residential and resort development has been predominantly in the western portion of the city.

CRITICAL ROADS AND FREEWAYS IN THE PROJECT VICINITY

Traffic and Transportation Table 2 identifies the critical roads and freeways in the vicinity of the project and functioning characteristics of each roadway (**Traffic and Transportation Figure 1 –** Local Transportation System). **Traffic Transportation Table 3** provides existing peak-hour intersection conditions.

TRAFFIC AND TRANSPORTATION Table 2
Existing Characteristics of Critical Roadways in Project Vicinity

Name	Classification	Average Daily Traffic Volume	Truck Traffic Percentage	LOS
I-10 (west of SR-62)	6-lane freeway	88,000[a]	22%[a]	B
I-10 (east of SR-62)	6-lane freeway	86,000[a]	26%[a]	B
I-10 (east of Indian Avenue)	6-lane freeway	86,000[a]	25%[a]	B
SR-62 (north of Dillon Road)	4-lane divided highway	24,900[a]	11%[a]	B
Indian Avenue (north of I-10)	2-lane undivided	16,900[a]	N/A[a]	F
Dillon Road (west of Indian Avenue)	2-lane undivided	3,246[b]	unknown	unknown
Dillon Road (east of SR-62)	2-lane undivided	16,000[c]	unknown	unknown

[a] Source: CPVS2007a Table 7.10-3, pg. 7.10-23.
[b] Source: CVAGDT2007
[c] Source: an Average Daily Trip count was not available at State Route 62/Dillon Road. Caltrans, Annual Average Daily Trip (AADT) count for State Route 62/Pierson Blvd was 16,300 and at State Route 62/I-10 was 19,200 (Source: CA DOT 2007). The Pierson Blvd. exit is approximately 2.5 miles north of the Dillon Road exit. The SR-62 junction with I-10 is approximately 1-mile south. Staff used 16,000 AADT for the SR-62/Dillon Road exit.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant impact generated by a project, staff reviews the project using the criteria found in the CEQA Guidelines Appendix G Environmental Checklist pertaining to Traffic and Transportation. Specifically, staff analyzed whether the proposed project would do the following:

- 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;
- Result in inadequate parking capacity, and;

- Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

Although not included as Appendix G Traffic and Transportation items, staff also discusses potential traffic and transportation impacts pertaining to nearby school operations, ground level fogging of roads and highways, and the transportation of hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

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] (HCM) defines six levels of service for roadways or intersections ranging from LOS A representing the best operating conditions and LOS F the worst. A more detailed description of LOS is found in **Traffic and Transportation Appendix A.**

The county of Riverside uses the LOS criteria, as defined by the Highway Capacity Manual, to qualitatively measure operational characteristics of local roadways. For county maintained roads and conventional state highways within the unincorporated area of the county, the LOS must be "C" or better. As an exception, LOS "D" may be allowed in county's designated Community Development areas, only at intersections of any combination of secondary highways, major highways, expressways, conventional state highways or freeway ramps (CORGPCE, pg.10). The California Department of Transportation (Caltrans) considers LOS D to be the limit of acceptable delay for state routes.

Intersections are analyzed by peak hour intersection capacity and operations. An intersection LOS is identified by a letter designation, varying from LOS A (up to 10 seconds of delay) to LOS F (greater than 80 seconds of delay). The measure of effectiveness for an intersection with traffic controls is control delay[2]. For urban settings, LOS E (delays of 55 to 80 seconds) is considered to be the limit of acceptable delay. LOS F represents the worst condition with gridlock and is typically unacceptable. See **Traffic and Transportation Appendix A** for further discussion. **Traffic and Transportation Table 3** summarizes the existing peak hour LOS for intersections in the project vicinity. Peak commute hours in the vicinity of the project are 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m.

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[1] The *Highway Capacity Manual* (HCM) is the most widely used resource for traffic analysis. The Highway Capacity Manual is prepared by the Transportation Research Board, Committee on Highway Capacity and Quality of Service. The current edition was published in 2000.

[2] Control delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents (TRB2000).

TRAFFIC AND TRANSPORTATION Table 3
Level of Service Summary for Peak-Hour Intersection Existing Conditions

Intersection	Peak Hour	Existing	
		LOS	Delay*
SR-62/Dillon Road	Morning Evening	F F	350.4 182.8
Worsley Road/Dillon Road	Morning Evening	B B	10.9 10.0
Diablo Road/Dillon Road	Morning Evening	B A	10.2 9.2
Indian Avenue/Dillon Road	Morning Evening	C D	15.9 28.8
Indian Avenue/20th Street	Morning Evening	C D	22.7 26.8
Indian Avenue/I-10 westbound ramps	Morning Evening	B B	16.6 19.2
Indian Avenue/I-10 eastbound ramps	Morning Evening	C C	30.8 22.4

*Average delay in seconds per vehicle.
Source: CPV 2007a, Table 7.10-4, pg. 7.10-24.

Construction Impacts and Mitigation

Construction Workforce and Truck Delivery

Facility construction is projected to take place over 18 months from the last quarter of 2008 to the second quarter of 2010 (estimated December 2008 to May 2010). The project's construction workforce requirements would be minimal during the mobilization and site grading period (the first 3 months of the construction period) and during the startup and testing period (the last 3 months of the construction period). Commercial operation is expected to commence during the fourth quarter of 2010.

Construction activities would generally occur between the hours of 6:00 a.m. and 6:00 p.m., Monday through Friday. The construction workforce (e.g., boilermakers, electricians, ironworkers, carpenters) is expected to come from Riverside County and Los Angeles County. The workforce is expected to use the following roadways: I-10, SR-62, Dillon Road, Indian Avenue, and Melissa Lane for construction traffic. The primary access to the site would be on Melissa Lane (**Traffic and Transportation Figure 2** – Proposed Project Construction Traffic Route).

The total onsite construction workforce for the project would average an estimated 300 workers per month for 18 months with a peak total workforce of 371 workers (CPVS2007a, pg. 7.10-7). The projected peak construction workforce is estimated to be reached six to seven months after the start of construction activities.

Truck deliveries during the construction period would supply construction materials and equipment. The truck route to the project site includes SR-62, Dillon Road, and Indian

Avenue. During the construction period staff estimates an average of 12 truck/heavy vehicle trips daily to the site with a peak of 16 deliveries. Truck deliveries are expected to occur on weekdays between 7:00 a.m. and 5:00 p.m.

Estimated Critical Intersection(s) LOS During Project Construction

Currently the intersection at SR-62/Dillon Road operates at LOS F during the morning and evening peak hours (**Traffic and Transportation Figure 3** – Aerial Photo of SR-62/Dillon Road Intersection). Motorists at this intersection currently experience a delay of 350 seconds during the AM peak hour and 183 seconds during the PM peak hour. During the project's peak construction period in 2009, it is estimated that the intersection delay at the peak hours would increase to 469 seconds during the AM period and 253 seconds during the PM period (**Traffic and Transportation Table 4** provides the year 2007 number of existing intersection LOS condition and the estimated peak construction LOS in 2009).

TRAFFIC AND TRANSPORTATION Table 4
Intersection Level of Service – Existing and Estimated at Peak Construction 2009

		2007 Existing Condition		**2009 Estimate Peak Construction**	
Intersection	**Peak Hour**	**LOS**	**Delay* (sec)**	**LOS**	**Delay* (sec)**
SR-62/Dillon Road	AM	F	350.4	F	469.4
	PM	F	182.8	F	252.6
Worsley Road/Dillon Road	AM	B	10.9	B	11.1
	PM	B	10.0	B	10.2
Diablo Road/Dillon Road	AM	B	10.2	B	10.4
	PM	A	9.2	A	9.3
Indian Avenue/Dillon Road	AM	C	15.9	C	17.3
	PM	D	28.8	F	54.5
Indian Avenue/20th Street	AM	C	22.7	C	24.4
	PM	D	26.8	E	36.3
Indian Avenue/I-10 westbound ramps	AM	B	16.6	B	17.4
	PM	B	19.2	C	22.4
Indian Avenue/I-10 eastbound ramps	AM	C	30.8	C	33.7
	PM	C	22.4	C	25.3

*****Delay in seconds per vehicle.
Source: CPVS2007a, Table 7.10-4, pg. 7.10-24, Table 7.10-8, pg. 7.10-26.

Project construction traffic is expected to cause a reduction in the LOS at two intersections during the PM peak and further increase their existing delay; Indian Avenue/Dillon Road, Indian Avenue/20th Street, and on the westbound ramps of Indian Avenue/I-10. During evening peak hours it is estimated the intersection of Indian Avenue/Dillon Road would degrade during the construction period from LOS D to LOS F, Indian Avenue/20th Street would degrade from LOS D to LOS E, and Indian Avenue/I-10 westbound ramps from LOS B to LOS C. Motorists would experience increased delay at the intersections. All three of the degraded intersections are currently unsignalized (**Traffic and Transportation Figure 4** – Aerial Photo of North Palm Springs - Indian Avenue/Dillon Road Intersection, and **Traffic and Transportation Figure 5** – Aerial Photo of Indian Avenue/Dillon Road Intersection).

During the PM peak hour during project construction, the intersection of Indian Avenue (uncontrolled) and 20th Street (stop controlled) is forecast to operate at LOS E, based on the worst case LOS of the intersection attributed to the westbound approach of 20th Street (approach LOS E). The remaining approaches of the intersections are operating at LOS A (Indian Avenue northbound and southbound approaches) and LOS C (20th Street eastbound approach) respectively. **Traffic and Transportation Table 4** shows the predicted change to critical intersection LOS during the construction of the project.

The applicant has proposed traffic control measures at Indian Avenue/Dillon Road and Indian Avenue/20th Street that would take place at the PM peak hour traffic at these intersections to help address the LOS reduction and the increase in traffic delay introduced by project construction. The applicant states that the majority of project added traffic routed via SR-62 and Dillon Road would be re-routed through Indian Avenue and Dillon Road to mitigate the AM and PM peak hour impacts at SR-62 and Dillon Road (CPVS2007a, pg. 7.10-15). Manual traffic control would be implemented only when there is an observed and immediate need to intervene and facilitate traffic flow. If the intersection is operating efficiently (i.e., no long queues and no excessive delays on all movements) no manual intervention should be necessary. Both Indian Avenue intersections (Dillon Road and 20th Street) would be monitored for efficient traffic operation during peak construction (CPVS2007a, pg. 7.10-15). Staff has not received comments as to the adequacy of the applicant's proposed traffic control measures from Caltrans District 8, the city of Palm Springs Department of Public Works, or the county of Riverside Transportation and Land Management Agency at the present time.

Hazards Due To A Street Design Feature

For the purpose of this analysis, a safe road design requires that road users must have sufficient time to be able to see, process and react to information.

The primary access to the CPV Sentinel project is on Dillon Road. The project's proposed access would be 3,200 feet long by 200 feet wide extending from Dillon Road to the project site. The 200-foot width includes a public right-of-way named Melissa Lane approximately 60 feet wide, a 75-foot wide natural gas corridor, and a 65-foot wide potable water line corridor (CPVS2007a, Figure 7.3-1). The applicant proposes to widen the access connection with Dillon Road to allow heavy haul vehicles to the project site (CPVS2007a, pg.1-2) (**Traffic and Transportation Figure 6** – Project Site, Construction Laydown Area, Access and Facility Linears).

The primary access would connect with Dillon Road approximately 3,000 feet east of the intersection with Diablo Road, and 2,500 feet west of the intersection with Karen Avenue (the closest intersections). The access connection with Dillon Road is not visually obstructed for at least 1,000 feet in the east and west directions. Local roadways along Dillon Road operate unimpeded and free-flowing. North-south cross-streets are controlled by stop signs. The posted speed along this segment of road is 55 miles per hour. To the west of the access apron with Dillon Road, the road dips in elevation; motorists are warned of the dip by advance warning signs. Staff concludes the proposed location of the primary access would be a safe design.

At the intersection of SR-62/Dillon Road, SR-62 operates as free-flowing and uncontrolled. Both approaches of Dillon Road crossing SR-62 are controlled by stop signs. The wide cross-section and median of SR-62, and the 55 mph and higher speeds of northbound and southbound SR-62 traffic introduce a potential safety concern for crossing and turning vehicles from both approaches of Dillon Road. Currently, vehicles crossing or turning left from Dillon Road must watch for gaps in the SR-62 traffic to proceed. When there is an adequate gap in traffic, the crossing or turn could be executed in one movement; however, some vehicles have to linger in the median before continuing (see **Traffic and Transportation Figure 3**). Staff has not received comments pertaining to the proposed construction traffic use of the intersection of SR-62/Dillon Road from Caltrans District 8 at the present time.

Linear Facilities

Natural gas would be supplied to the proposed power plant by a 2.6-mile long 24-inch pipeline extending from the Indigo Energy Facility. The pipeline would cross 18th Avenue (unimproved road) and Dillon Road. The pipeline would be placed in an existing 20-foot wide easement. The width of the construction along the pipeline route would be approximately 75 feet. The pipeline would be installed at least 4 feet below ground surface (CPVS2007a, pg. 5-1) (see **Traffic and Transportation Figure 6**).

Potable water would be supplied to the site by a 3,200-foot long, three-inch underground pipeline connected to an existing 12-inch potable water main line located on the south side of Dillon Road.

The project proposes a 2,300-foot long 220 kV single circuit transmission line to interconnect the power plant and the Devers Substation. The overhead transmission line would cross an existing unpaved road named Power Line Road at two locations. The transmission line requires the installation of nine steel monopole type structures that range from 85 to 115 feet in height. The monopoles would be located outside of the county public right-of-way.

An underground recycled water pipeline would connect to an existing pipeline on the south side of South Murray Canyon Drive in the city of Palm Springs. Although most of the proposed pipeline route is within an existing golf course, a portion of the pipeline would cross underneath South Murray Canyon Drive. The pipeline would be installed at the intersection of South Murray Canyon Drive and Kings Road East. This intersection provides access to residences situated along Kings Road East. Access to residences from this intersection may be temporarily disrupted during pipeline installation.

The construction of the recycled water pipeline under the road would require trenching and potentially require alternating partial closure of the traveled way while trenching work is conducted on the other half of the roadway. It is anticipated that one lane of South Murray Canyon Drive could be kept open to traffic in both directions at all times due to the large width of the road. Depending on roadway median conditions, construction work on the south half of the roadway could potentially shift at least one lane of eastbound traffic to the north and vice versa to avoid total directional roadway closure (LW2008a, pg. 12-13). A detour would be available to potentially affected residences (**Traffic and Transportation Figure 7** – Proposed Recycled Water Line Crossing at South Murray Canyon Drive In the city of Palm Springs). Construction of the portion of the pipeline crossing South Murray Canyon Drive is expected to be completed in one day. The entire recycled water pipeline is expected to be completed within one month.

The applicant is required to obtain an encroachment permit from the Riverside County Department of Public Works (title 12, section 2.08.020, Riverside County Government Code) and the city of Palm Springs Department of Public Works and Engineering (title 14, section 14.16.040, Palms Springs Municipal Code) for work to be conducted within the county and city public right-of-way to ensure that proper traffic control measures are implemented during installation of the recycled water pipeline, and to comply with applicable LORS, staff has proposed Condition of Certification **TRANS-1**.

Construction Workforce Parking and Laydown Area

The applicant proposed to have a construction laydown and construction contractor parking on the 37-acre project site (CPVS2007a, pg. 7.10-10). In addition, an offsite construction worker parking area is to be located approximately 700 feet south of the project site (see **Traffic and Transportation Figure 6**). The applicant's AFC did not provide a conceptual construction parking area diagram showing the dimensions of the parking areas, ingress/egress access, or parking lot circulation.

To access the construction worker parking and laydown area to the south of the project site, the recommended route for incoming workers would be SR 62, then east on Dillon Road, north on Melissa Lane, towards the parking and construction laydown area. Vehicles originating from the east, northeast and southeast will access the site using Indian Avenue, Dillon Road and Melissa Lane (CPVS2007a, pg.7-10-9).

Using AFC Figure 7.3-1, Figure 7.3-2 and Figure 7.10-1B, staff has calculated that the offsite parking area consists of approximately 13 acres. Approximately 8.5 acres of the parking/laydown area would be within the county of Riverside's jurisdiction. The remaining 4.5 acres is within the city of Palm Springs jurisdiction.

In order to estimate a possible size for the onsite parking area and the 8.5-acre portion of the offsite parking area, staff used the parking space calculations found in section 18.12 off-street vehicle parking for industrial uses of the county of Riverside Government Code. The county's minimum size requirement for a parallel parking space is 9 feet by 23 feet (standard parking space) with a minimum travel aisle width of 12 feet.

For the 4.5 acres under the city's jurisdiction, staff used the city of Palm Springs Municipal Code, section 93.06.00 off-street parking. The city's minimum size requirement for a parallel parking space is 9 feet by 17 feet for a standard parking space with a minimum travel aisle width of 24 feet.

The number of construction workers for the project is estimated to be 371 during the peak construction month. If one 9-foot by 23-foot parking space were provided for each of the 371 peak workforce construction workers, the applicant would need an approximate 76,797 square foot area (1.7 acres) plus a 12-foot wide travel lane(s). Hence, the estimated 8.5-acre portion of the parking area, the 4.5-acre portion of the parking area, and the 37-acre project site would provide size sufficient to address the project's peak construction workforce parking. Staff does not anticipate a construction worker parking impact to be introduced.

Proximity to School

Two Bunch Palms Elementary School is the closest school to the project site. It is approximately 3.6 miles away. The school is located in the city of Desert Hot Springs. The project's construction traffic route does not enter the city, or pass in the vicinity of the school; therefore staff does not anticipate a traffic impact on schools due to project construction.

Operation Impacts and Mitigation

Operation Workforce Traffic

The proposed project at operation in October 2010 would employ ten full-time and four part-time workers spread over a 24-hour period. It is estimated there would be one to two nonrecurring service/delivery trips per month to and from the project site.

Tanker trucks with a capacity of up to 8,000 gallons would deliver aqueous ammonia to the power plant up to 56 times per year from a supplier in Southern California. The deliveries are to replenish aqueous ammonia stored on site for plant operation (CPVS2007a, pg. 7.10-13).

Traffic and Transportation Table 5 provides the estimated intersection LOS for the Year 2010 without the project.

TRAFFIC AND TRANSPORTATION Table 5
Peak-Hour Intersection LOS – Year 2010 Estimated No Project Conditions

	A.M. Peak Hour		P.M. Peak Hour	
Intersection	**LOS**	**Delay* (sec)**	**LOS**	**Delay* (sec)**
SR-62/Dillon Road	F	514.3	F	289.8
Worsley Road/Dillon Road	B	11.0	B	10.2
Diablo Road/Dillon Road	B	10.4	A	9.2
Indian Avenue/Dillon Road	C	18.0	E	39.8
Indian Avenue/20th Street	D	25.1	D	29.7
Indian Avenue/I-10 westbound ramps	B	17.8	C	20.1
Indian Avenue/I-10 eastbound ramps	D	35.3	C	25.5

***** Average delay in seconds per vehicle.
Source: CPVS2007a, Table 7.10-12, pg. 7.10-28.

The estimated employee generated Peak-Hour Intersection LOS trips projected in the Year 2010 is presented in **Traffic and Transportation Table 6**.

TRAFFIC AND TRANSPORTATION Table 6
Peak-Hour Intersection LOS – Year 2010 Projection With Project Operation

	A.M. Peak Hour		P.M. Peak Hour	
Intersection	**LOS**	**Delay* (sec)**	**LOS**	**Delay* (sec)**
SR-62/Dillon Road	F	514.3	F	289.8
Worsley Road/Dillon Road	B	11.0	B	10.2
Diablo Road/Dillon Road	B	10.4	A	9.2
Indian Avenue/Dillon Road	C	18.3	E	40.7
Indian Avenue/20th Street	C	22.1	D	30
Indian Avenue/I-10 westbound ramps	B	17.8	C	20.1
Indian Avenue/I-10 eastbound ramps	D	35.4	C	25.4

***** Average delay in seconds per vehicle.
Source: CP CPVS2007a, Table 7.10-13, pg. 7.10-28.

The project's estimated operational related trips would generate a minimal increase to the projected 2010 LOS intersection delay and these trips are not expected to cause a noticeable change in the LOS at the identified intersections.

Onsite Parking

Section 18.12 of the county's zoning ordinance (off-street vehicle parking for industrial uses) provides a calculation for the number of permanent parking spaces required for the project. Section 18.12 states where the number of workers can be determined: one space for each two employees of the largest shift, and one space for each vehicle. The project at operation would have ten full-time employees and four part-time employees; therefore a minimum of six permanent employee parking spaces would be required. The 37-acre project site provides sufficient area for the minimum number of onsite parking spaces. Staff has proposed Condition of Certification **TRANS-2** which requires the applicant to provide a parking plan demonstrating compliance with the county's requirement.

Airports

Palms Springs International Airport is the closest airport to the proposed project. The airport is located approximately eight miles south southeast of the site in the city of Palm Springs. One hundred sixteen aircraft are based on the field[3]. The airport averages 232 daily aircraft operations[4].

The Visual Flight Rules (VFR) Aeronautical Chart showing Palms Springs International Airport shows a permanent cautionary advisory in the area. A cautionary advisory alerts aircraft pilots of any hazards en route or at a specific location. The cautionary advisory near the project site alerts aircraft pilots of numerous windmills highest 1,980 feet above mean sea level. The CPV Sentinel's proposed exhaust stack heights would be 90 feet tall. Its nine transmission line structures range between 85 to 115 feet tall.

The project site is not located within 20,000 feet of an airport runway triggering a notification to the FAA (FAA Form 7460-1). The project does not have any structure exceeding 200 feet in height which would also trigger an FAA notification.

Emergency Services Vehicle Access

The Riverside County Fire Department provides 24-hour fire protection and emergency medical services anywhere in their service territory which includes the unincorporated area and contract cities. North Palm Springs Fire Station 36 is the closest station to the project site at 2.2 miles (63777 Dillon Road, North Palm Springs). Emergency services vehicle/fire apparatus access to the project site would be on Melissa Lane.

Riverside County Code, Ordinance No. 787 (as amended through 787.3) adopted the 2007 California Fire Code and the 2007 California Building Standards Code which includes an emergency services vehicle access review for a project during a building

[3] for 12-month period ending 31 December 2007

[4] for 12-month period ending 31 December 2007

fire plan check by the Riverside County Fire Department. Staff has proposed Condition of Certification **TRANS-3** which includes emergency services vehicles access review by the fire department. For a more detailed discussion on emergency services serving the facility read the **Worker Safety and Fire Protection** section in this Final Staff Assessment (FSA).

Ground Level Fogging of Roads and Highways

Staff conducted modeling of the proposed project's cooling tower using the Seasonal and Annual Cooling Tower Impact (SACTI) model to identify the potential for ground level fogging (WW 2007). Based on three years of historic metrological data and the three-cell tower operation modeled, a ground hugging plume could occur for a distance of up to 984 feet for a total of 36 minutes over a three year period. Given this, there would be a chance that a very limited amount of ground level fogging could reach Power Line Road. Ground level fogging is not predicted to reach Diablo or Dillon Roads. Staff concludes that there would be a very limited occurrence (frequency and duration) of ground level fogging by the project's cooling towers; thereby introducing a less than significant impairment of visibility to motorists on nearby public roads and highways.

Transportation of Hazardous Materials

During the construction period, small qualities of hazardous materials would be used (e.g. waste oil, cleaning solvents, paint, and asbestos containing materials). No acutely toxic hazardous materials would be used. During operation, trucks would periodically deliver and haul away aqueous ammonia, sulfuric acid, cleansing chemicals, lubricating oil and filters, oily rags, oil absorbent, water treatment chemicals and laboratory waste. The applicant estimates an average of two or less truck trips per day to the site, maximum of three truck trips per day.

Tanker trucks with a capacity of up to about 8,000 gallons would deliver aqueous ammonia to the facility up to 56 times per year from a supplier based in Southern California. Such deliveries would be made to replenish aqueous ammonia stored on site. The average amount of aqueous ammonia to be stored on site is 12,000 gallons, and the maximum storage capacity is 24,000 gallons. To maintain adequate aqueous ammonia reserve levels on site, two full tanker trucks at 8,000 gallons each load are needed each month. Sulfuric acid would also be used for pH control. Based on an estimated usage rate of 4,200 gallons in 30 days, the 5,000 gallons of sulfuric acid stored on site would be replenished once a month (CPVS2007a, pg. 7.10-13). For a more detailed discussion on hazardous material delivery to the power plant read the **Hazardous Materials Management** section in this FSA.

The California Department of Motor Vehicles licenses all drivers who carry hazardous materials. Drivers are required to check weight limits and conduct periodic brake inspections. Commercial truck operators handling hazardous materials are 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 by the California Highway Patrol at inspection stations along major highways and interstates.

Specific sections of the California Vehicle Code and the California Streets and Highways Code 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.

Staff reviewed the applicant's proposed transportation route for hazardous materials. The proposed route would be I-10 to State Route 62, east on Dillon Road to the project site access. Staff agrees that this is a suitable route considering its low potential for impact on residential districts, active recreational areas, recognized places for public assembly and its overall LOS. The exact route would be subject to permitting approval by the California Highway Patrol prior to any delivery of aqueous ammonia to the site. For a more detailed discussion on the handling and disposal of hazardous substances, see the **Hazardous Materials Management** section of this FSA.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its incremental effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, title 14, section 15130).

The applicant has identified several development projects within a six-mile radius of the project site that have been either filed with a city or the county, or approved by them within the eighteen months prior to the filing of the AFC with the Energy Commission. AFC pages 7.10-13 through 14 identify the following projects (CPVS2007a, pg. 7.10-13).

- Indian Avenue/I-10 Interchange Project involves reconstruction of the I-10 Freeway/Indian Avenue interchange three miles south of the CPV Sentinel project site. The project is currently under environmental review.
- Dillon Wind Farm project involves the installation of 45 wind turbines at three separate locations: (1) an area west of Devers Substation approximately 5,000 feet from the project site, (2) an area 2,000 feet east of the project site, and (3) an area 4,500 feet to the southeast of the project site. The Environmental Impact Report for this project was recently certified by Riverside County. Construction period is expected to last six months.
- Wind Energy Conservation System (WECS) 20 Permit Project would consist of eight new General Electric (GE) 1.5 MW wind turbine generators being installed in the existing WECS 20 wind park. This wind park is located approximately two miles northwest of the proposed project site, a half-mile west of State Route 62.
- Green Path Project is a new 100-mile, 500-kV line extension from the Devers-Palo Verde transmission corridor north to a new Upland Substation in the northeastern sector of Los Angeles Department of Water and Power service territory. Planned construction is 2007 to 2009.
- Oasis Development and annexation is a mixed-use development on 155 acres located approximately 3.2 miles northeast of the project site. The city of Desert of Hot Springs is annexing the project.

- Alpine Group Development is a mixed-use development that includes schools and high density residential) on 160 acres located one mile northwest of the project site. The city of Desert of Hot Springs is to annex the project. At this early stage, there is no timetable for the start of construction.
- Palmwood Specific Plan and Outparcels Development is a mixed-use development that includes 1,853 residential units on 1,926-acres located 6.5 miles north of the CPV Sentinel project. The proposed project's peak construction activities would occur in 2009.

The city of Desert Hot Springs website states that they have approved 13 residential developments within its jurisdiction, they include the following: Agua Dulce, Vista Hacienda, Indigo Lakes, Eagle Point, Indian Highlands, Mountain View Estates, Paradise Springs, Vista del Monte, Silver Oakes, Palmwood, Skybourne, Tuscan Hills, and Highland Falls. At build out these projects would include 12,000 new homes. In addition, approved commercial developments include the Oasis Development, a project estimated to serve upwards to 60,000 people shopping for everything from groceries to home appliances. The Pierson Professional Center which includes community medical and professional office space, and building area for a restaurant and coffee house, and the Village at Mission Lakes development which would offer 68,000 square feet of rentable space for restaurants, markets, and office space (CODHS). Indian Avenue is a major north-south roadway system that connects the cities of Desert Hot Springs and Palms Springs. A 1.5-mile segment of Indian Avenue from I-10 to Dillon Road would be used for project related activity. Two intersections may be affected by the identified developments. As shown in **Traffic and Transportation Table 4**, the Indian Avenue/Dillon Road and Indian Avenue/20th Street intersections currently operate at LOS D or worse. Staff believes that the culmination of the above identified developments would further contribute to a degrading of existing (2007) intersection operations. Motorists would experience increased intersection delay. Staff has proposed Condition of Certification **TRANS-3** to reduce this cumulatively considerable and significant impact that may not be reduced to a less than significant level without extensive road work and traffic signalization.

As shown in **Traffic and Transportation Table 4** the project's construction peak workforce would introduce a significant impact to the identified intersections during the peak construction period for the project. This impact would diminish after completion of project construction (**Traffic and Transportation Table 6** - Peak-Hour Intersection LOS – Year 2010 Projection With Project Operation) to a less than significant level. Even though low-income and minority populations exist in the immediate project area, staff has not identified any significant unmitigated adverse traffic and transportation impacts with the proposed project or cumulative impacts; therefore, no significant adverse impacts to minority or low-income populations are expected to occur

COMPLIANCE WITH LORS

Traffic and Transportation Table 7 provides a general description of applicable statutes, regulations and standards adopted by the federal government, the State of California, the county of Riverside and the city of Palm Springs pertaining to traffic and transportation with which the project is required to comply. Conditions of certification are included to make the project consistent with LORS where not already mandated by federal regulations.

TRAFFIC AND TRANSPORTATION Table 7
Project Compliance with Adopted Traffic and Transportation LORS

Applicable LORS	LORS Description and Project Compliance Assessment
Federal	
CFR, 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.
	Enforcement is conducted by state and local law enforcement agencies, through state agency licensing and ministerial permitting (e.g., California Department of Motor Vehicles licensing, Caltrans permits), and/or local agency ministerial permitting (e.g., Riverside County Transportation Department).
State	
California Code of Regulations, Title 24, Part 9, Chapter 5, Section 503.1. (also Riverside County Code, Ord. No. 787)	Title 24 is a compilation of building standards contained in national model codes adopted by state agencies, and building standards authorized by the California legislature. Part 9 contains fire safety-related building standards. Section 503.1 includes fire apparatus ingress/egress access for development projects.
	Condition of Certification **TRANS-2** requires the applicant to show ingress/egress access for emergency services vehicle access to the project site.
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 licensing and regulations pertaining to size, weight and load upon vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials.
	Enforcement is provided by state and local law enforcement agencies, and through ministerial state agency licensing 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.
	Enforcement is provided by state and local law enforcement, and through ministerial state agency licensing and/or local agency permitting.
Local	
Riverside County Code – Title12 Encroachment and Excavations	Title 12 includes permit requirements for work in a county public right-of-way, includes encroachment, excavation, utility maintenance and relocation.
	Energy Commission staff has proposed **TRANS-1** which requires the applicant to obtain an encroachment permit (a ministerial action) as per Riverside County Code, title 12, section 12.08.020.

Riverside County General Plan, Circulation Element - Policies C 2.1, C 2.4, C 3.6, C 3.13, C 3.15	The Circulation Element provides direction and guidance relating to the transportation network that serves the county. It identifies the circulation system and describes policies, design elements, operating characteristics and obstacles. Policy C 2.1 provides countywide target LOS "C" along all county maintained roads and conventional state highways. As an exception, LOS "D" may be allowed in Community Development areas, only at intersections of any combination of Secondary Highways, Major Highways, and Urban, Expressways, conventional state highways or freeway ramp intersections. LOS "E" may be allowed in designated community centers to the extent that it would support transit-oriented development and walkable communities. Policy C 2.4 directs project related traffic impacts of new development proposals be mitigated via conditions of approval requiring the construction of any improvements identified as necessary to meet level of service standards. Policy C 3.6 requires private developers to be primarily responsible for the improvement of streets and highways service access to developing commercial, industrial, and residential areas. These may include road construction or widening, installation of turning lanes and traffic signals, and the improvement of any drainage facility or other auxiliary facility necessary for the safe and efficient movement of traffic or the protection of road facilities. Policy C 3.13 design street intersections, where appropriate, to assure the safe, efficient passage of through-traffic and the negotiation of turning movements. Policy C 3.15 requires adequate sight distances for safe vehicular movement at a road's design speed and at all intersections.
	Energy Commission staff has proposed Condition of Certification **TRANS-3** which requires the preparation of a traffic control plan. The plan would include the timing of heavy equipment and building materials deliveries, the scheduling of the construction workforce start and end times, and ridesharing which will help limit the project's short-term construction impact to the intersections at Dillon Road/SR-62 and Dillon Road/Indian Road during the morning and evening peak hours. The intersections currently operate at LOS F and LOS D. Staff has proposed **TRANS-1** which requires the applicant to obtain an encroachment permit for work conducted within the county public right-of-way.
Riverside County Zoning Ordinance – Section 18.12 Off-Street Vehicle Parking	This section provides for off-street parking and loading spaces for all land uses in the unincorporated area of the county of Riverside and to assure the provision and maintenance of safe, adequate and well-designed off-street parking facilities. It is the intent of this section that the number of required parking and loading spaces will meet the needs created by the particular uses.

	Energy Commission staff has proposed Condition of Certification **TRANS-2** which requires the applicant to provide a parking plan for the project at operation to address the county's requirement and to provide adequate parking for construction workers. **TRANS-2** also includes the submittal of a construction parking layout.
Riverside County Ordinance 461 - Standard No. 136 - Collector Rural Road	Provides road improvement standards and specifications, includes collector rural road serving ½ acre gross minimum lot size.
	Energy Commission staff has proposed **TRANS-5** which requires the project owner to improve Melissa Lane in accordance to Riverside County Ordinance 461 – County Standard No. 136.
Riverside County Ordinance 499.11 - Encroachments In County Highways	No person, including firm, corporation, public utility company, public agency or district, or political subdivision, shall make any excavation or backfill in, or construct, install, or maintain any improvement, structure, or encroachment in, on, over, or under, any county highway or the right of way thereof without first obtaining from the County Transportation Director a permit .
	A letter received from Ron Goldman, Planning Director, county of Riverside Transportation and Land Management Agency, dated August 27, 2008 (docketed September 5, 2008). It recommends as a condition of approval for the project that Melissa Lane be improved with 28-feet of asphalt concrete pavement within a 60-foot full-width dedicated right-of-way from Dillon Road to the project's northern facility boundary in accordance with Riverside County Standard No. 136 (CORTALMA2008). Energy Commission staff has proposed **TRANS-5** which requires the project owner to improve Melissa Lane as per the county's recommendation in accordance with Riverside County Ordinance 499.11 and Standard No. 136.
Riverside County Ordinance No. 673 - Transportation Uniform Mitigation Fee Program within the Coachella Valley	Established a Transportation Uniform Mitigation Fee, where the proceeds are placed in a trust fund established by Coachella Valley Association of Government and used to construct the transportation improvements needed by the year 2030 to accommodate traffic generated by the development of land in the county and in the entire Coachella Valley (CORTALMA2008).
	Energy Commission staff has proposed **TRANS-6** which requires the project owner to pay the Transportation Uniform Mitigation Fee in accordance to Riverside County Ordinance 673.
City of Palm Springs Municipal Code – Chapter 14.16 Encroachments	Chapter 14.16 includes permit requirements for work in the city public right-of-way, includes encroachment, excavation, utility maintenance and relocation.
	Energy Commission staff has proposed **TRANS-1** which requires the applicant to obtain an encroachment permit as per Palm Springs Municipal Code, section 14.16.040 for work conducted within the city public right-of-way.

COUNTY OF RIVERSIDE CORRESPONDENCE DATED AUGUST 27, 2008

A letter received from Ron Goldman, Planning Director, county of Riverside Transportation and Land Management Agency, dated August 27, 2008 (docketed September 5, 2008) recommends the following traffic/transportation related conditions of approval for the CPV Sentinel project:

- The project owner is to pay a Transportation Uniform Mitigation Fee in accordance with the fee schedule in effect at the time of issuance, pursuant to county Ordinance No. 673.
- The project owner is to provide sufficient public street right-of-way along Melissa Lane from Dillon Road to the project's north boundary to establish a 60-foot full-width right-of-way including standard corner cutbacks.
- The project owner is to improve Melissa Lane with 28-feet of asphalt concrete pavement within a 60-foot full-width dedicated right-of-way from Dillon Road to the project's north boundary. The improvement is to in accordance with County Standard No. 136.

Staff response: Staff has proposed Conditions of Certification **TRANS-5** and **TRANS-6** which require the project owner to dedicate and improve Melissa Lane, and make payment of a Transportation Uniform Mitigation Fee for the project in accordance to applicable county ordinances. Staff has also proposed Condition of Certification **TRANS-4** which requires the applicant to repair affected public rights-of-way (e.g., highway, road, bicycle path, pedestrian path) to original or near original condition that may have been damaged due to the project's construction activities.

CONCLUSIONS

Staff has analyzed potential construction and operation impacts generated on the regional and local traffic/transportation system by the proposed project and conclude the following:

1. The existing LOS at the intersection of Indian Avenue/Dillon Road (LOS D) does not currently meet the LOS C standard adopted by the county of Riverside during the evening peak, or the LOS D standard established by Caltrans at the intersection of SR-62/Dillon Road (LOS F) during the morning and evening peak hours.

2. During evening peak hours it is estimated the intersection of Indian Avenue/Dillon Road would degrade during the project's construction period from LOS D to LOS F, and Indian Avenue/20th Street would degrade from LOS D to LOS E.

3. During construction and operation, the project's proposed primary vehicle access (Melissa Lane) is at a location that provides an unobstructed viewing distance of at least 1,000 feet in both directions along Dillon Road.

4. The onsite and offsite construction parking/laydown area dimensions, ingress/egress, and vehicle circulation have not been clearly identified. Staff estimates that the proposed offsite construction worker parking/laydown area consists of approximately 13 acres, and would be of a sufficient size to provide for the estimated peak construction workforce. The 37-acre project site offers sufficient size for the project's operation workforce (onsite parking area).

5. Aircraft under normal operations approaching or departing Palm Springs International Airport would not be impacted by the operation of the power plant.

6. Staff believes that the cumulative traffic impact introduced by the construction of CPV Sentinel project, along with other identified developments in the vicinity of the project site would further contribute to a degrading of year 2007 intersection operations resulting in a cumulatively considerable impact. This impact may not be mitigated to a less than significant level without extensive road work and traffic signalization. Although the project's construction peak workforce would significantly add to an existing significant impact at the identified intersections this impact would significantly diminish after completion of project construction. The CPV Sentinel contribution to the cumulative impact would be less than significant during operation.

The construction and operation of the CPV Sentinel project as proposed with the effective implementation of the applicant's mitigation measures, and the staff's recommended conditions of certification below would ensure that the project's direct adverse traffic and transportation impacts are less than significant and, ensure that the project complies with applicable LORS regarding traffic and transportation.

PROPOSED CONDITIONS OF CERTIFICATION

Encroachment Permit

TRANS-1 Prior to any ground disturbance within a public right-of-way (e.g., highway, road, bicycle path, pedestrian path), the project owner or its contractor(s) shall secure an encroachment permit in accordance with the applicable requirements of the county of Riverside, the city of Palm Springs, and Caltrans (if applicable) for encroachment into the affected jurisdiction's public right-of-way.

Verification: Prior to ground disturbance in the public right-of-way the project owner shall provide to the CPM copies of the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans (if applicable) issued/approved encroachment permit(s). In addition, the project owner shall retain copies of the issued/approved permit(s) and supporting documentation in its compliance file for a minimum of 180 calendar days after the start of commercial operation.

Parking Standards

TRANS-2 The project owner shall comply with the applicable parking standards of the county of Riverside. The project owner shall prepare and submit to the CPM for approval a parking plan for the operation phase of the project in consultation with the county of Riverside.

The operational parking plan shall show the location of the proposed parking area(s), a plot plan (diagram) with dimensions with an accurate portrayal of the number of parking spaces in accordance to the sizes stipulated in the applicable parking standards by the county of Riverside Transportation and Land Management Agency. The plan shall also show ingress/egress access (including emergency services vehicle access), parking lot circulation, car/van pool loading and unloading area(s) and any other item(s) that are requested by the county of Riverside Transportation and Land Use Management Agency subject to approval by the CPM.

The operational parking plan shall include a policy to be enforced by the project owner stating all project-related parking occur onsite or in designated offsite parking areas as shown on the plan.

Prior to site mobilization, the project owner shall provide to the CPM for approval a conceptual construction parking layout plan for the project. The conceptual parking layout plan shall show with an accurate portrayal the number of parking spaces in accordance to the sizes stipulated in the applicable parking standards by the county of Riverside Transportation and Land Management Agency, and parking lot circulation.

Verification: The project owner shall submit the proposed operation parking plan to the county of Riverside Department of Transportation for review and comment. The project owner shall provide to the CPM a copy of the transmittal letter submitted to the county of Riverside Department of Transportation requesting their review of the parking plan. The project owner shall provide any comment letters to the CPM for review.

The applicant shall provide the county of Riverside Transportation and Land Management Agency 30 calendar days to review the parking plan and provide written comments to the project owner. The project owner shall provide a copy of the county of Riverside Transportation and Land Management Agency written comments and a copy of the parking plan(s) to the CPM for review and approval.

At least 30 calendar days prior to site mobilization, the project owner shall provide a copy of the construction phase parking plan to the CPM for review and approval.

At least 60 calendar days prior to the start of commercial operation, the project owner shall provide a copy of the operation phase parking plan to the CPM for review and approval.

Prior to site mobilization, the project owner shall provide to the CPM for approval a conceptual construction parking layout plan for the project.

Traffic Control and Implementation Plan

TRANS-3 The project owner shall prepare a construction traffic control and implementation plan for the project and its associated facilities. The project owner shall consult with the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans in the preparation of the traffic control and implementation plan. The project owner shall provide a copy of the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans written comments and a copy of the traffic control and implementation plan to the CPM for review and approval.

The traffic control and implementation plan shall include and describe the following minimum requirements:

- Timing of heavy equipment and building materials deliveries;
- Redirecting construction traffic with a flag person if required;
- Signing, lighting, and traffic control device placement if required;
- Construction work hours and arrival/departure times outside of peak traffic periods;
- Haul routes;
- Procedures for safe access to the main entrance;
- Ensure access for emergency services vehicles to the project site;
- Temporary travel lane closure;
- Ensure access to adjacent residential and commercial property during the construction of all linears, and;
- Provide a construction workforce organized ridesharing plan (ridesharing refers to carpooling and vanpooling. Rideshare programs typically provide carpool matching, vanpool sponsorship, marketing programs and incentives to rideshare rather than drive alone).

Verification: The project owner shall submit the proposed traffic control and implementation plan to the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans for review.

The project owner shall provide to the CPM a copy of the transmittal letter submitted to the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans requesting their review of the traffic control and implementation plan.

The project owner shall provide the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans 30 calendar days to review the plan and provide written comments to the project owner. The project owner shall provide the CPM a copy of the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans comments to the CPM.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM and the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans a plan with the specified revisions for review and approval by the CPM before the plan is implemented.

At least 30 calendar days prior to site mobilization, the project owner shall provide a copy of the traffic control and implementation plan to the CPM for review and approval.

Repair of Public Right-of-Way

TRANS-4 The project owner shall repair affected public rights-of-way (e.g., highway, road, bicycle path, pedestrian path) to original or near original condition that has been damaged due to construction activities conducted for the project and its associated facilities.

Prior to start of site mobilization, the project owner shall notify the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans about their schedule for project construction. The purpose of this notification is to request the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans to consider public right-of-way repair or improvement activities after project construction has taken place and to coordinate construction-related activities.

Verification: Prior to the start of site mobilization, the project owner shall photograph, or videotape the following applicable affected public right-of-way segment(s) (includes intersections): Indian Avenue, Dillon Road, Melissa Lane, State Route 62, South Murray Canyon Drive, and Kings Road East. The project owner shall provide the CPM, the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans with a copy of these images.

Within 60 calendar days after completion of construction, the project owner shall meet with the CPM, the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans to identify sections of public right-of-way to be repaired, to establish a schedule to complete the repairs and to receive approval for the action(s). Following completion of any public right-of-way repairs, the project owner shall provide to the CPM a letter signed by the county of Riverside Transportation and Land Management Agency, the city of Palm Springs Department of Public Works and Engineering, and Caltrans stating their satisfaction with the repairs.

Improvement to Melissa Lane and Dedication of Roadway

TRANS-5 Prior to the start of commercial operation, the project owner shall dedicate, and complete improvement of Melissa Lane from Dillon Road to the north boundary of the CPV Sentinel Energy facility site to the county of Riverside standard for a collector rural road – Riverside County Standard No. 136. The project owner shall improved Melissa Lane with 28-feet of asphalt concrete pavement within a 60-foot full-width dedicated right-of-way including standard corner cutback in accordance to county standards.

Verification: Not later than a 180 days prior to the estimated start of commercial operation, the project owner shall submit to the Director of the county of Riverside Transportation and Land Management Agency, Planning Department for review, the required improvement plan(s) for Melissa Lane, and the completed forms for the dedication of the roadway.

The project owner shall provide to the CPM a copy of the transmittal letter submitted to the county of Riverside Department of Transportation and Land Management Agency, Planning Department requesting their review of the improvement plans and dedication of roadway submitted for Melissa Lane.

The project owner shall allow the Director of the county of Riverside Transportation and Land Management Agency, Planning Department 30 days to provide comment on the improvement plans and roadway dedication.

The project owner shall provide a copy of the Director of the county of Riverside Transportation and Land Management Agency, Planning Department comments to the CPM prior to the start of construction of the improvements to Melissa Lane and roadway dedication.

If the CPM determines that the improvement plans and/or the roadway dedication requires revision, the project owner shall provide to the CPM and the Director of the county of Riverside Transportation and Land Management Agency, Planning Department a plan and/or roadway dedication request with the specified revision(s) for review and approval by the CPM before the improvement plan is implemented.

The project owner shall simultaneously notify the CPM and the Director of the county of Riverside Transportation and Land Management Agency, Planning Department that the improvement to Melissa Lane is completed and ready for final inspection.

County Transportation Uniform Mitigation Fee

TRANS-6 Prior to the start of commercial operation, the project owner shall pay to the county of Riverside or designee, the Transportation Uniform Mitigation Fee calculated for the CPV Sentinel Energy Project in accordance to Riverside County Ordinance 673.

Verification: Prior to the start of commercial operation, the project owner shall provide to the CPM a copy of the receipt provided by the county of Riverside or its designee demonstrating payment of Transportation Uniform Mitigation Fee.

REFERENCES

CA DOT 2007 – CA Dept. Transportation. Traffic and Vehicle Data Systems Unit, http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/index.htm, date accessed 10/7/2008.

CODHS - City of Desert Hot Springs. Website: http://www.desert-hot-springs.us, date accessed 04/17/2008.

COPSMC 2007- City of Palm Springs Municipal Code. December 2007.

CORGC – County of Riverside Government Code.

CORGPCE– County of Riverside General Plan Circulation Element.

CORTALMA2008 – County of Riverside Transportation and Land Management Agency, Riverside County Planning Department, Response to Request for Agency Comments on the Preliminary Staff Assessment for the CPV Sentinel energy Project. Dated 08/27/08. Submitted to CEC/Docket Unit on 09/05/08.

CORTD2007 – County of Riverside Transportation Department. Traffic County Book, September 2007.

CORZO – County of Riverside Zoning Ordinance.

CVAGDT2007 - Coachella Valley Association of Governments Department of Transportation, Existing Daily Traffic Volumes Map, April 2007.

CPVS2007a – CPV Sentinel, LLC / D. Shileikis (tn: 41166). CPV Sentinel Application for Certification – Volume 1, 2, & 3. Dated on 6/25/2007. Submitted to CEC/Docket Unit on 6/25/2007.

TRB2000 - Transportation Research Board. Highway Capacity Manual 2000. Washington, D.C.

LW2008a – Latham & Watkins LLP / P. Kihm (tn: 45406). AFC Supplement: Revised Water Supply Plan. Dated on 2/19/2008. Submitted to CEC/Docket Unit on 2/19/2008.

RCFD – Riverside County Fire Department. Website: www.rvcfire.org, date accessed 04/21/2008.

WW2007- Will Walters. Email from Will Walters to Mark Hamblin regarding CPV Sentinel Ground Fogging Statistics. Dated 10/11/2007.

HIGHWAY CAPACITY MANUAL

The Highway Capacity Manual is prepared by the Transportation Research Board, Committee on Highway Capacity and Quality of Service. It represents a concentrated, multi-agency effort by the Transportation Research Board, the Federal Highway Administration, the American Association of Highway and Transportation Officials, and other traffic/transportation related agencies. It is the most widely used resource for traffic analysis. Several versions of the Highway Capacity Manual (HCM) have been published. The current edition was published in 2000. It contains concepts, guidelines, and computational procedures for computing the capacity and quality of service of various highway facilities, including freeways, signalized and unsignalized intersections, rural highways, and the effects of transit, pedestrians, and bicycles on the performance of these systems.

LEVEL OF SERVICE

The description and procedures for calculating capacity and level of service are found in the Highway Capacity Manual 2000. The Highway Capacity Manual 2000 represents the latest research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with level of service A representing the best operating conditions and level of service F the worst. Each level of service represents a range of operating conditions and the driver’s perception of these conditions. Safety is not included in the measures that establish service levels. A general description of service levels for various types of facilities is shown in **Table A**.

Table A
Level of Service Description

Facility Type	Uninterrupted Flow	Interrupted Flow
	Freeways Multi-lane Highways Two-lane Highways Urban Streets	Signalized Intersections Unsignalized Intersections - Two-way Stop Control - All-way Stop Control
Level of Service		
A	Free-flow	Very low delay
B	Stable flow. Presence of other users noticeable.	Low delay
C	Stable flow. Comfort and convenience starts to decline.	Acceptable delay
D	High density stable flow	Tolerable delay
E	Unstable flow	Limit of acceptable delay
F	Forced or breakdown flow	Unacceptable delay

Source: Highway Capacity Manual 2000

Interrupted Flow

One of the more important elements limiting, and often interrupting the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals, stop and yield signs. These all operate quite differently and have differing impacts on overall flow.

Signalized Intersections

The capacity of a highway is related primarily to the geometric characteristics of the facility, as well as to the composition of the traffic stream on the facility. Geometrics are a fixed, or non-varying, characteristic of a facility.

At the signalized intersection, an additional element is introduced into the concept of capacity: time allocation. A traffic signal essentially allocates time among conflicting traffic movements seeking use of the same physical space. The way in which time is allocated has a significant impact on the operation of the intersection and on the capacity of the intersection and its approaches.

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (i.e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Specifically, level of service criteria for traffic signals is stated in terms of average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the ratio of green time to cycle length and the volume to capacity ratio for the lane group.

For each intersection analyzed the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A level of service designation is given to the control delay to better describe the level of operation. Descriptions of levels of service for signalized intersections can be found in **Table B**.

Table B
Description of Level of Service for Signalized Intersections

Level of Service	Description
A	Very low control delay, up to 10 seconds per vehicle. Movement forward (progression) is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	Control delay greater than 10 and up to 20 seconds per vehicle. There is good progression or short cycle lengths or both. More vehicles stop causing higher levels of delay.
C	Control delay greater than 20 and up to 35 seconds per vehicle. Higher delays are caused by fair progression or longer cycle lengths or both. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase does not serve a waiting line of vehicles, and overflow occurs. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	Control delay greater than 35 and up to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Control delay greater than 55 and up to 80 seconds per vehicle. The limit of acceptable delay. High delays usually indicate poor progression, long cycle lengths, and high volumes. Individual cycle failures are frequent.
F	Control delay in excess of 80 seconds per vehicle. Unacceptable to most drivers. Oversaturation, arrival flow rates exceed the capacity of the intersection. Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.

Source: Highway Capacity Manual 2000

The use of control delay, often referred to as signal delay, was introduced in the 1997 update to the Highway Capacity Manual. It represents a departure from previous updates. In the third edition of the Highway Capacity Manual, published in 1985 and the 1994 update to the third edition, delay only included stop delay. Thus, the level of service criteria listed in Table B differs from earlier criteria.

Unsignalized Intersections

The current procedures on unsignalized intersections were first introduced in the 1997 update to the Highway Capacity Manual and represent a revision of the methodology published in the 1994 update to the 1985 Highway Capacity Manual. The revised procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (i.e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

Two-Way Stop Controlled Intersections

Two-way stop controlled intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At two-way stop-controlled intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay is determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A level of service designation is given to the expected control delay for each minor movement. Level of service is not defined for the intersection as a whole. Control delay is the increased time of travel for a vehicle approaching and passing through an all-way stop-controlled intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection. A description of levels of service for two-way stop-controlled intersections is found in **Table C**.

Table C
Description of Level of Service for Two-Way Stop Controlled Intersections

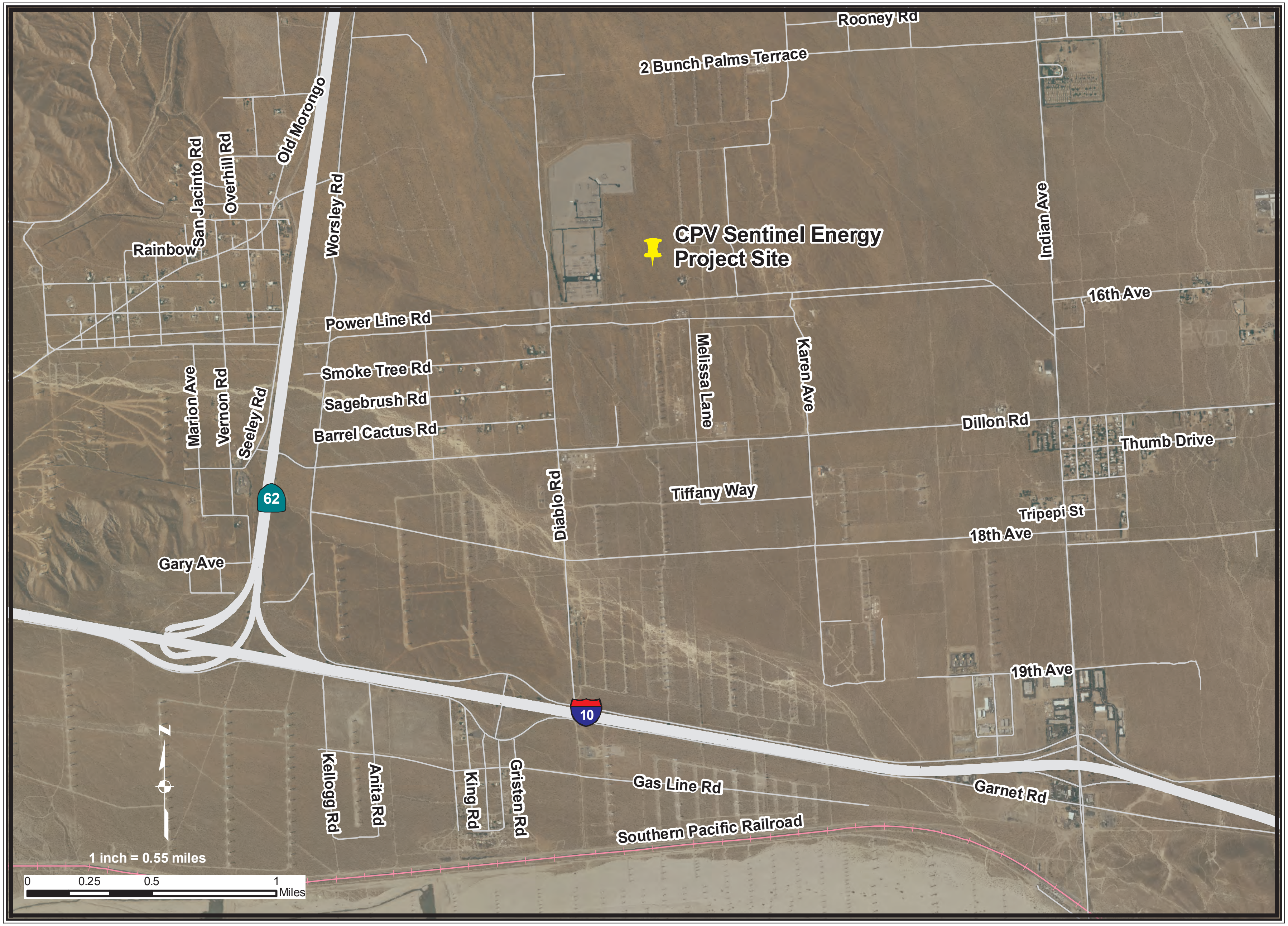
Level of Service	Description
A	Very low control delay less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of acceptable control delay greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay in excess of 50 seconds per vehicle for each movement subject to delay.

Source: Highway Capacity Manual 2000

REFERENCE

Transportation Research Board. Highway Capacity Manual 2000. Washington, D.C.

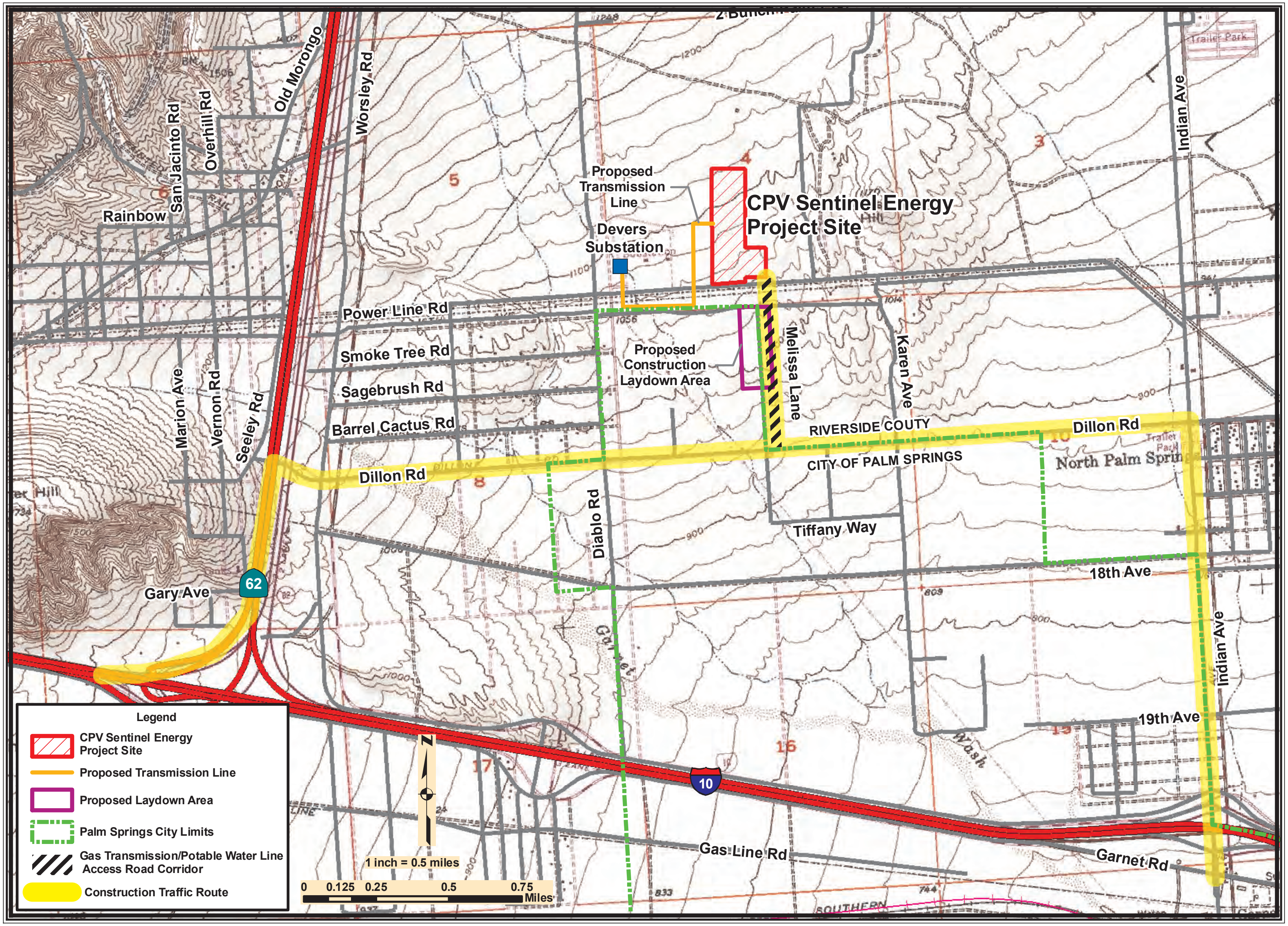
TRAFFIC & TRANSPORTATION - FIGURE 1
CPV Sentinel Energy Project - Local Roads



CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, OCTOBER 2008
SOURCE: California Energy Commission - Tele Atlas Data - 2005 NAIP DOQQ

TRAFFIC & TRANSPORTATION - FIGURE 2

CPV Sentinel Energy Project - Project Construction Traffic Route

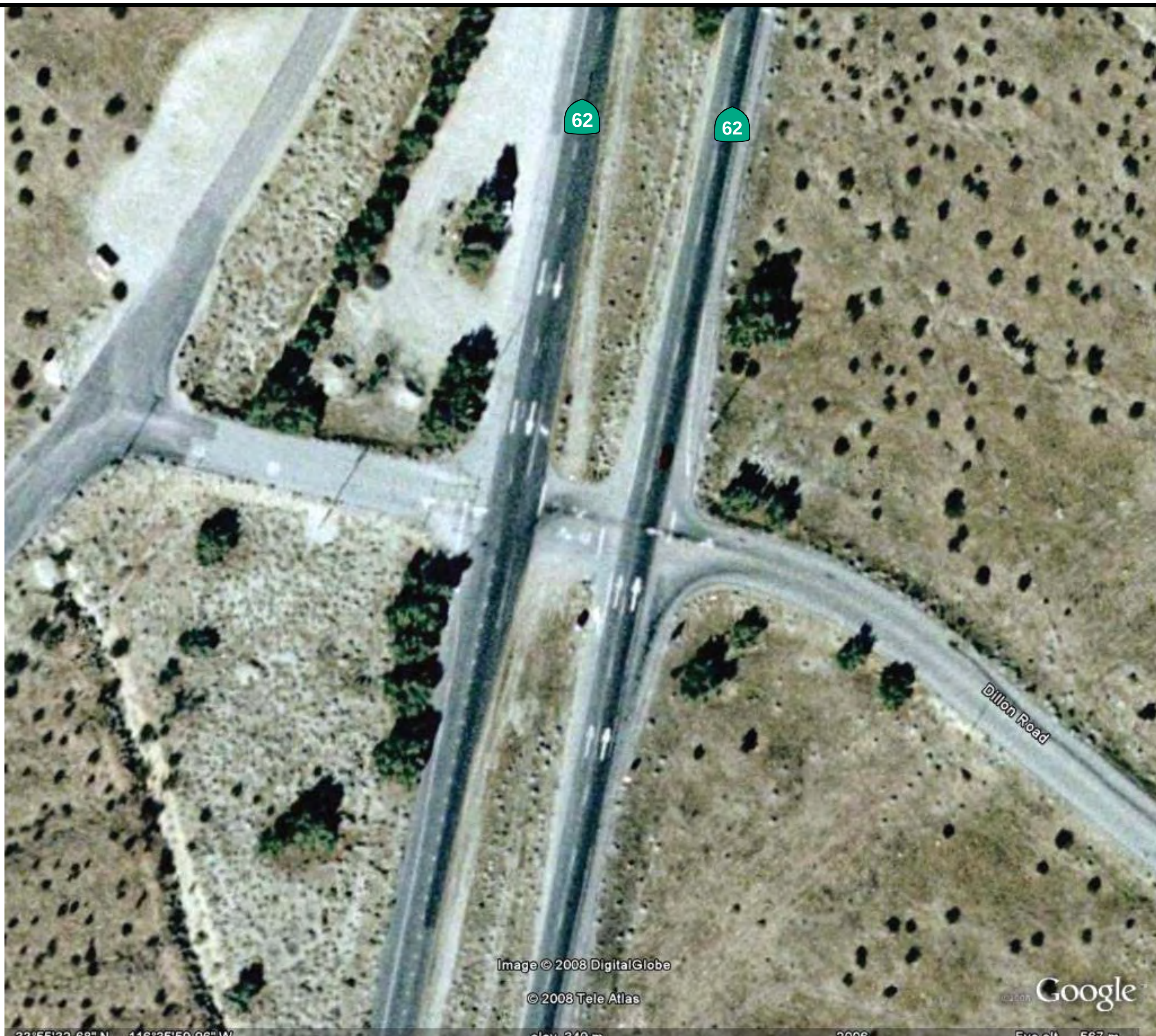


CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: California Energy Commission - TOPO Map

TRAFFIC & TRANSPORTATION - FIGURE 3

CPV Sentinel Energy Project - Aerial Photo of State Route 62 at Dillon Road Intersection



SOURCE: Microsoft Virtual Earth

TRAFFIC & TRANSPORTATION - FIGURE 4

CPV Sentinel Energy Project - North Palm Springs - Indian Avenue/Dillon Road Intersection

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: California Energy Commission - Tele Atlas Data - 2005 NAIP DOQQ

TRAFFIC & TRANSPORTATION - FIGURE 5

CPV Sentinel Energy Project - Aerial Photo of Indian Avenue/Dillon Road Intersection

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: Microsoft Virtual Earth

TRAFFIC & TRANSPORTATION - FIGURE 6

CPV Sentinel Energy Project - Project Site, Construction Laydown Area, Access and Linear Facilities

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: AFC Figure7.3-1

TRAFFIC & TRANSPORTATION - FIGURE 7

CPV Sentinel Energy Project - Proposed Recycle Water Line Crossing at South Murray Canyon Drive in City of Palm Springs

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: AFC Supplement - Revised Water Supply Plan - Figure 4

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The applicant, CPV Sentinel LLC, proposes to transmit the power from the proposed CPV Sentinel Energy Project to the Southern California Edison (SCE) transmission grid through its existing 220-kV Devers Substation 700 feet west of the project site. The project would include construction of a single-circuit, 220-kV line from the power plant to the substation. The line would (a) traverse undisturbed desert land with no nearby residents, thereby eliminating the potential for residential electric and magnetic field exposures and (b) 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 line design and operational plan for the proposed CVP Sentinel 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 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	
Riverside County General Plan, Noise Element	**References the County's Ordinance Code for noise limits.**
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
Title 8, California Code of Regulations (CCR) Section 2700 et seq. "High Voltage Safety Orders"	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.

Applicable LORS	Description
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, “IEEE Guide for Fence Safety Clearances in Electric-Supply Stations”	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
GO-131-D, CPUC ”Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California”	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring electric and magnetic fields from an operating electric line.
Fire Hazards	
State	
14 CCR Sections 1250-1258, “Fire Prevention Standards for Electric Utilities”	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

SETTING

As noted in the **Project Description** section, the site for the proposed CPV Sentinel is 37-acre parcel in unincorporated Riverside County, California, adjacent to northern limits of the city of Palm Springs. The site is currently vacant except for an unoccupied dwelling located approximately 690 feet to the south. This dwelling would be purchased by the applicant and evacuated before the start of construction leaving the nearest building as the one currently located 1,300 feet away from the site. The surrounding area is dominated by wind farms to the north, east and south, with the Southern California Edison’s (SCE’s) 220-kV Devers Substation 700 feet to the west. The Indigo Energy facility is approximately 1.8 miles to the southeast. The project site was chosen in part for its closeness to the SCE Devers Substation through which the facility would be connected to the SCE electric power grid (CPV2 2007, pp. 2-1, 4-1, 4-2, and 7.4-2).

The current proposal is to connect CPV Sentinel to the SCE electric power grid at the Devers Substation using a 220-kV single-circuit, overhead transmission line with a total length of the 3,250 feet, 1,800 feet of which would be located outside the property boundaries for CPV Sentinel and the Devers Substation. The line would be routed through an area with other 115-kV or 220-kVlines whose corridors are not readily accessible to the general public (CPV Sentinel 2007a p. 4-6).

PROJECT DESCRIPTION

The proposed CPV Sentinel line consists of the segments listed below:

- The 3,250-foot, 220-kV, single-circuit, overhead line extending from the project's switchyard to the SCE Devers Substation to the west;
- The project's on-site 220-kV switchyard from which the conductors would extend to the connection points at the Devers Substation; and
- Project-related modifications within the Devers Substation.

The proposed line would be erected on nine steel pole structures of between 85 feet and 115 feet as typical of similar SCE lines. The line would be owned, operated, and maintained by SCE so its conductors would be standard low-corona aluminum, steel-reinforced cables utilized by SCE for lines in this voltage class. The applied design and construction would be in keeping with SCE guidelines that ensure line safety and efficiency together with reliability, and maintainability (CPV Sentinel 2007a, p. 4-2 and 4-4).

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, the nearest area airport to the project site is the Palm Springs International Airport approximately 9 miles to the north and thus too far away for the line's structures to pose a collision hazard to area aircraft according to FAA criteria. The Devers Substation's heliport is located north of the project site where the line would not pose a collision hazard according to FAA requirements (CPV Sentinel 2007a, p. 7.10-3). The FAA would thus, 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 for 220-kV lines such as the proposed 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, and the nearest residence would be 1,300 feet from the line, staff does not expect any residential 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 CVP Sentinel. 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 (CPV Sentinel 2007a, p 4-2). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this mitigation approach. Condition of Certification **TLSN-4** is recommended to ensure compliance with important aspects of the fire prevention measures.

Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line, whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

The applicant's stated intention to implement the GO-95-related measures against direct contact with the energized line (CPV Sentinel 2007a, p.4-1) would serve to minimize the risk of hazardous shocks. Staff's recommended Condition of Certification **TLSN-1** would be adequate to ensure implementation of the necessary mitigation measures.

Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line's electric and magnetic fields.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). For the proposed project line, the project owner will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way. This would be accomplished through standard industry grounding practices (CPV Sentinel 2007a, p 4-1). Staff recommends Condition of Certification **TLSN-5** to ensure such grounding for CPV Sentinel.

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 CPUC, other regulatory agencies, and staff have evaluated the available evidence and concluded that such fields do not pose a significant health hazard to exposed humans. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as staff does, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability and maintainability.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- There are measures that can be employed for field reduction, but they can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

State

In California, the CPUC (which regulates the installation and operation of many high-voltage lines owned and operated by investor-owned utilities) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Publicly owned utilities, which are not within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local factors bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied in ways that prevent significant impacts on line operation and safety. The extent of such applications would be reflected by ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess the effectiveness of the applied reduction measures. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the support structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since 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, the proposed line's 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 CPUC found that there is no need for significant changes to existing field management policies. Since there are no residences in the immediate vicinity of the proposed project line, there would not be the long-term residential EMF exposures mostly responsible for the health concern of recent years. The only project-related EMF exposures of potential significance are the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the vicinity of the line. These types of exposures are short term and well understood as not significantly related to the health concern. Given the potential for human exposures, staff recommends measurements of each line's maximum fields to allow for uniform, field strength-related characterization of all lines. It is such field strength measurements that are required in Condition of certification **TLSN-3**

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 too much stronger fields while using some common household appliances than from high-voltage lines (National Institute of Environmental Health Services and the U.S. Department of Energy, 1998). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short-term, while the 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 to an optimal level;

2. Reducing the spacing between the conductors to an optimal level;

3. Minimizing the current in the line; and

4. Arranging current flow to maximize the cancellation effects from interacting of conductor fields.

The applicant has estimated the maximum field strengths typically encountered along the route of 220-kV lines at a benchmark distance of 100 feet from the line. For the electric field, this maximum intensity was estimated as 0.3 kV/m, and 7.1 mG for the companion magnetic field. Staff has verified the accuracy of the applicant’s assumptions for lines in this voltage class but recommends the on-site measurement requirements in Condition of Certification **TLSN-3** to validate the applicant’s assumed reduction efficiency. These field intensities are similar to those of SCE lines of similar voltage and current-carrying intensity.

CUMULATIVE IMPACTS AND MITIGATION

When field intensities are measured or estimated 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**. Even though low-income and minority populations exist in the immediate project area, staff has not identified any significant unmitigated adverse transmission line safety and nuisance impacts with the proposed project or cumulative impacts; therefore, no significant adverse impacts to minority or low-income populations are expected to occur.

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 the LORS listed in Table 1, 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 requirements of concern in this analysis. The actual contribution to the area's field exposure levels would be assessed from results of the field strength measurements required in Condition of Certification **TLSN-3**.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no public or agency comments on the transmission line nuisance and safety aspects of the proposed CPV Sentinel project.

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, would minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the proposed route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed CVP Sentinel project 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 and would be 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 line operation together with the corrective action taken in response to each complaint.

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 for which intensity estimates were provided by the applicant. 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.

CPVS2007a-CVP Sentinel, LLC/D. Shileikis (tn: 45770). Application for Certification of CPV Sentinel Energy project, Volumes I and II submitted to the California Energy Commission on June 25, 2007.

VISUAL RESOURCES

Testimony of Martha A. Goodavish

SUMMARY OF CONCUSIONS

Staff analyzed visual resource-related information pertaining to the proposed CPV Sentinel Energy Project. The analysis indicated the project would not introduce a significant adverse aesthetic impact under the California Environmental Quality Act and Guidelines and that with the incorporation of all staff-recommended conditions of certification, it would comply with applicable state and local laws, ordinances, regulations, and standards pertaining to aesthetic and visual resources.

INTRODUCTION

Visual resources are the visible natural and man-made features and attributes of the proposed project setting or viewshed. The following analysis evaluates potential impacts to visual and aesthetic resources from the construction and operation of the CPV Energy Project (CPV Sentinel) under criteria of the California Environmental Quality Act (CEQA) Guidelines, and the consistency of project construction and operation with applicable state and local laws, ordinances, regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The visible features of CPV Sentinel will be located in Riverside County, since the features within the city limits of Palm Springs are buried pipelines. Therefore the following discussion of applicable laws, ordinances, regulations, and standards focuses on adopted policies from the Riverside County General Plan (2003). Policies applicable to CPV Sentinel are found in two components of the plan: county-wide policies that cover the entire unincorporated portion of the County; and, within the Western Coachella Valley Area Plan (WCVAP), one of 19 area plans contained within the General Plan that provide more detailed policies to manage development within specific areas of the County. **Visual Resources Table 1** below, first identifies the policies at the county-wide General Plan level, followed by the specific policies of the WCVAP. Project conformance with these standards is discussed in the Compliance with LORS section later in this analysis.

VISUAL RESOURCES Table 1
Applicable Laws, Ordinances, Regulations, and Standards

Laws, Ordinances, Regulations, and Standards	Discussion
Federal	
	There are no federal lands within the effective viewshed of the project, nor are there any recognized National Scenic Byways, or All American Roads.
State	
California Streets and Highways Code, sections 260 through 263 – Scenic Highways: “establish the State's responsibility for the protection and enhancement of California's natural scenic beauty by identifying those portions of the State highway system which, together with adjacent scenic corridors, require special conservation treatment." (Scenic corridors consist of land that is visible from, adjacent to, and outside the highway right-of-way, and is comprised primarily of scenic and natural features. Topography, vegetation, viewing distance, and/or jurisdictional lines determine the corridor boundaries.)	State Route 62 has been an officially designated state scenic highway since 1972. The 9.2 mile route extends from Interstate 10 in Riverside County, north to the San Bernardino County line (Caltrans, 2007). There are no other state-eligible or state-designated scenic highways within the effective viewshed of the project.
Local	
County of Riverside General Plan, Chapter 3, Land Use Element, Project Design (2003): ***Policy LU 4.1*** Require that new developments be located and designed to visually enhance, not degrade the character of the surrounding area through consideration of the following concepts: a. Compliance with the design standards of the appropriate area plan land use category. c. Require that an appropriate landscape plan be submitted and implemented for development projects subject to discretionary review. d. Require that new development utilize drought tolerant landscaping and incorporate adequate drought-conscious irrigation systems.	“The project design policies are intended to address the importance of detail at the parcel and project level in achieving the vision for Riverside County. The individual project is the immediate manifestation of the desires to incorporate quality and innovative design techniques that help enhance the character of the County and contribute to the distinctiveness of the community.” (Riverside County General Plan 2003)

County of Riverside General Plan, Chapter 3, Land Use Element, Scenic Corridors: ***Policy LU 13.1***: Preserve and protect outstanding scenic vistas and visual features for the enjoyment of the traveling public. ***Policy LU 13.3:*** Ensure that the design and appearance of new landscaping, structures, equipment, signs, or grading within Designated and Eligible State and County scenic highway corridors are compatible with the surrounding scenic setting or environment. ***LU 13.4*****:** Maintain at least a 50-foot setback from the edge of the right-of-way for new development adjacent to Designated and Eligible State and County Scenic Highways. ***Policy LU 13.5:*** Require new or relocated electric or communication distribution lines, which would be visible from Designated and Eligible State and County Scenic Highways, to be placed underground. ***Policy LU 13.6:*** Prohibit offsite outdoor advertising displays that are visible from Designated and Eligible State and County Scenic Highways. ***Policy LU 13.8:*** Avoid the blocking of public views by solid walls.	**"**The intent of these policies is to conserve significant scenic resources along designated scenic highways for future generations and to manage development along scenic highways and corridors so as not to detract from the area's scenic quality." (Riverside County General Plan 2003).
County of Riverside General Plan, Chapter 3, Land Use Element, Public Facilities: ***Policy LU 25.3***: Require that new public facilities protect sensitive uses, such as schools and residences, from the impacts of noise, light, fumes, odors, vehicular traffic, parking, and operational hazards. ***Policy LU 25.5***: Require that public facilities be designed to consider their surroundings and visually enhance, not degrade, the character of the surrounding area.	"The Public Facilities area plan land use designation provides for the development of various public, quasi-public, and private uses with similar characteristics, such as governmental facilities, utility facilities including public and private electric generating stations and corridors, landfills, airports, educational facilities, and maintenance yards." (Riverside County General Plan 2003)
County of Riverside General Plan, Chapter 4, Circulation Element, Scenic	"Many corridors in Riverside County traverse its scenic resources. Enhancing

Corridors: ***Policy C 13.8***: Avoid the blocking of public views by solid walls.	aesthetic experiences for residents and visitors to the County has a significant role in promoting tourism, which is important to the County's overall economic future. Due to the visual significance of some of these areas, several roadways have been officially recognized as either State or County designated or eligible scenic highways. Enhancement and preservation of the County's scenic resources will require careful application of scenic highway standards along Official Scenic Routes. "(Riverside County General Plan 2003)
County of Riverside General Plan, Chapter 5: Multipurpose Open Space Element, Scenic Resources: ***Policy OS 21.1:*** Identify and conserve the skylines, view corridors, and outstanding scenic vistas within Riverside County.	"Scenic resources are an important quality of life component for residents of the County. In general, scenic resources include areas that are visible to the general public and considered visually attractive. …scenic resources include natural landmarks and prominent or unusual features of the landscape. Scenic backdrops include hillsides and ridges that rise above urban or rural areas or highways. Scenic vistas are points, accessible to the general public, that provide a view of the countryside." (Riverside County General Plan 2003).
County of Riverside General Plan, Chapter 5: Multipurpose Open Space Element, Scenic Corridors: ***Policy OS 22.1:*** Identify and conserve the skylines, view corridors, and outstanding scenic vistas within Riverside County.	"Many roadway corridors in Riverside County traverse its scenic resources. Enhancing aesthetic experiences for residents and visitors to the County promotes tourism, which is important to the County's overall economic future. Enhancement and preservation of the County's scenic resources will require careful application of scenic highway standards along Official Scenic Routes." (Riverside County General Plan 2003).
County of Riverside, General Plan, Western Coachella Valley Area Plan (WCVAP), Industrial Uses: ***Policy WCVAP 12.2:*** Ensure that industrial buildings do not exceed fifty feet in height.	"The Land Use Plan for Western Coachella Valley designates over 4,500 acres of land for industrial development. Several of these areas are located along the Interstate 10 corridor, with some nearby areas designated for residential

Policy WCVAP 12.4: Require the screening and/or landscaping of outdoor storage areas, such as contractor storage yards and similar uses.	uses. Preserving the visual qualities of the Valley and ensuring compatibility with adjacent uses are the focus of these policies." (Riverside County General Plan 2003)
County of Riverside, General Plan, Western Coachella Valley Area Plan (WCVAP), Light Pollution: ***Policy WCVAP 15.1:*** Where outdoor lighting is proposed, require the inclusion of outdoor lighting features that would minimize the effects on the nighttime sky and wildlife habitat areas. ***Policy WCVAP 15.2:*** Adhere to the lighting requirements of the County Ordinance Regulating Light Pollution for standards that are intended to limit light leakage and spillage that may interfere with the operations of the Palomar Observatory.	"The continued growth of urban activities throughout the Valley has many consequences. One of the attractions for residents is the brilliance of the nighttime sky on clear nights, unencumbered by lighting scattered over a large urban area. Wildlife habitat areas can also be negatively impacted by artificial lighting. As development continues to encroach from established urban cores into both rural and open space areas, the effect of nighttime lighting on star-gazing and open space areas will become more pronounced." (Riverside County General Plan 2003) "…... the Mount Palomar Observatory, located in San Diego County, requires darkness so that the night sky can be viewed clearly. The presence of the observatory necessitates unique nighttime lighting standards in several areas of Riverside County." (Riverside County General Plan 2003) The project is in Zone B (within 45 miles) of the Mount Palomar Nighttime Lighting Policy Area.
County of Riverside, General Plan, Western Coachella Valley Area Plan (WCVAP), Scenic Highways: ***Policy WCVAP 18.1:*** Protect the scenic highways in the Western Coachella Valley from change that would diminish the aesthetic value of adjacent properties in accordance with policies in the Scenic Corridors sections of the Land Use, Multipurpose Open Space, and Circulation Elements.	See discussion of scenic highways above.

SETTING

REGIONAL LANDSCAPE SETTING

The proposed CPV Sentinel is located at the northwest end of Western Coachella Valley, in an unincorporated area of Riverside County and in the city of Palm Springs **(Visual Resources Figure 1)**.

The Western Coachella Valley encompasses over 650 miles surrounded by several mountain ranges: the San Bernardino Mountains to the northwest; Little San Bernardino Mountains to the northeast; Indigo Hills to the southeast, and the most visually dramatic of the ranges, the Santa Rosa Mountains (a national scenic area) and San Jacinto Mountain to the south and southwest. The valley consists of broad open expanses of low-lying desert flatlands and rolling foothills. Vegetation dots the desert landscape, and consists primarily of scrub-like shrubs typically three to five feet in height.

The project site is located at the northwest end of the valley, within Riverside County's *San Gorgonio Wind Energy Area* (Riverside County 2007). This area extends west of Indian Avenue to the foothills north and west, south to the city of Palm Springs, and west through the I-10 corridor. The area is generally characterized by a large expanse of open desert, with isolated pockets of development, surrounded by mountainous terrain. Due to the constant prevailing westerly winds through San Gorgonio Pass, this area supports the highest concentration of commercial wind energy development in Riverside County. Thus, much of the landscape in the vicinity of the project is dominated by wind turbines and related facilities.

Another aspect of the prevailing westerly winds through the San Gorgonio Pass is the change in air quality that can occur during the day as smog from the Los Angeles Basin blows into the valley and reduces visibility. This can be seen in figures presented in the Application for Certification (AFC) (CPVS 2007a, Figures 7.11-10 and 7.11-12).
Other prominent features in this landscape include utility corridors such as the high voltage electrical transmission lines along Power Line Road, and at the Devers Substation. I-10, a major travel corridor between the greater Los Angeles area and Nevada, is two miles to the south and has been designated by Riverside County as an eligible county scenic highway (Riverside County 2003). South of I-10, the Colorado River Aqueduct and the Whitewater River parallel I-10. State Route (SR) 62, a state-designated scenic highway, is 1.3 miles west of the project and is the primary access route to Joshua Trees National Monument. One mile to the north of the project site is Pierson Boulevard, a local arterial road connecting the community of Desert Hot Springs with SR 62. Recent transportation improvements, including landscaping and pedestrian crosswalks have resulted in Pierson Boulevard being called the new "Main Street" by the city of Desert Hot Springs (Desert Hot Springs, city of 2008).

Landscape views are panoramic in scale. Foreground and middle ground views are dominated by horizontal expanses of desert terrain interspersed with low-growing, spherically-shaped shrubs. Distant views are of mountains and hills surrounding the valley. Much of the visual interest in this landscape comes from the complexity of form, line and texture of the mountain terrain that surrounds the valley. San Jacinto Mountain to the southwest and the San Bernardino Mountains to the northwest in particular, offer dramatic views of steep, rugged terrain, and seasonal snow-capped peaks. Mountain colors are similar to those of the desert landscape, although atmospheric perspective makes the mountains appear bluish **(Visual Resources Figure 2)**.

According to the AFC (CPVS 2007a, page 7.11-1), there are approximately 4,000 wind turbines located in the vicinity of the project. To the north and east there is a wind generation facility with approximately 100 wind turbines. To the south and southeast are more wind turbine facilities with 100 or more wind turbines. Turbine heights range from about 100 to 300 feet tall, with towers 80 to 225 feet in height, and rotor blades adding another 16 to 105 feet. Tower structures are typically light in color and range in form from steel pylons to heavy lattice structures similar to high voltage electrical transmission towers. Associated features typically include mobile home-like service buildings, power lines, and dirt access roads. The AFC describes the appearance of the landscape as "shimmering" when there is a modest or heavier wind. This was not observed by staff during the field reconnaissance since wind speeds were low and limited turbine spinning was observed.

The project site is generally surrounded by wind farms and energy projects in a relatively isolated rural area. Pockets of single-family residential lots of five acres or less are scattered throughout the area. The site is almost completely surrounded by industrial facilities involved in energy production or distribution. To the west of the proposed project is the 105-acre Devers Substation containing numerous, large vertical components. The turbines in combination with the existing transmission lines, towers and the Devers Substation have altered and dominate the existing landscape setting such that the general level of existing visual quality in the immediate project vicinity is moderately low, although visual quality classifications vary by view location due to the orientation and duration of the view.

PROJECT DESCRIPTION

Project Location

The project is located approximately 1.3 miles east of State Route (SR) 62, 1.7 miles north of I-10, and 1.3 miles west of Indian Avenue. Power Line Road runs east-west along the south side of the property. The project power plant would be constructed on a 37-acre site located east of the Devers Substation within unincorporated Riverside County with pipelines for gas and a recycled water main to be located within the city of Palm Springs.

The 37-acre power plant site is currently vacant. An unoccupied dwelling and detached garage at the southeast corner of the site were demolished in January 2008. The site is approximately one-half mile long by 1,000 feet at its widest point. The project site generally slopes down to the southeast and ranges in elevation from about 1,180 to 980 feet elevation. The site surface contains gravel, cobbles, and occasional boulders up to one foot in diameter. Vegetation consists of sparse scrub brush. The area that surrounds the site is characterized by industrial uses associated with wind energy and transmission infrastructure, interspersed with pockets of low density residential development. The Devers Substation is approximately 700 feet to the west of the proposed project site and the nearest occupied residence to the power plant site is approximately 330 feet to the east. The site is designated PF (Public Facility) in the Riverside County *General Plan* (Riverside County 2003) and zoned W-2 (Controlled Development Area).

Project Construction

According to the AFC (CPVS 2007a, section 2.3) construction would include the disturbance or scraping of land and removal of vegetation on approximately 85 acres of land. Of this, 24.5 acres associated with pipeline right-of-ways would be returned to pre-project conditions after the project is constructed. Sixty one acres would be permanently disturbed: 37 acres for the project site; 14 acres for the laydown area; 9.5 acres for the project linear right-of-ways (pipelines and roads) (CPVS 2007a, section 2.3) and; 0.1-acre for the recycled water pipeline (LW 2008a, section 5.11.1).

The proposed 14-acre construction laydown area is an undeveloped area within an existing wind farm. This area is currently used for equipment laydown by the wind farm operator. The project owner will cover this area in gravel, and the gravel will remain after project construction is complete in order to facilitate continued use of this area for equipment laydown by the wind farm operator. Parking for construction workers will be located within the laydown area.

Natural gas would be supplied to the project site via the extension of a buried 2.6-mile long, 24-inch diameter natural gas line extending from the Indigo Energy Facility to the CPV Sentinel site. Potable water would be supplied to the project site via a 3,200-foot long extension of a buried potable water supply line. A buried 900-foot long recycled water line extension would provide recycled water to the Palm Springs National Golf from an existing recycled water main on South Murray Canyon Drive in Palm Springs as part of the CPV Sentinel Revised Water Supply Plan (LW 2008a). The gas and water pipelines would be buried approximately three feet underground and there would not be above ground components, except for an occasional above ground marker. Following construction, revegetation would occur along the project linear rights-of-way (pipelines and temporary road alignments), and at the tensioning and pulling sites.

Project Operation

The most visible features of the project would be the eight combustion turbine generators and associated 90-foot tall exhaust stacks, and the nine 85-115-foot high steel poles associated with the 220-kV transmission line. See **Visual Resources Figure 3, 4, and 5** which depict the general arrangement and plant elevations for CPV Sentinel (CPVS 2007a, Figures 2.4-1, 2.4-2 and 2.4-3). **Visual Resources Table 2** below summarizes the description of the dimensions, colors and materials of the major project features.

VISUAL RESOURCES Table 2
Dimensions and Visual Characteristics of Major Project Features

Major Project Feature	Feature Height (feet)	Width (feet)	Length (feet)	Color	Materials
8 Combustion Turbine Generators (CTGs)	40 (55 for VBV Duct)	90	130	Gray	Steel
8 CTG Stacks	90	30 (13.5 in diameter)	67	Gray	Steel
Cooling Tower (5-cell)	36 (46 ft stack)	55	211	Light Earth Tone	Fiberglass
Cooling Tower (3-cell)	36 (46 ft stack)	55	127	Light Grey or Off-white	Fiberglass
Cooling Tower Building/Warehouse	20 ft eave	60	125	Light Grey or Off-white	Steel
Operations Building	20 ft eave	70	130	Light Earth Tone	Steel
Gas Compression Building	20 ft eave	60	120	Light Earth Tone	Steel
Gas Compression Building	20 ft eave	60	90	Light Earth Tone	Steel
Transformer Containment with GSU	24	24	32	Light Gray	Concrete Containment & Steel GSU
Unit Control Building	12 ft eave	20	40	Light Earth Tone	Steel
Raw Water Storage Tank	36	80 ft diameter	-	Light Earth Tone	Steel
Treated Water Storage Tank	36	70 ft diameter	-	Light Earth Tone	Steel
Fire Water Pump Enclosure	12	11	30	Light Earth Tone	Steel
Switchyard, Buses & Towers	85-115 ft poles	100 ft right-of-way	2,300	Aluminum Bus, Galvanized Towers	Aluminum Bus, Galvanized Towers
Transmission Line	-	-	2,300		
Switchyard Building	16 ft eave	25	60	Light Earth Tone	Steel

Source: AFC Sections 4.1, 4.2.3 and Table 7.11-2 (CPV Sentinel 2007a)

Plant Night Lighting

According to the AFC (CPVS 2007a, section 7.11.2-4), operational night lighting would be restricted to areas required for safety, security, and operation. Exterior lighting would be shielded, directionally oriented and motion or timing sensors would be used.

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, Energy Commission staff reviews the project using the 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?

Water Vapor Plumes

In addition to the four CEQA questions above, another visual issue pertaining to aesthetics addressed by staff in this report is the visual impact associated with water vapor plumes emitted from the cooling towers.

Visual impacts of vapor plumes are more difficult to evaluate than structures because they vary in both size and duration depending upon operating and meteorological conditions. Vapor plumes are generally associated in the public's mind with heavy industrial land uses and pollution, and thus tend to be regarded negatively by visually sensitive observers. Vapor plumes may attain very large size and thus affect considerably larger areas than a power plant's structures.

The visual impact of vapor plumes was evaluated by Energy Commission air quality staff (Appendix VR-3). Impact assessment is based on the results of a "visible plume modeling analysis". A visual impact would be expected to occur if the modeling analysis shows vapor plumes to occur for 20 percent or more of seasonal daytime clear hours, during the period of November through April (when plumes are most prevalent in the project setting). Nighttime hours without fog are also considered in cases where night illumination could result in potential visual impacts from plumes.

The 20 percent criterion recognizes that plumes occurring less frequently than 20 percent of the seasonal period would be sufficiently infrequent as to represent a less than significant impact regardless of size. The seasonal criterion reflects the tendency of visible plumes to be concentrated in certain seasonal periods and not in others. The clear criterion reflects the fact that plumes may often form in conditions that are also conducive to fog, rain and overcast weather, but are less likely to be highly visible or perceived as substantially adverse under such conditions, since visibility and contrast of plumes is lower under such conditions.

Key Observation Points (KOPs)

Staff evaluates the existing visible physical environmental setting from representative fixed vantage points, called *key observation points* (KOP). 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 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 KOPs that would most clearly represent the major visual effects of the proposed project as they would be experienced by key sensitive viewing groups. In addition to the KOP photograph(s), staff reviews

[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.

landscape character photos that help provide a visual overview of a project site, its vicinity, and the selected KOP area. **Visual Resources Figure 6** shows the location of the five KOPs used in this analysis:

- KOP 1 – View from I-10, looking North;
- KOP 2 – View from Dillon Road, looking Northwest;
- KOP 3 – View from Diablo Road, looking North;
- KOP 4 – View from Esparta Avenue near SR 62, looking Southeast;
- KOP 5 – View from Western Avenue, looking Southwest.

Staff's analysis of the project's effect on each KOP is presented under "Operation Impacts. Significant impacts are identified by staff where the level of visual change caused by the project would exceed acceptable levels in the context of a KOP's overall visual sensitivity, a measure that reflects the anticipated sensitivity of the viewing public to the visual effects of the proposed project. Please refer to **APPENDIX VR-1** for a complete description of staff's visual resources evaluation process.

APPENDIX VR-2 provides terms defined by staff for the purpose of this analysis.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The impact discussion is presented under the following topics as listed in the CEQA Guidelines Appendix G: scenic vistas, scenic resources, visual character or quality, and light or glare.

Scenic Vistas

"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 or along a corridor or opening that exhibits a high level of visual quality, particularly including viewpoints identified as having scenic value in public documents. There are no specific scenic vista points of notable importance in the project viewshed. None of the KOPs would experience substantial view intrusion or obstruction as a result of the project, as discussed further under each individual KOP in the section, "Operation Impacts," below.

Scenic Resources

"Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor?"

Scenic resources for the purpose of this analysis include a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique visual/historical importance to a community (a tree linked to a famous event or person, an ancient old growth tree); historic building; or a designated federal scenic byway or state scenic highway corridor.

The proposed project site is located 1.8 miles east of SR 62, a state-designated scenic highway. According to Caltran's *Scenic Highway Guidelines* (Caltrans 2007, section 1, Scenic Highway Program History) the corridor of a scenic highway is defined as the "…land that is visible from, adjacent to, and outside the highway right-of-way, and is comprised primarily of scenic and natural features. Topography, vegetation, viewing distance, and/or jurisdictional lines determine the corridor boundaries." Based on this definition, the proposed project could be within the scenic corridor of SR 62, as is the Devers Substation and the numerous wind turbines surrounding it. However, more scenic views of the Santa Rosa and San Bernardino Mountains exist to the south and west.

Assuming the proposed project lies within the scenic corridor of SR 62 (no evidence was obtained by staff that showed a defined scenic corridor boundary for this route), the visual impact of the project on the landscape would not result in a significant and adverse impact to the existing scenic corridor of SR 62. Existing industrial development associated with wind turbine generation and electrical transmission development dominate the flat desert landscape of this corner of the Western Coachella Valley. While the project would contribute to the existing industrial character, and introduce solid forms and cylindrical towers, the scale of the power plant with maximum stack heights of 90 feet, would appear somewhat dwarfed relative to the tall wind turbines that dot the landscape with maximum heights of 200 to 300 feet. Therefore, in the context of the existing level of scenic quality, the project would result in an adverse visual impact on the scenic corridor of SR 62. However, this impact on the scenic resources of SR 62 would not be significant due to the poor existing visual condition.

Visual Character or Quality

"Would the project substantially degrade the existing visual character or quality of the site and its surroundings?"

The project's visual setting is described in terms of existing visual character and quality. Visual character refers to formal attributes of the visual setting and is descriptive. Visual quality is an evaluative measure that reflects a judgment of a landscape's attractiveness as determined by characteristics broadly recognized as valued and preferred by most viewers. These include the presence of natural features, particularly vegetation and water, and visual attributes typically identified as preferred or valued in various professionally accepted assessment methodologies, such as vividness, unity and intactness (see Appendix VR-2 for definitions for visual analysis terms). Visual quality is rated in the context of the project's broad regional landscape setting. That is, landscapes that are common within the region are assigned moderate visual quality. Landscapes that are unusually scenic and vivid within the region are given a high visual quality rating.

The project aspects evaluated under this criterion are broken down into two categories: Construction Impacts and Operation Impacts.

Construction Impacts

Construction activities for the CPV Sentinel project would occur over an approximately 18-month period. Construction activity is proposed to occur from 6:00 a.m. to 7:00 p.m.

Monday through Saturday, although construction periods of 24 hours a day, seven days a week would occur during the start-up phase and during other phases of project construction, according to the AFC (CPVS2007a section 7.11.2-4). To the extent possible, during these times, lighting would be pointed downward toward the center of the site where activities are occurring, and task-specific lighting would be used to the extent practical while complying with federal and state worker safety regulations.

Construction activities would begin with site clearing and grading, followed by the delivery of temporary construction buildings, power plant equipment and supplies. Construction of foundations, underground electrical and underground mechanical equipment would occur next after which above ground structures, electrical and mechanical equipment would be built.

Construction of the power plant, electric transmission line, water and gas underground pipelines and access road would cause temporary visual impacts due to the presence of equipment, materials, and workforce. These impacts would occur at the proposed power plant site and construction laydown area, and along the rights of way for the transmission line, and the water and gas supply pipelines. Traffic associated with the work force and equipment deliveries would increase on Dillon Road. Construction of the recycled water line to the Palm Springs Golf Course would occur in the road right of way and on the golf course greens and would result in minimal level of visual disturbance. The applicant proposes to bury project related linear pipelines. With the burying of pipelines and the restoration of the ground surfaces, the linear routes and the laydown area would not create a change to the existing visual condition.

Construction activities will be seen primarily by residents who access their residences using Diablo Road. Construction activities could also be seen from travelers on, and residences near Dillion Road and SR 62. Grading of the project site and the use of large equipment could be noticeable from more distant viewing locations such as Western Avenue and I-10. Since visual quality and visual sensitivity is low to moderate, visual impacts would be less than significant.

Nighttime Construction Impacts

During nighttime construction periods, illumination that meets state and federal worker safety regulations will be required. As a result, there would be times during the construction period that the project site would be brightly illuminated at night. Night lighting from the project would be noticeable from the surrounding area to varying degrees.

Impact Significance

Night lighting associated with project construction would result in a potentially significant visual impact. Night lighting for residences near KOP 3 (Diablo Road) could potentially be significant given the foreground viewing distance. Adverse light impacts could potentially occur from bright facility night lighting.

Mitigation

Staff recommends adoption of Condition of Certification **VIS-2** to reduce perimeter and exterior night lighting associated with construction activities at the project site and construction laydown areas.

Residual Impact Significance after Mitigation with Staff-Recommended Measures

Residents are considered to have high sensitivity to night lighting impacts. Typical bright industrial lighting used in facility construction could result in a highly dominant, strongly contrasting element in the nighttime landscape. Under worst-case conditions with bright, industrial lighting left on throughout the night, significant adverse impacts could be anticipated on at least those residents nearest the project site.

As described under staff-recommended Condition of Certification **VIS-2**, the project site and construction laydown areas would be of minimal brightness consistent with safety; lighting would be shielded and directed to eliminate all direct off-site illumination and all upward (backscatter) illumination; and lighting for maintenance purposes would be kept off when not needed. With these measures, the facility would impart a somewhat industrial character to the nighttime viewshed within the foreground of the project site. With adoption of **VIS-2**, the anticipated visual change at nighttime would be low, resulting in impacts to residences that would be less-than-significant.

Operation Impacts

Operational impacts to the setting's existing visual character and quality are assessed from the five KOPs identified by the applicant in the AFC (CPVS 2007a, section 7.11.2.3). Staff concurs with many of the evaluations and rationales underlying the AFC's conclusions on potential visual impacts to the five KOPs as presented.

KOP 1 − View from I-10, Looking North

Visual Resources Figure 7 represents the existing view westbound travelers on I-10 experience of the project site. KOP 1 is located on the shoulder of westbound I-10, with the view of the project site to the north, approximately 1.75 miles away. Approximately 89,400 average daily trips are estimated for this segment of I-10 by 2009 and the posted speed limit is 70 miles per hour (mph) (CPVS 2007a, section 7.10.1.1). The segment of I-10 between Indian Avenue and SR 62 is generally east-west, with travelers' cone of vision oriented similarly. For westbound travelers, visual interest would primarily be towards the west and Santa Rosa and San Bernardino Mountains.

Visual Sensitivity

The overall visual sensitivity of KOP 1 is *Moderately Low.* Visual sensitivity is the composite evaluation of existing visual quality, anticipated viewer concern for visual resources, and viewer exposure, each of which is discussed below.

Visual Quality

The existing visual quality is *Low*. Views toward the project site from KOP 1 are predominantly industrial in character. The terrain is flat, brownish tan and dotted with dark green scrub vegetation. Linear rows of wind turbines in predominantly north-south orientations dominate the foreground (0 to 0.5 miles) and middleground (0.5 to 4 miles).

A variety of turbine structures (lattice and pylon) and sizes (100 to 300 feet), as well as fences, roads, and small structures give a cluttered appearance to the landscape. Distant views, when haze does not limit visibility to the middleground, are of the San Bernardino and Little San Bernardino mountains. No vivid landscape or cultural features can be seen in the KOP 1 viewshed and the industrial character of wind generation facilities dominate the view.

Viewer Concern

Viewer concern from KOP 1 is considered to be *Moderate.* Travelers on I-10 are assumed to be a combination of local residents, workers and travelers with a moderate level of visual concern for the scenic quality.

Viewer Exposure

Viewer exposure from KOP 1 is *Low.* Factors that determine viewer exposure are number of viewers, duration of view, and visibility of the project. While the number of viewers from KOP 1 is high (approximately 142,000 vehicles per day), the duration of view is relatively short (3 minutes) assuming three miles of travel through the KOP 1 viewshed at speeds of 60 miles per hour. Above all, the visibility of the project would be minimal due to the distance of the project from I-10 (1.8 miles from the project site) and the intervening terrain, presence of wind turbines, and atmospheric haze.

Visual Change

Visual Resources Figure 8 presents a photo simulation of the proposed project after completion of construction as seen from KOP 1. The most visible features of the project would be the eight CTG stacks, each of which would be 90 feet tall, gray, and cylindrical in form. The 3,200 foot long transmission line would be strung on 85- to 115-foot tall, steel poles. Except for the two cooling towers, which would be 46 feet high, light gray or earth tone and cylindrical in form, most other project features would be in the 12- to 20-foot high range (see **Visual Resources Table 2).** The intervening wind turbines between the project site and KOP 1 range in height from 100 to 300 feet.

As seen from KOP 1, the overall visual change to the viewshed is *Low*. Visual change is a composite evaluation of visual contrast, project dominance, and view disruption, each of which is discussed below.

Visual Contrast

The visual contrast introduced by the project features would be *Low* due to the distance of the project from I-10 (1.8 miles) and the visual dominance of the wind turbines in the viewshed. From this KOP the project would not be readily discernable, especially at I-10 travel speeds. The project would result in minimal levels of contrast in form, line, color or texture from this KOP. The form and line of the project structures appear small from this distance and the heights of the stacks and transmission poles are not readily noticeable in the context of the existing landscape that is dominated by wind turbines. The light grays, off-whites and earth tones of the project features appear lighter in color than the surrounding landscape, resulting in moderate color contrast. Textures associated with the project features would be indiscernible from this distance.

Project Dominance

Project dominance as seen from KOP 1 would be *Low*. The apparent size and scale of the project as seen from KOP 1 would not be readily discernable. This would be primarily due to the distance from which the project is seen, and secondly, due to the wind turbines in the immediate foreground that dominate the view and additional wind turbines between the project site and this KOP.

View Disruption

The project would not disrupt any scenic views or vistas from KOP 1. The project would appear relatively small and not readily discernable from this KOP.

Impact Significance

Staff concludes the introduction of the project into the landscape of the KOP 1 viewshed would not result in substantial degradation of visual resources. The *Moderately Low* overall visual sensitivity, combined with the *Low* overall visual change would result in a less than significant visual impact. The CPV Sentinel project would appear as a relatively small light colored object as seen in the middleground distance zone of KOP 1.

KOP 2 – View from Dillon Road, Looking Northwest

Visual Resources Figure 9 represents the existing view that westbound travelers on Dillon Road and residents to the south would experience of the project site. KOP 2 is located on the westbound shoulder of Dillon Road, with the view of the project site to the northwest, approximately 1.2 miles away (middleground distance zone). This segment of Dillon Road runs east-west between SR 62 and Indian Avenue. It is a two-lane collector road with a posted speed limit of 55 mph (CPVS 2007a, 7.10.1.1). It is not a Riverside County scenic route. Staff observed the road to be used primarily by local residents, and workers. There is a wind turbine tour operator on Dillon Road that offers van tours of wind generation facilities. The cone of vision for travelers would be primarily east and west, with most of the visual interest towards the mountains to the west.

Visual Sensitivity

The overall visual sensitivity of KOP 2 is *Moderate.* Visual sensitivity is a composite evaluation of existing visual quality, anticipated viewer concern for visual resources, and viewer exposure, each of which is discussed below.

Visual Quality

The overall existing visual quality is *Moderately High* from KOP 2. Existing foreground (0 to 0.5 mi.) and background views (4 mi. and beyond) to the north of Dillon Road exhibit a visual quality that ranges from moderately high in the foreground to very high in the background. In contrast, middleground views (0.5 to 4 mi.), where the project would be located are dominated by human alterations associated with energy-related development, resulting in a low visual quality.

Panoramic views of the San Bernardino Mountains and foothills dominate the view from KOP 2. The mountain landscape appears near natural with no noticeable human alterations. The rugged terrain and atmospheric perspective creates a high degree of vividness which in combination with the undisturbed appearance of the mountain foothills, gives this background view a high degree of visual unity, and high visual quality.

The immediate foreground view north of Dillon Road appears near natural from KOP 2. The desert landscape appears intact and there are no visual obstructions or human modifications dominating the view. While the desert landscape has a high degree of unity and intactness, vividness is low, giving a moderately high visual quality to the foreground landscape.

The presence of energy related development in the middleground landscape, where the project would be located, results in a low level of scenic intactness due to the discordant features of transmission towers and poles, wind turbines, and electrical substation structures. The middleground view exhibits no vividness or unity and the visual quality of the middleground landscape is very low. However, the distance from which these existing alterations are seen, combined with the dominance and intactness of the foreground and background landscapes, minimizes the visual prominence of the middleground.

Viewer Concern

Viewer concern from KOP 2 is considered to be *Moderate.* Travelers on Dillon Road are assumed to be a combination of workers and local residents with a moderate level of visual concern for the scenic quality. Staff observed that this segment of Dillon Road was not heavily used, and traffic volumes are considered to be low according to the AFC (CPVS 2007a, section 7.10.1.1).

Viewer Exposure

Viewer exposure from KOP 2 is *Low.* Factors that determine viewer exposure are number of viewers, duration of view, and visibility of the project. Viewers would include travelers on Dillon Road, which has low traffic volumes, and residents from the relatively few residences to the south of KOP 2. Therefore, the number of viewers is considered to be low. Viewing duration is considered low since travel speeds on Dillon Road are 55 mph, and there are no traffic lights and few stop signs. Auto passengers would experience brief periods of seeing the project area; it would not be in the driver’s typical cone of vision. The few residents to the south could have longer duration views. The visibility of the project however would be low due to the distance from which the project site is seen, and the greater visual dominance of the surrounding industrial development.

Visual Change

Visual Resources Figure 10 presents a photo simulation of the proposed project after completion of construction as seen from KOP 2. The project is seen in the simulation to the left and partially behind Devers Hill and to the right and partially in front of the Devers Substation. The project appears as a massing of solid forms in varying shapes and colors: low rectangular and cylindrical forms with the eight narrow CTG stacks extending to near the level of nearby power poles (85-115 feet). Structures are painted a combination of grays, tans, and earth tone colors. (see **Visual Resources Table 2).**

As seen from KOP 2, the overall visual change to the viewshed is *Low*. Visual change is a composite evaluation of visual contrast, project dominance, and view disruption, each of which is discussed below.

Visual Contrast

The visual contrast introduced by the project would be *Low.* The background views of the San Bernardino Mountains and foothills, in combination with the open undeveloped character of the foreground landscape, dominate the view from KOP 2 and minimize the visual contrasts of the project seen in the middleground such that the project does not appear readily noticeable. In the middleground landscape, existing alterations dominate the view with vertical lines associated with transmission towers and poles, and wind turbines. The dominance of these vertical lines minimizes visual contrasts in form and line associated with the project which appears low to the horizon line compared to the surrounding industrial elements. The distance from which the project is viewed minimizes contrasts in color and texture with the surrounding landscape. In conclusion, the project would result in minimal levels of contrast in form, line, color and texture from this KOP.

Project Dominance

Project dominance as seen from KOP 2 would be *Low*. The apparent size and scale of the project as seen from KOP 2 would not be readily noticeable to most travelers on Dillon Road and nearby residents. This is primarily due to the distance from which the project is seen, and relatively low elevation of the project compared to adjacent transmission towers and wind turbines, and lastly, due to low contrasts in color between the project and surrounding desert landscape.

View Disruption

The project would not disrupt any scenic views or vistas from KOP 2. The project would not be seen against the backdrop of the San Bernardino Mountains due to the relatively low (90 feet) maximum height of the power plant structures. While the project would not detract from distant views of the San Bernardino Mountains, it would intensify to a relatively minor degree, the overall visual disruption of the industrial structures already present in this view. In conclusion, the project would detract from, but not disrupt the scenic views of the San Bernardino Mountains.

Impact Significance

Staff concludes the introduction of the project into the landscape of the KOP 2 viewshed would not result in substantial degradation of visual resources. The *Moderate* overall visual sensitivity, combined with *Low* overall visual change would result in a less than significant visual impact.

The CPV Sentinel project would appear as a small massing of rectangular and cylindrical forms, similar in color to the surrounding landscape, and back-dropped against the foothills of the San Bernardino Mountains. Due to the middleground distance from which the project is viewed, and the expansiveness of the view, the project would not result in a substantial change in the existing vividness, intactness and/or unity of the landscape setting as seen from KOP 2.

KOP 3 – View from Diablo Road, Looking Northeast

Visual Resources Figure 11 represents the existing condition from Diablo Road near Power Line Road, looking northeast through the transmission line towers and lines along Power Line Road and the Devers Substation towards the proposed project site, 0.4 miles away. Diablo Road runs north-south; beginning at Dillon Road and ending at Power Line Road, it is unpaved and used primarily by local residents and substation workers. Approximately a dozen residences are located to the west of Diablo Road, between Power Line and Dillon roads.

Visual Sensitivity

The overall visual sensitivity of KOP 3 is *Moderate.* Visual sensitivity is a composite evaluation of existing visual quality, anticipated viewer concern for visual resources, and viewer exposure, each of which is discussed below.

Visual Quality

The existing visual quality of the KOP 3 viewshed is *Low*. Existing foreground (0 to 0.5 mi.) views to the northeast are dominated by steel lattice transmission towers and lines and wood power poles and lines resulting in a very low visual quality. The immediate middleground landscape is dominated by steel transmission structures associated with the Devers Substation, giving the middleground landscape a low visual quality as well. Distant views of the Little San Bernardino Mountains appear visually intact, with high visual quality, but are partially screened due to the intervening electrical transmission facilities, several of which are sky-lined from this location (extend above the background landscape and seen against the sky, increasing visual contrast and dominance).

The dominance of energy-related development in the foreground and middleground (where the project would be located) results in a very low level of visual intactness due to the discordant features of transmission towers and poles, and electrical transmission structures associated with the Devers Substation. The native landscape (without human alteration) is desert floor and foothills, a common landscape with little vividness. Visual unity of the desert landscape is moderate, but the predominance of human alterations breaks up the desert landscape with numerous discordant vertical elements.

Viewer Concern

Viewer concern from KOP 3 is considered to be *High* since Diablo Road provides residential access to approximately one dozen homes located west of Diablo Road, north of Dillon Road, east of SR 62 and south of Power Line Road. Diablo Road is a dirt road that receives minimal use, primarily from local residents and workers associated with the Devers Substation. Residents would experience foreground views of the project from Diablo Road. While the primary view of interest from residences would be towards San Jacinto Mountain, other views could be oriented toward the northeast and the project site as people use Diablo Road to access their property. This KOP is representative of the closest views residents would experience of the project. Residential viewers are considered to have a high level of viewer concern while workers associated with the substation and transmission lines are considered to have low viewer concern.

Viewer Exposure

Viewer exposure from KOP 3 is *Moderate.* Factors that determine viewer exposure include number of viewers, duration of view, distance, and visibility of the project. The number of viewers would be low, considering the relatively few residences in the area. The duration of view and visibility of the project from the individual residences is not known, however it is assumed residents would experience at least short term views of the project when traveling on Diablo Road. Views that exist would be at foreground distance. Staff observed that most homes could not be seen from this KOP due to vegetative screening, fencing, and intervening topography. Based on this, it is assumed viewer exposure of the residents in this area would be moderate.

Visual Change

Visual Resources Figure 12 presents a photo simulation of the proposed project after completion of construction as seen from KOP 3. The project is seen in the simulation to the right of the Devers Substation and to the left of the base of Devers Hill (on far right of image). The project is seen through the existing transmission line and substation. The most visually prominent features from this KOP are the eight 90-foot high CTG stacks. The gray cylindrical forms of the stacks add solid vertical elements to the scene. Other project features appear low to the ground as a solid massing of buildings and structures that vary in shape, textures, and range in color from dark grays to light tans (refer back to **Visual Resources Table 2).**

As seen from KOP 3, the overall visual change to the viewshed is *Moderate*. Visual change is a composite evaluation of visual contrast, project dominance, and view disruption, each of which is discussed below.

Visual Contrast

The visual contrast introduced by the project could ranger from *Moderate to Moderately High,* depending upon color. Due to the near proximity of the project to this KOP, the project results in the introduction of moderate levels of form, line, color and texture contrasts. The project would introduce a large building form into the landscape, in contrast to the narrow vertical forms that dominate now. If painted gray, the color of the solid forms would create moderately strong contrasts in color with the adjacent wind turbines and would be in strong contrast to the tans and browns of the Little San Bernardino Mountains which provide a back drop for the project.

Project Dominance

Project dominance as seen from KOP 3 would be *Low*. The project would be seen in the context of the existing human alterations and would not dominate the view from KOP 3. This is due primarily to the relatively low elevation of the project compared to taller adjacent transmission towers and wind turbines.

View Disruption

The project would not disrupt any scenic views or vistas from KOP 3. The existing visual quality from this location of the project is low and there are no scenic views or vistas to disrupt.

Impact Significance

Staff concludes the introduction of the project into the landscape of the KOP 3 viewshed would result in an adverse impact to visual resources due to foreground views of the project by residential viewers. The *Moderate* overall visual sensitivity, combined with the *Moderate* overall visual change could result in a potentially significant visual impact.

Mitigation

Reduction of color contrast of *all* project structures would be an important factor in reducing overall project contrast and dominance from this and other KOPs. Staff thus recommends adoption of Condition of Certification **VIS-1**, surface treatment of all project structures, to ensure the lowest feasible color contrast in the short term.

In addition, screening of the south side of the facility with perimeter landscape plantings would further reduce project texture, color, and form contrast for nearby residential viewers and motorists on Diablo Road in the long term. Staff thus recommends adoption of Condition of Certification **VIS-3**, Perimeter Landscape Screening. This condition of certification would also be consistent with the existing landscape screening of the Devers Substation from residences near the substation. In addition, screening would be consistent with screening that some residences have around their homes and would look consistent with the residential neighborhood plantings as seen from some segments of Dillon Road.

Residual Impact Significance after Mitigation with Staff-Recommended Measures

With recommended Conditions of Certification **VIS-1** and **VIS-3**, the introduction of project structures would not substantially degrade the existing viewshed of KOP 3. The resulting impact would be considered less than significant.

Painting facility structures a non-reflective light color, similar in both hue and value to the desert landscape, with the CTG stacks similar to the color of the wind turbine pylon and blades would reduce overall contrast further in the short term, and reduce color contrasts with the surrounding desert landscape and wind turbine development.

Perimeter landscape screening on the south side of the project would screen the low-elevation project facilities in the long term. With these staff-recommended measures, overall visual change due to the project would be insignificant in the short term and long term, representing a less than significant impact in both the short and long term.

KOP 4 – Esparta Avenue near SR 62, Looking Southeast

Visual Resources Figure 13 presents the existing view of the project area as seen from KOP 4 located on Esparta Avenue near the intersection with Salton View Road, just west of SR 62. This KOP is approximately 1.7 miles from the project site and is somewhat representative of the types of views residents near SR 62 would have of the project, although visual contrasts are weakened due to distance and hazy atmospheric conditions. While hazy conditions may be common in the valley, visual contrasts would be stronger on days with clear atmospheric conditions.

KOP 4 is adjacent to SR 62 (seen in the foreground of the photograph), and is generally representative of the views travelers would have of the project. SR 62, a state-designated scenic highway runs generally north-south on the west side of the Western Coachella Valley. Average daily traffic volumes are estimated to be 25,900 by 2009 (CPV2007a, Table 7.10-6). The project site is within the scenic corridor of SR 62, but outside the 50-foot scenic highway setback (sees Riverside County policy LU 13.4 in **Visual Resources Table 2**).

KOP 4 is about 100-200 feet west of the highway, increasing slightly the distance from, and thereby minimizing slightly the visual effect of the project. The bushes in the foreground partially screen views of the project site and of the Devers Substation. This is uncharacteristic of views from SR 62 which provides travelers open and expansive views across the valley. The primary cone of vision for northbound travelers is to the north, with highly scenic views of the San Bernardino Mountains to the northwest. For southbound travelers the primary cone of vision is to the south where there are highly scenic views of the Santa Rosa Mountains with San Jacinto Mountain being a focal point. Thus, views of the project are to the side and away from the primary cone of vision.

At its nearest point, SR 62 is within 1.3 miles of the project site, almost a half-mile closer than KOP 4. **Visual Resources Figure 2**, photograph 2e shows the view towards the project site from the intersection of SR 62 and Painted Hills Road. Devers Hill can be seen behind the substation. The project would be between the substation and Devers Hill. The top elevation of Devers Hill is 1,170 feet (USGS 1978). The top elevations of the CTGs would range from 1,169 feet to 1,183 feet (CPVS 2007a). Since the CTGs are closer to the viewpoint, they would appear at or slightly above the top of Dever Hill, but would be back-dropped by the mountains in the distance.

Visual Sensitivity

The overall visual sensitivity of KOP 4 is *Moderately High.* Visual sensitivity is a composite evaluation of existing visual quality, anticipated viewer concern for visual resources, and viewer exposure, each of which is discussed below.

Visual Quality

The overall existing visual quality is *Moderate* from KOP 4. In the foreground and background distance zones visual quality is moderately high; in the middleground, low. The immediate foreground next to SR 62 consists of native appearing desert landscape with limited alterations. Background views are predominantly of the Little San Bernardino Mountains which appear largely natural from this distance. Both these landscapes possess unity and intactness, but have low vividness due to a lack of uniqueness. In contrast, middleground views (0.5 to 4 mi.) are dominated by human alterations associated with energy-related development, resulting in low levels of landscape intactness, unity and vividness.

Viewer Concern

Viewer concern from KOP 4 is considered to be *Moderately High.* Nearby residents and travelers on state scenic highway SR 62 are assumed to have a high level of concern for scenic quality. However, the existing visual quality of the valley as seen from the scenic highway corridor is already strongly compromised, mitigating the sensitivity of valley views from the highway by motorists in this segment of the road.

Viewer Exposure

Viewer exposure from KOP 4 is *High.* Factors that determine viewer exposure are number of viewers, duration of view, and visibility of the project. Viewers would include travelers on SR 62, and a substantial number of residents from dozens of residences along the SR 62 corridor between Pierson Road and I-10. Viewing duration could be high for residents, and could be a few minutes for travelers on SR 62, assuming about three miles of exposure at speeds of 65 mph. Residents and travelers would have expansive and continuous views of the project area, although it would not be in a driver's primary cone of vision.

Visual Change

Visual Resources Figure 14 presents a photo simulation of the proposed project after completion of construction as seen from KOP 4. The project is seen in the simulation to the left of the Devers Substation and in front of Devers Hill. The most visually prominent features from this KOP are the eight 90-foot high CTG stacks and generators. The gray cylindrical forms of the stacks and generators add solid vertical elements to the scene. Other project features such as the cooling towers would be discernable.

As seen from KOP 4, the overall visual change to the KOP 4 viewshed from the project would be *Moderately High*. Visual change is a composite evaluation of visual contrast, project dominance, and view disruption, each of which is discussed below.

Visual Contrast

As noted before, visual contrasts from KOP 4 may be underestimated in the simulation due to hazy atmospheric conditions and the distance of the KOP from the project site. As discussed above, the project can be seen from residences and locations on SR 62 that are one-half mile closer to the project near the intersection with Painted Hills Road. Considering this, the visual contrast introduced by the project, as seen from KOP 4 and nearer locations is considered to be *Moderately High*. From KOP 4 and other locations near SR 62, the CTGs and cooling towers appear more massive, solid and darker in color than the other existing structures in the landscape, creating strong contrasts in form, line and color as compared to the existing condition. However, the lower height, overall vertical shape and continuous line of structures create a repetition of form somewhat consistent with transmission towers along Power Line Road. The project berm on the west side of the project would introduce lighter soil colors in contrast to the project colors and desert landscape as seen from SR 62.

Project Dominance

Project dominance is considered *Moderately High* KOP 4 affords an unusual perspective on the project: the entire length of the one-half-mile long project can be seen, spanning an area similar in length to the Devers Substation. The project would strongly contribute to and strengthen the existing dominance of the middleground landscape and its industrial character. Although the project would not dominate over the existing scene due to the relatively lower height of the stacks compared to the adjacent transmission towers and wind turbines, it would occupy a large proportion of the overall view and be a strong new visual presence.

View Disruption

The viewshed from KOP 4 is part of the scenic corridor of SR 62, and therefore the view seen from KOP 4 is considered scenic. The project would contribute to and exacerbate the already compromised middleground view of the valley floor as seen from SR 62. However, the level to which this scenic corridor is already compromised is such that changes due to the proposed project would represent an incremental decline in existing visual quality, but not a substantial qualitative alteration of a highly scenic view. Therefore, the project is considered to result in a *Moderately Low* level of view disruption.

Impact Significance

Staff concludes the introduction of the project into the landscape of the KOP 4 viewshed would result in an adverse impact to visual resources due to middleground views of the project by residential viewers and scenic highway viewers. The *Moderately High* overall visual sensitivity, combined with the *Moderately High* overall visual change could result in a potentially significant visual impact.

Mitigation

Reduction of color contrast of *all* project structures would be an important factor in reducing overall project contrast and dominance from this and other KOPs. Staff thus recommends adoption of Condition of Certification **VIS-1**, surface treatment of all project structures, to ensure the lowest feasible color contrast in the short term.

In addition, perimeter landscape planting, similar to existing desert plantings could further reduce project contrast of the soil berm in the long term. Staff thus recommends adoption of Condition of Certification **VIS-3**, Perimeter Landscape Screening, with particular emphasis on reduction of berm soil color contrast from SR 62.

Residual Impact Significance after Mitigation with Staff-Recommended Measures

With recommended Conditions of Certification **VIS-1** and **VIS-3**, the introduction of project structures would reduce the visual impact of the project to a less than significant level.

Painting facility structures a non-reflective light color, similar in hue and value to the desert landscape, with the CTG stacks blending with the background landscape as seen from this KOP would reduce overall contrast further in the short term, and reduce color contrasts with the surrounding desert landscape and wind turbine development.

Perimeter landscape screening on the west side of the project with native desert vegetation on the berm would reduce soil contrasts with the surrounding desert landscape.

KOP 5 – Western Avenue, Looking East

Visual Resources Figure 15 represents existing views from the closest residences to the north of the project site. KOP 5 is located on Western Avenue near 14th Avenue, 1.15 miles from the project site. There are approximately ten residences dispersed across a large area of undeveloped land bordered by Pierson Road, Indian Avenue and Karen Avenue. The area is remote and not readily accessible to the public and was not visited during the staff field reconnaissance. Therefore, this analysis is based on staff's familiarity with the project area and the simulations in the AFC.

Visual Sensitivity

The overall visual sensitivity of KOP 5 is *Moderate.* Visual sensitivity is a composite evaluation of existing visual quality, anticipated viewer concern for visual resources, and viewer exposure, each of which is discussed below.

Visual Quality

The overall existing visual quality is *Moderately High* from KOP 5. Existing foreground (0 to 0.5 mi.) and background views (4 mi. and beyond) to the south exhibit a visual quality that is moderate in the foreground and high in the background. In contrast, middleground views (0.5 to 4 mi.), where the project would be located, are dominated by human alterations associated with energy-related development, resulting in a low visual quality.

Panoramic views to the southwest of the Santa Rosa Mountains (a National Scenic Area) dominate the view (air quality permitting) from KOP 5. On clear days, the mountain landscape appears nearly natural with a high degree of unity and intactness. The rugged terrain of the mountains create a high degree of vividness which in combination with the dominant scale, dramatic ridgeline, and undisturbed appearance of the mountains, gives this background view strong visual dominance and a very high degree of scenic quality.

The immediate foreground view to the south also appears nearly natural from KOP 5. The desert landscape appears intact and there are no visual obstructions or human modifications dominating the foreground view. While the desert landscape has a high degree of unity and intactness, vividness is low due to the lack of diversity, giving a moderate visual quality to the foreground landscape.

Wind turbines and transmission towers dominate the middleground landscape where the project would be located resulting in a low level of intactness due to the discordant features of transmission towers, poles, wind turbines, and electrical substation structures. The middleground landscape exhibits no vividness, unity or intactness and the visual quality is very low. Overall, the distance from which the alterations are seen combined with the dominance and intactness of the foreground and background landscapes, minimizes the visual effects of the middleground and gives the overall view a *Moderately High* visual quality.

Viewer Concern

Viewer concern from KOP 5 is considered to be *Moderately High.* Local residents could experience views towards the project, particularly when traveling to and from their property. Nearby residents to KOP 5 are considered to have a high concern for visual quality.

Viewer Exposure

Viewer exposure from KOP 5 is *Low.* Factors that determine viewer exposure are number of viewers, duration of view, and visibility of the project. Viewers would primarily include the nearby residents of approximately ten homes in the vicinity of KOP 5. The number of viewers is considered to be low. Viewing duration is considered low since most residents would see the project area when traveling to and from their property. The visibility of the project is considered low due to the distance (over one mile) from which the project site is seen, and the appearance of the project in the context of the surrounding industrial development.

Visual Change

Visual Resources Figure 16 presents a photo simulation of the proposed project after completion of construction as seen from KOP 5. The CTG stacks are the primary project features that would be seen and are located on the left side of the simulation and to the left of Devers Substation.

As seen from KOP 5, the overall visual change to the KOP 5 viewshed from the project would be *Low*. Visual change is a composite evaluation of visual contrast, project dominance, and view disruption, each of which is discussed below.

Visual Contrast

The visual contrast introduced by the project would be *Low.* The background views of the Santa Rosa Mountains in combination with the foreground desert landscape, would dominate views from KOP 5 and minimize the visual contrasts of the project as seen in the middleground. The vertical form of the CTG stacks would blend with the existing vertical lines and forms of the transmission towers, poles and turbines. The solid gray color of the stacks may create minor contrasts in color compared to the lattice structures and white colors of the wind turbines. Differences in textures would not be discernable from this distance. Overall, the project would result in minimal levels of contrast in form, line, and color and texture from this KOP.

Project Dominance

Project dominance as seen from KOP 5 would be *Low*. The apparent size and scale of the project in the middleground of KOP 5 would not dominate the view experienced by local residents in the area. This is primarily due to the perspective and distance from which the project would be seen. The project would be back dropped against the view of the Santa Rosa Mountains, which dominates the view. The relatively low elevation of the project compared to adjacent transmission towers and wind turbines result in the CTG stacks looking similar in mass to the surrounding structures due to the distance from which the project and the surrounding structures are viewed.

View Disruption

The project would result in a *Low* level of disruption to scenic views and vistas from KOP 5. The project would be seen against the backdrop of the Santa Rosa Mountains, a National Scenic Area, and would contribute minimally to the existing disruption caused by the electrical transmission and wind turbine facilities that dominate the middleground distance zone from this KOP. The project would intensify the disruption from the existing industrial features already dominating the middleground view. In conclusion, the project would result in a low level of disruption to the scenic views of the Santa Rosa Mountains.

Impact Significance

Staff concludes that the introduction of the project into the landscape of the KOP 5 viewshed would result in an adverse, but not significant impact on visual resources. The *Moderate* overall visual sensitivity, combined with the *Low* overall visual change would result in a less than significant visual impact. However, mitigations **VIS-1** could contribute to a reduction in color contrasts if the CTG stacks are painted to better harmonize with the wind turbine pylons and blades.

Light and Glare

"Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? "

According to the AFC, the CPV Sentinel project could be operated 24 hours per day, seven days per week for undefined periods of time. Project operation during times of darkness will require on-site nighttime lighting for safety and security. Lighting would provide personnel with illumination for operation under normal operating conditions. As a result, night lighting from the project would be noticeable from the surrounding areas to varying degrees.

Impact Significance

Night lighting associated with project operation could result in a potentially significant visual impact. Night lighting for residences near KOP 3 (Diablo Road) could potentially be significant given the foreground viewing distance. Adverse light impacts could potentially occur from bright facility night lighting.

Furthermore, the project is within the Mount Palomar Nighttime Lighting Policy Area (Riverside County 2003). The Mount Palomar Observatory, located in San Diego County, requires darkness so that the night sky can be viewed clearly. The project site is in Zone B of the Mount Palomar Nighttime Lighting Policy Area. The Riverside County General Plan (Riverside County 2003) has adopted policy WCVAP 15.2 which calls for the adherence of lighting requirements of the *County Ordinance Regulating Light Pollution* for standards that are intended to limit light leakage and spillage that may interfere with the operations of the Palomar Observatory.

Staff is concerned that night lighting could contribute to a cumulative effect on night lighting at the Palomar Observatory. Night lighting can potentially result in impacts on visual resources by increasing ambient light to surrounding areas, creating distracting glare, and reducing sky or star visibility. The proposed project is located in a relatively industrialized area with features that result in reduced lighting contrast when compared to the unlighted areas of the undeveloped, open desert.

Mitigation

Since the project is located in the Mount Palomar Nighttime Lighting Policy Area, staff recommends adoption Condition of Certification **VIS-2** to reduce any possible contribution to cumulative effects from perimeter and exterior night lighting associated with construction and operational activities associated with the project.

Residual Impact Significance after Mitigation with Staff-Recommended Measures

As described under staff-recommended Condition of Certification **VIS-2**, project lighting would be of minimal brightness consistent with safety; would be shielded and directed to eliminate all direct off-site illumination and all upward (backscatter) illumination; and lighting for maintenance purposes would be kept off when not needed. With these measures, the facility would impart a somewhat industrial character to the nighttime viewshed within the foreground of the project site. With adoption of **VIS-2**, anticipated level of nighttime lighting would be low, resulting in impacts on the Mount Palomar Nighttime Lighting Policy Area that would be less than significant.

Visible Vapor Plumes

Energy Commission staff completed a modeling analysis for the applicant's proposed unabated cooling tower design and qualitatively analyzed the gas turbine design based on data provided by the applicant (**Appendix VR-3**). The applicant modeled the cooling tower plumes using the Combustion Stack Visible Plume (CSVP) model. The applicant's analysis, which showed a very high plume frequency (97 percent of all hours), had one major flaw that caused a significant overestimation of the plume frequency. The calculated exhaust water content was above the saturated water content, causing the CSVP model to predict small visible plumes during ambient conditions that would clearly not have visible plumes. Staff's calculations have corrected this error and show that plume frequencies would be substantially less than predicted by the applicant.

Staff's analysis concluded that visible water vapor plumes from the proposed CPV Sentinel cooling towers are expected to occur well less than 20 percent of seasonal daylight clear hours, the frequency threshold used by staff to determine if an evaluation of vapor plume visual impacts is necessary (**Appendix VR-3**). Based on staff's estimated plume frequencies of 7.4 percent of the seasonal daylight clear hours, the plumes are considered less than significant and no further visual analysis is required.

CUMULATIVE IMPACTS AND MITIGATION

Land uses in the project area are changing and residential and mixed-use development will be moving closer to the project site. Annexation of land to the north of the project is designed to facilitate residential and commercial development, and transportation improvements. Wind farm development will also continue within the San Gorgonio Wind Energy Plan Area. One residential project, one wind energy project and one transportation improvement project were identified:

- Eagle Point Development – is a 160 acres mixed-use development with schools, and 264 homes that would be one mile north of the project site at the intersection of Pierson Boulevard and Karen Avenue. Field reconnaissance by staff along Pierson Boulevard found that the CPV Sentinel project would not be seen given the existing topography, vegetation and distance from the project site **(See Visual Resources Figure 2,** photograph 2g for the view of the project area from Pierson Boulevard).
- Indian Avenue/I-10 Interchange Project – This proposed project involves reconstruction of the I-10 Freeway/Indian Avenue interchange and is located about two miles south of the proposed project. This project will increase the footprint of the interchange to accommodate increases in traffic volumes. Improvements to the interchange are consistent with the existing viewing conditions.
- Wind Energy Conservation System (WECS) 20 Project – would consist of eight wind turbines in the existing WECS 20 Wind Park. This site is located approximately two miles northwest of the proposed project site.

As discussed above, CPV Sentinel would not result in significant project-specific adverse visual impacts. There are no known projects that would remove surrounding structures and make the project more visible nor are there new structures proposed that would alter the anticipated views of the project. For these reasons, the CPV Sentinel would not contribute to any adverse cumulative visual impacts.
Even though low-income and minority populations exist in the immediate project area, staff has not identified any significant unmitigated adverse visual impacts with the proposed project or cumulative impacts; therefore, no significant adverse impacts to minority or low-income populations are expected to occur.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

VISUAL RESOURCES Table 3 provides an analysis of the applicable LORS pertaining to the 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 the LORS where appropriate.

VISUAL RESOURCES Table 3
Proposed Project Consistency with LORS Applicable to Visual Resources

Source	Policies	Consistency Determination	Basis for Consistency
County of Riverside General Plan, adopted October 7, 2003.	**Chapter 3 Land Use Element, Project Design**		
	Policy LU 4.1 Require that new developments be located and designed to visually enhance, not degrade the character of the surrounding area through consideration of the following concepts:		While the project would not visually enhance the character of the surrounding area, it would not substantially degrade the existing character of the surrounding area since existing development has resulted in substantial

			degradation. Conditions of Certification **VIS-1** and **VIS-3** would mitigate the visual impact of the project.
	a. Compliance with the design standards of the appropriate area plan land use category.	YES AS CONDITIONED	CPV Sentinel would be in compliance with design standards for industrial land uses as discussed below under policies 12.2 and 12.4 for the Western Coachella Valley Area Plan (WCVAP).
	c. Require that an appropriate landscape plan be submitted and implemented for development projects subject to discretionary review.	YES AS CONDITIONED	c. Condition of Certification **VIS-3** calls for the use of drought tolerant landscaping and incorporates adequate drought-conscious irrigation systems, and for the landscape plan to comply with Riverside County policies ordinances.
	d. Require that new development utilize drought tolerant landscaping and incorporate adequate drought-conscious irrigation systems.	YES AS CONDITIONED	d. Condition of Certification **VIS-3** calls for the use of drought tolerant landscaping and incorporates adequate drought-conscious irrigation systems, and for the landscape plan to comply with Riverside County policies ordinances.
	Chapter 3 Land Use Element, Scenic Corridors:		
	Policy LU 13.1: Preserve and protect outstanding scenic vistas and visual features for the enjoyment of the traveling public.	YES	The project would not block or disrupt scenic vistas towards the Santa Rosa and San Bernardino Mountains or towards San Jacinto Mountain from publicly traveled roads, highways or freeways.
	Policy LU 13.3: Ensure that the design and appearance of new landscaping, structures, equipment, signs, or grading within Designated and Eligible State and County scenic highway corridors are compatible with the surrounding scenic setting or environment.	YES AS CONDITIONED	Condition of Certification **VIS-1** calls for the development of a surface treatment plan that would minimize the visual intrusion and contrast created by the project. **VIS-1** calls for the surface treatment plan to be consistent with local policies and ordinances. Condition of Certification **VIS-3** calls for the project owner to provide landscaping that will partially screen the project in the long term. **VIS-3** calls for the landscape plan to comply with local policies and ordinances.
	LU 13.4: Maintain at least a 50-foot setback from the edge of the right-of-way for new development adjacent to Designated and Eligible State and County Scenic Highways.	NOT APPLICABLE	The project is not within the 50-foot setback from the edge of the right-of-way of SR 62 and I-10. At the nearest point, the project is 1.3 miles east of SR 62 and 1.7 miles north of I-10.
	Policy LU 13.5: Require new or relocated electric or communication distribution lines, which would be visible from Designated and Eligible State and County Scenic Highways, to be placed underground.	NOT CONSISTENT	CPV Sentinel proposes 2,300 feet of transmission line to be carried on nine steel poles (85- to 115-feet tall). Since the transmission line and poles would parallel existing lines, the transmission lines and towers would not be readily discernable from SR 62 or

			I-10.
	Policy LU 13.6: Prohibit offsite outdoor advertising displays that are visible from Designated and Eligible State and County Scenic Highways.	NOT APPLICABLE	The project does not propose offsite advertising or signs that would be visible from SR 62 or I-10.
	Policy LU 13.8: Avoid the blocking of public views by solid walls.	YES	The project proposes fencing to enclose the site. No solid perimeter wall is proposed.
	Chapter 3 Land Use Element, Public Facilities:		
	Policy LU 25.3: Require that new public facilities protect sensitive uses, such as schools and residences, from the impacts of noise, light, fumes, odors, vehicular traffic, parking, and operational hazards.	YES AS CONDITIONED	Condition of Certification **VIS-2** calls for a lighting mitigation plan that would be in compliance with policies and ordinances of Riverside County. See sections on noise, air quality, transportation and hazardous materials regarding compliance with this policy for noise, fumes, odors, vehicular traffic, parking and operational hazards.
	Policy LU 25.5: Require that public facilities be designed to consider their surroundings and visually enhance, not degrade, the character of the surrounding area.	YES AS CONDITIONED	Condition of Certification **VIS-1** calls for the development of a surface treatment plan that would minimize the visual intrusion and contrast created by the project. **VIS-1** calls for the surface treatment plan to be consistent with local policies and ordinances. Condition of Certification **VIS-3** calls for the project owner to provide landscaping that will partially screen the project in the long term. **VIS-3** calls for the landscape plan to comply with local policies and ordinances.
	Chapter 4 Circulation Element, Scenic Corridors:		
	Policy C 13.8: Avoid the blocking of public views by solid walls.	YES	The project does not propose the construction of solid walls around the facility.
	County of Riverside General Plan, Chapter 5: Multipurpose Open Space Element, Scenic Corridors:		
	Policy OS 22.1: Identify and conserve the skylines, view corridors, and outstanding scenic vistas within Riverside County.	YES	Project features would not alter skyline viewing conditions from most viewing locations since existing transmission and wind facilities extend above the height of the proposed CPV Sentinel features. Project features would not significantly alter views from scenic corridors such as SR 62 and I-10 since existing transmission and wind turbine facilities already dominate. Outstanding scenic vistas of the Santa Rosa Mountains and San Bernardino Mountains would not be blocked or intruded upon by the project since the project does not

			intrude into the viewshed of the mountains as discussed in the analysis of KOPs 1 through 5.
	County of Riverside, General Plan, Western Coachella Valley Area Plan (WCVAP), Industrial Uses:		
	Policy WCVAP 12.2: Ensure that industrial buildings do not exceed fifty feet in height.	YES	Buildings associated with CPV Sentinel do not exceed 50 feet. The CTG exhaust stacks and transmission poles would exceed 50 feet, but are not considered to be buildings.
	Policy WCVAP 12.4: Require the screening and/or landscaping of outdoor storage areas, such as contractor storage yards and similar uses.	YES AS CONDITIONED	Condition of Certification **VIS-3** calls for the screening of contractor storage yards and similar uses. This would ensure that the project is in compliance with this policy.
	County of Riverside, General Plan, Western Coachella Valley Area Plan (WCVAP), Light Pollution:		
	Policy WCVAP 15.1: Where outdoor lighting is proposed, require the inclusion of outdoor lighting features that would minimize the effects on the nighttime sky and wildlife habitat areas.	YES AS CONDITIONED	Condition of Certification **VIS-2** calls for a lighting mitigation plan that would be in compliance with policies and ordinances of Riverside County.
	Policy WCVAP 15.2: Adhere to the lighting requirements of the County Ordinance Regulating Light Pollution for standards that are intended to limit light leakage and spillage that may interfere with the operations of the Palomar Observatory.	YES AS CONDITIONED	Condition of Certification **VIS-2** calls for a lighting mitigation plan that is in compliance with policies and ordinances of Riverside County.
	County of Riverside, General Plan, Western Coachella Valley Area Plan (WCVAP), Scenic Highways:		
	Policy WCVAP 18.1: Protect the scenic highways in the Western Coachella Valley from change that would diminish the aesthetic value of adjacent properties in accordance with policies in the Scenic Corridors sections of the Land Use, Multipurpose Open Space, and Circulation Elements.	YES AS CONDITIONED	See the compliance discussion above for Chapters 3, 4 and 5 of the Riverside County General Plan regarding scenic highways.

RESPONSE TO COMMENTS

Staff received no specific comments from the public on the visual resources section of the Preliminary Staff Assessment (PSA) (CEC 2008). General comments regarding descriptions of the residential land use in the vicinity of the project were made by Riverside County, and one member of the public commented that the Skyborne Development was one street away from the proposed project. Specific comments on the visual resources section were received from the applicant, CPV Sentinel, LLC (CVPS 2008). Staff has summarized these comments and provides responses below.

Riverside County Comment: "The residential development scattered throughout the rural area should be acknowledged."

Response to Riverside County Comment: The description of residential development in the Regional Setting section of the FSA has been revised accordingly.

Valdez Comment regarding the location of the Skyborne Development: DR Horton (America's largest homebuilder) has begun the building of some 2000 new homes only one street from the proposed site of the CPV Sentinel LLC power plant in their newest development named "SkyBorne" after the clean air famous to the area.

Response to Valdez Comment regarding the location of the Skyborne Development. The Skyborne Development is located on the north side of Pierson Boulevard at the intersection with Karen Avenue. This location is approximately one mile north of the northern most proposed project site boundary, and 2 miles north of the project entrance. The Skyborne location was visited by staff during the field reconnaissance for the visual resource analysis. The development, and the view towards the project from the intersection of Pierson and Karen Avenue is documented in the report in Figures 2f and 2g, respectively. Field reconnaissance found the project would not be seen or readily discernable from this location.

CPVS Comment 187. The vacant dwelling unit and detached garage on the project site were demolished in January 2008.

Response to CPVS Comment 187. The FSA has been revised accordingly.

CPVS Comments 188, 189, 190, 192 and 195. The applicant proposes to shift the transmission line 270 feet to the north of the alignment shown in the PSA (CEC 2008). The transmission line would continue west adjacent to Powerline Road to the Devers Substation. This modification would reduce the length of the transmission line from 3,250 feet to approximately 2,300 feet.

Response to CPVS Comments 188, 189, 190, 192 and 195. References to the transmission line length have been revised from 3,250 feet to 2,300 feet.

The proposed modification of the transmission line route would not alter the results of the visual analysis. The transmission line route modification would be visible from the same Key Observation Points (KOPs) identified in the analysis above and the visual impact of the modified transmission line route would be similar to the results of the assessment presented above. Therefore, potential impacts to visual resources as a result of the proposed transmission line modification would be less-than-significant.

CPVS Comment 191. The AFC lists all the KOPs regarding night lighting and lists KOP three as having the greatest impact. The AFC determined that the project would have an adverse but not significant impact on visual resources from night lighting.

Response to CPVS Comment 191. Agree. The FSA has been revised accordingly.

CPVS Comment 193. Determining viewer exposure to be Moderate from KOP 3 seems elevated.

Response to Comment 193. Disagree. Most residents would experience foreground views of the project when traveling to and from their residences on Diablo Road, in addition to possible viewing of the project from their residences.

CPVS Comment 194. Statements regarding KOP 4 appear contradictory.

Response to Comment 194. These excerpts are referring to two different CEQA guideline criteria used for the assessment of impacts. The discussion on page 4.12-112 of the PSA is an assessment of whether the project would result in an adverse impact on "scenic resources" as defined by the CEQA guidelines. Scenic resources include state designated scenic highways such as SR 62. The discussion on page 4.12-24 of the PSA is an assessment of whether the project would result in an adverse impact on "visual character or quality" as defined by the CEQA guidelines. Visual character and quality is assessed based on the level of visual sensitivity and visual change as seen from KOP 4 which is representative of residents located near SR 62 as well as travelers on SR 62.

CPVS Comment 196. Extending the lighting condition to construction laydown areas implies that a lighting plan for construction will have to be developed separately and reviewed.

Response to Comment 196. Condition of Certification VIS-2 calls for the preparation of one lighting mitigation plan that addresses lighting during project construction (including laydown areas) and permanent exterior lighting fixtures during operation.

PROPOSED CONDITIONS OF CERTIFICATION

SURFACE TREATMENT OF PROJECT STRUCTURES AND BUILDINGS

VIS-1 The project owner shall treat the surfaces of all project structures and buildings visible to the public so that their colors minimize visual intrusion and contrast by blending with the desert landscape in both color and value; b) their colors and finishes do not create excessive glare; and c) their colors and finishes are consistent with local policies and ordinances.

The project owner shall submit to the Compliance Project Manager (CPM) for review and approval, and simultaneously to Riverside County for review and comment, a specific surface treatment plan that will satisfy these requirements. 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, wall, 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. A specific schedule for completion of the treatment; and

E. A written procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated in the field, until the project owner receives notification of approval of the treatment plan by the CPM. Subsequent modifications to the treatment plan are prohibited without CPM approval.

Verification: At least 90 days prior to specifying to the vendor the colors and finishes of the first structures or buildings that are surface treated during manufacture, the project owner shall submit the proposed treatment plan to the CPM for review and approval and simultaneously to Riverside County for review and comment.

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 treatment plan must be submitted to the CPM for review and approval and simultaneously to Riverside County for review and comment.

Prior to 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 they are ready for inspection and shall submit one set of electronic color photographs from the same key observation points (KOPs) analyzed in this report.

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.

TEMPORARY AND PERMANENT EXTERIOR LIGHTING

VIS-2 To the extent feasible and consistent with safety and security considerations, the project owner shall design and install all temporary and permanent exterior lighting so that: a) lamps and reflectors are not visible from beyond the project site, including any off-site construction laydown areas and security buffer areas; 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; e) lighting on the exhaust stacks shall be the minimum needed to satisfy safety and security concerns; and f) the plan complies with local policies and ordinances of Riverside County.

The project owner shall submit to the CPM for review and approval and simultaneously to Riverside County for review and comment, a lighting mitigation plan that includes the following:

A. Location and direction of permanent light fixtures, taking lighting mitigation requirements into account;

B. Lighting design shall consider setbacks of project features from the site boundary and construction laydown areas to aid in satisfying the lighting mitigation requirements;

C. Lighting shall incorporate fixture hoods/shielding, with light directed downward or toward the area to be illuminated;

D. Light fixtures that are visible from beyond the project boundary shall have cutoff angles that are sufficient to prevent lamps and reflectors from being visible beyond the project boundary, except where necessary for security;

E. All lighting shall be of minimum necessary brightness consistent with operational safety and security; and

F. 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 discuss the documentation required in 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 Riverside County for review and comment, a lighting mitigation plan.

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 completed 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 48 hours 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 48 hours after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to the CPM within 30 days.

The project owner shall provide a status report regarding permanent exterior lighting in the Annual Compliance Report. The report shall specify a): the condition of the lighting that has been installed under the lighting plan at the end of the reporting year; b) any deviations in lighting from the plan that occurred during the reporting year; and c) any proposed deviations from the lighting plan for the next year.

PERIMETER LANDSCAPE SCREENING

VIS-3 The project owner shall develop a landscape plan that: a) reduces the visibility of the project from the south and west; b) utilizes drought tolerant landscaping and incorporates adequate drought-conscious irrigation systems; and c) complies with local policies and ordinances of Riverside County, including Policy WCVAP 12.4 which requires screening and/or landscaping of outdoor storage areas, such as contractor storage yards and similar uses. Plantings on the south side of the project are to screen views of the project by residents that live to the south and west of the project.

The project owner shall submit to the CPM for review and approval and simultaneously to Riverside County for review and comment, a landscaping plan providing proper implementation that will satisfy these requirements. The plan shall include:

A. A detailed landscape, grading, and irrigation plan, at a reasonable scale such that all information on the plan is legible. The plan shall demonstrate how the requirements stated above shall be met. The plan shall provide a detailed installation schedule demonstrating installation of as much of the landscaping as early in the construction process as is feasible in coordination with project construction;

B. A list (prepared by a qualified professional arborist familiar with local growing conditions) of proposed species, specifying installation sizes, growth rates, expected time to maturity, expected size at five years and at maturity, spacing, number, availability, and a discussion of the suitability of the plants for the site conditions and mitigation objectives, with the objective of providing the widest possible range of species from which to choose;

C. Maintenance procedures, including any needed irrigation and a plan for routine annual or semi-annual debris removal for the life of the project;

D. A procedure for monitoring for and replacement of unsuccessful plantings for the life of the project; and

E. The plan shall not be implemented until the project owner receives final approval from the CPM.

Verification: The landscaping plan shall be submitted to the CPM for review and approval and simultaneously to Riverside County for review and comment, at least 90 days prior to installation.

If the CPM determines that the plan requires revision, the project owner shall provide to the CPM and simultaneously to Riverside County a revised plan for review and approval by the CPM.

The planting must occur during the first optimal planting season following site mobilization. The project owner shall simultaneously notify the CPM and Riverside County within seven days after completing installation of the landscaping, that the landscaping is ready for inspection.

The project owner shall report landscape maintenance activities, including replacement of dead or dying vegetation, for the previous year of operation in each Annual Compliance Report.

REFERENCES

Caltrans (California Department of Transportation). 2007. Scenic Highway Guidelines. Site visited on April 30, 2008. http://www.dot.ca.gov/hq/LandArch/scenic/guidelines/scenic_hwy_guidelines.pdf

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CPVS2007 – CPV Sentinel, LLC / D. Shileikis (tn: 41166). CPV Sentinel Application for Certification – Volume 1, 2, & 3. Dated on 6/25/2007. Submitted to CEC/Docket Unit on 6/25/2007.

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Desert Hot Springs, City of. 2008. Site visited on May 8, 2008. http://www.desert-hot-springs.us/Pierson_Blvd_Corridor.

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Riverside County, California. 2003. County of Riverside General Plan. Riverside County Department of Transportation and Land Management Agency. Adopted October 7, 2003. Website visited on April 20-25, 2008. http://www.rctlma.org/genplan/default.aspx.

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APPENDIX VR-1

STAFF'S VISUAL RESOURCES EVALUATION METHODOLOGY

Staff evaluates the visual characteristics of the existing physical setting, the proposed project, the circumstances affecting the viewer, and the degree of visual change that a proposed project may introduce using the identified elements and generally accepted criteria for determining substantial environmental 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) that provides a view of 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 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 considers 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.

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).

[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.

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, for both construction and operation phases.

APPENDIX VR-2

ENERGY COMMISSION STAFF - VISUAL ANALYSIS TERMS

For the purpose of this visual analysis, Energy Commission staff has defined the following visual related terms:

Duration of View - ranges from *high* (extended), a view of the project site that is reached across an extended distance or amount of time, to *low* (brief), a view of the project site that is reached in a short amount of distance or time. The range of view duration generally differs depending on the type of activity in which the viewer is engaged.

Intactness – referring to a landscape character and quality that appears untouched or unaltered by human actions that harm or diminish landscape character or quality.

Scenic Resource - a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique visual/historical importance to a community (a tree linked to a famous event or person, an ancient old growth tree); historic building; or a designated federal scenic byway or state scenic highway corridor.

Scenic Vista - a distant view through and along a corridor or opening that exhibits a high degree of pictorial quality.

Viewer Concern - estimated level of a viewer's anticipated interest in preserving and protecting the existing physical environment. Viewer attitudes and expectations are often correlated with viewer activity type (e.g., viewers engaged in certain activities, such as recreation, are considered to have high levels of concern for scenic quality, while those engaged in other activities, such as work, are generally considered to have lower levels of concern). Residences are generally considered to have high viewer concern.

Existing landscape character may temper viewer concern on some state and locally designated scenic highways and corridors. Similarly, travelers on other highways and roads, including those in agricultural areas, may have moderate viewer concern depending on viewer expectations as conditioned by regional and local landscape features. Commercial uses, including business parks, typically have low-to-moderate viewer concern, though some commercial developments have specific requirements related to visual quality with respect to landscaping, building height limitations, building design, and prohibition of above-ground utility lines, thus indicating a higher level of viewer concern. Industrial uses typically have the lowest viewer concern because workers are focused on their work and generally are working in surroundings with relatively low visual value.

Viewer Exposure – the primary factors affecting viewer susceptibility to impacts, including visibility of a landscape feature, the number of viewers, distance, and the duration of the view.

Viewshed – an area visible to an observer from a fixed vantage point, called a *key observation point* (KOP). Staff uses a 35mm camera with a focal length of 50mm which encompasses an approximate image angle of 46^0. The staff uses a field of view that is not to be confused with a panoramic (180^0) or cycloramic (360^0) view. These are broad horizontal composition with no apparent limits to the view.

Visibility - the level to which the proposed project site is visually obstructed by natural and/or man-made surface features (development, vegetation, hills) from the key observation point.

Visual Contrast - the conspicuousness or prominence of a project and its compatibility with its setting. Visual contrast is described in terms of formal attributes of form, line, color, and texture of the project in comparison to those of the setting. Staff considers the proposed project's introduction of form (shape and mass), line (changes in edge types and interruption or introduction of edges, bands, and silhouette lines), color (surface color, reflectivity, and glare), and texture (noticeable differences in the grain or irregularity and directional patterns) to the existing physical environment to determine the degree of contrast**.** Degree of contrast: *none* – the element contrast is not visible or perceived; *weak* – the element contrast can be seen but does not attract attention; *moderate* – the element contrast begins to attract attention and begins to dominate the characteristic landscape; *strong* – the element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Visual Disruption - the extent to which a previously visible scenic resource or scenic vista in the existing physical environment is blocked from view by the proposed project. The view disruption is assigned greater weight according to the quality and importance of the blocked view.

Visual Quality – the estimated visual impression and appeal of the existing physical environmental setting and the associated public value attributed to it. An outstanding visual quality is a rating reserved for landscapes that would be what a viewer might think of as "picture postcard" landscapes. Low visual quality describes landscapes that are often dominated by visually discordant human alterations and do not provide views that people would find inviting or interesting (Buhyoff et al. 1994).

Visual Scale - the proposed project's apparent size relationship with other components in the existing physical environment relative to the total field-of-view as viewed by the human eye, or the lens of a 35mm camera with a focal length of 50mm.

Visual Sensitivity - the overall level of sensitivity of a viewshed due to visual change that is a function of visual quality, viewer concern, and viewer exposure.

Vividness - referring to landscape character and quality that is visually distinctive with visual elements that are extraordinary and special. Landscape character and quality that is attractive and stands out from common landscapes.

Unity – referring to a landscape character and quality of wholeness such that the combination and arrangement of landscape features creates a unified whole. A landscape that appears to be in a condition of accord and harmony.

APPENDIX VR-3

VISIBLE PLUME MODELING ANALYSIS

William Walters

INTRODUCTION

The following provides the assessment of the CPV Sentinel Energy Project (CPV Sentinel) cooling tower and gas turbine exhaust stacks visible water vapor plumes. Staff completed a modeling analysis for the applicant's proposed unabated cooling tower design and qualitatively analyzed the gas turbine design based on data provided by the applicant.

PROJECT DESCRIPTION

The proposed project will utilize eight LMS100 gas turbines in simple cycle mode. The applicant has also proposed a five-cell and a three-cell mechanical-draft cooling tower. Because of the intercooler characteristic of the LMS100 type gas combustion turbine, the gas turbine cooling load is significantly larger than the gas turbine cooling load for other simple-cycle gas turbines. The intercooler removes heat from the gas turbine inlet air after it has been compressed in the gas turbine compressor's low pressure section and before it is fed into the gas turbine compressor's high pressure section. The intercooler closed-loop cooling water in turn is cooled by the cooling tower's recirculating water flow in a non-contact heat exchanger. The applicant has not proposed to use any methods to abate visible plumes from the cooling towers.

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 exhausts. This model provides conservative estimates of both plume frequency and plume size. This model uses hourly 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 and an urban land classification was used in the modeling analysis.

CLOUD COVER DATA ANALYSIS METHOD

A plume frequency of 20 percent 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[1] used in the analysis categorizes sky cover in several increments from zero (clear) to ten (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 equal to zero plus b) half of the hours with total sky cover from three to five. 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 opacity of sky cover is relatively low (equal to or less than 50%), clouds do not substantially reduce contrast with plumes; staff has estimated that approximately half of the hours meeting the latter sky cover and sky opacity criteria 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 percent 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 provided in applicant's plume modeling files (URS 2007). 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		5 Cells		
Cell Height		46 feet (14.02 meters)		
Cell Stack Diameter		30 feet (9.14 meters)		
Case	**Inlet Air Ambient Condition**	**Heat Rejection Rate (MW)**	**Exhaust Flow Rate (K lbs/hr)**	**Exhaust Temperature**
1	17°F, 80% RH	126.7	12,148 [a]	74.9°F
2	72°F, 40% RH	154.7	27,325	78.8°F
3	107°F, 18% RH	168.3	26,162	90.4°F

Note: a – The cooling tower cell fans are cycled to avoid freezing so that the total flow is 44% of full time fan flow.
Source: URS 2007, and staff calculations to determine exhaust flow and exhaust temperature using energy balances and the assumption that fan cycling starts when inlet air wet bulb temperatures are below 50°F.

[1] This analysis uses an applicant formatted meteorological data set that uses onsite data for temperature and wind speed and data from Daggett/Barstow for relative humidity and cloud cover.

The five and three cell cooling towers will operate with the same per cell heat rejection and air flows; therefore, only one cooling tower was modeled to determine potential visible plume frequencies.

The cooling tower fans will be cycled during very low temperatures to avoid freezing. Staff has assumed that cells will remain on without cycling when the wet bulb temperatures are at or above 50°F, and flow reduction will be reduced linearly below a wet bulb temperature of 50°F to the cold weather condition provided in **VISIBLE PLUME Table 1**.

These cooling towers, unlike other cooling towers proposed for other recent LMS100 turbine projects (Walnut Creek and Sun Valley) have a relatively high air flow rate per heat rejection rate, generally above 20 kg/s/MW when not cycling fans under cold temperature conditions. This flow rate is approximately twice that proposed for the Walnut Creek and Sun Valley projects. Therefore, these cooling towers will have a substantially reduced visible plume potential due to the design, as well as due to having the plume unfavorable desert ambient conditions north of Palm Springs.

COOLING TOWER VISIBLE PLUME MODELING RESULTS

VISIBLE PLUME Table 2 provides the CSVP model visible plume frequency results for the cooling tower.

VISIBLE PLUME Table 2
Predicted Hours with Cooling Tower Steam Plumes

Case	Modeled Hours	Full Load	
		Plume (hr)	Percent
All Hours	26,304	1,694	6.44%
Daylight Hours	12,238	482	3.94%
Daylight Clear Hours	7,240	195	2.69%
Seasonal Daylight Clear Hours*	2,579	192	7.44%

*Seasonal conditions occur from November through April.

Visible plumes are predicted to occur less than 20 percent of the seasonal (from November through April), daylight clear hours. Additionally, the modeling analysis assumed full time operation of the cooling tower, while the gas turbines for this peaking facility will be permitted to operate less than 40 percent of the time on an annual basis. Additionally, recent communication with the Energy Commission's Electricity Analysis Office (EAO) indicates that a more reasonable worst-case estimate for the annual capacity factor for a high efficiency peaking turbine project (100 MW facility with a full load heat rate of 8,688 Btu/hr) would be 17 percent[2] (CEC 2007). Therefore, staff expects that the actual plume frequency for this project, assuming no changes in the assumed cooling tower design, will be lower than that modeled and shown in **VISIBLE PLUME Table 2** and well less than 20 percent of seasonal daylight clear hours.

[2] This estimate is based on a 100 MW facility with an 8,688 Btu/kW full load heat rate with: 1) expected renewable energy based on the renewable portfolio standards (RPS); 2) dry hydro conditions throughout the Western Energy Coordinating Council (WECC); and 1 in 2 peak and energy forecast. An 800 MW peaking facility with a similarly low heat rate, such as Sentinel, would be expected to have a somewhat lower estimated annual capacity factor than the EAO modeled 100 MW facility due to the greater increase in available supply that it would provide.

APPLICANT'S COOLING TOWER MODELING ANALYSIS

The applicant modeled the cooling tower plumes using the CSVP model. The applicant's analysis, which showed a very high plume frequency (97 percent of all hours), had one major flaw that caused a significant overestimation of the plume frequency. The calculated exhaust water content was above the saturated water content, which will cause the CSVP model to predict small visible plumes during ambient conditions when there will clearly not be visible plumes. Staff's calculations have corrected this error and show that the plume frequencies will be substantially less than predicted by the applicant.

GAS TURBINE VISIBLE PLUME ANALYSIS

The LMS100 simple cycle gas turbine exhaust temperatures will be well over 700 degrees Fahrenheit. Simple cycle turbines with such high exhaust temperatures have no potential to cause visible water vapor plumes under normal operating and ambient conditions.

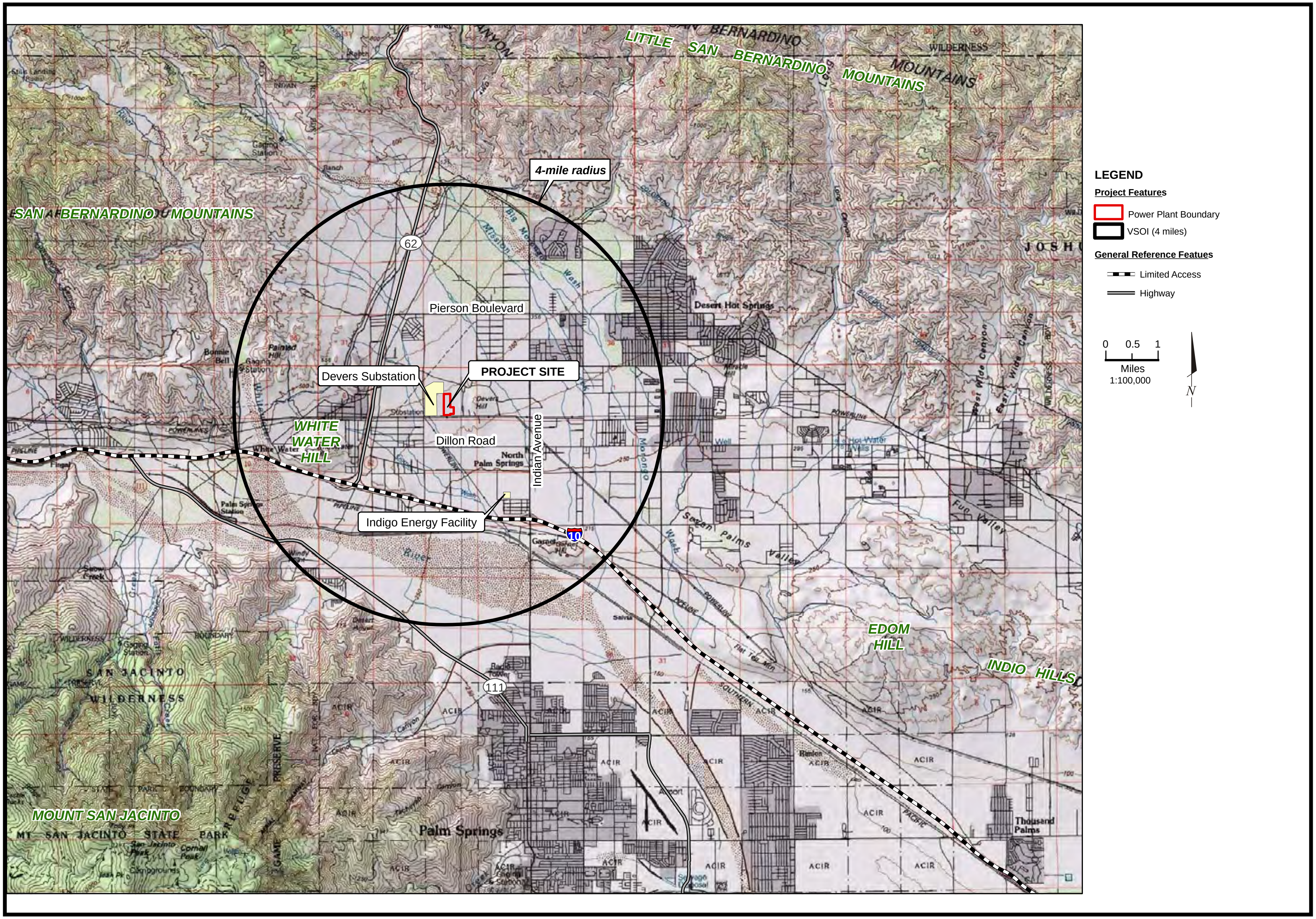
CONCLUSIONS

Visible water vapor plumes from the proposed Sentinel cooling towers are expected to occur well less than 20 percent of seasonal daylight clear hours. Therefore, further visual impact analysis of worst-case plume frequencies and plume sizes has not been completed.

REFERENCES

URS 2007. CPV Sentinel Application for Certification – Air Quality and Public Health Modeling Files. June 25, 2007.**CEC 2007.** Personal communication between Angela Tanghetti, Energy Commission Electricity Analysis Office, and William Walters, Aspen Environmental Group. August 23, 2007.

VISUAL RESOURCES - FIGURE 1
CPV Sentinel Energy Project - Regional Landscape Setting



SOURCE: AFC Figure 7.11-1. Visual Sphere of Influence

VISUAL RESOURCES - FIGURE 2A
CVP Sentinel Energy Project - Landscape Character Photographs

Photo 1 View of the San Bernardino Mountains as seen from Dillon Road near the project site, looking northwest.

Photo 2 View of the Little San Bernardino Mountains as seen from Dillon Road near the project site, looking northeast.

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, OCTOBER 2008
SOURCE: WORD files with 2 photos per page, photos 2a-2h

Photo 3 View of the Santa Rosa Mountains and San Jacinto Mountain (snow-dusted peak) as seen from the Interstate 10 - State Route 62 interchange, looking southeast.

Photo 4 View of Interstate 10 and the Little San Bernardino Mountains and Indigo Hills in the distance as seen from the Interstate 10 - State Route 62 interchange, looking east-southeast.

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, OCTOBER 2008
SOURCE: WORD files with 2 photos per page, photos 2a-2h

VISUAL RESOURCES - FIGURE 2C

CVP Sentinel Energy Project - Landscape Character Photographs

Photo 5 View of Devers Substation from SR 62 as Painted Hills Road, looking east.

Photo 6 View of the Skyborne gated community, looking northeast from Pierson Boulevard.

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, OCTOBER 2008
SOURCE: WORD files with 2 photos per page, photos 2a-2h

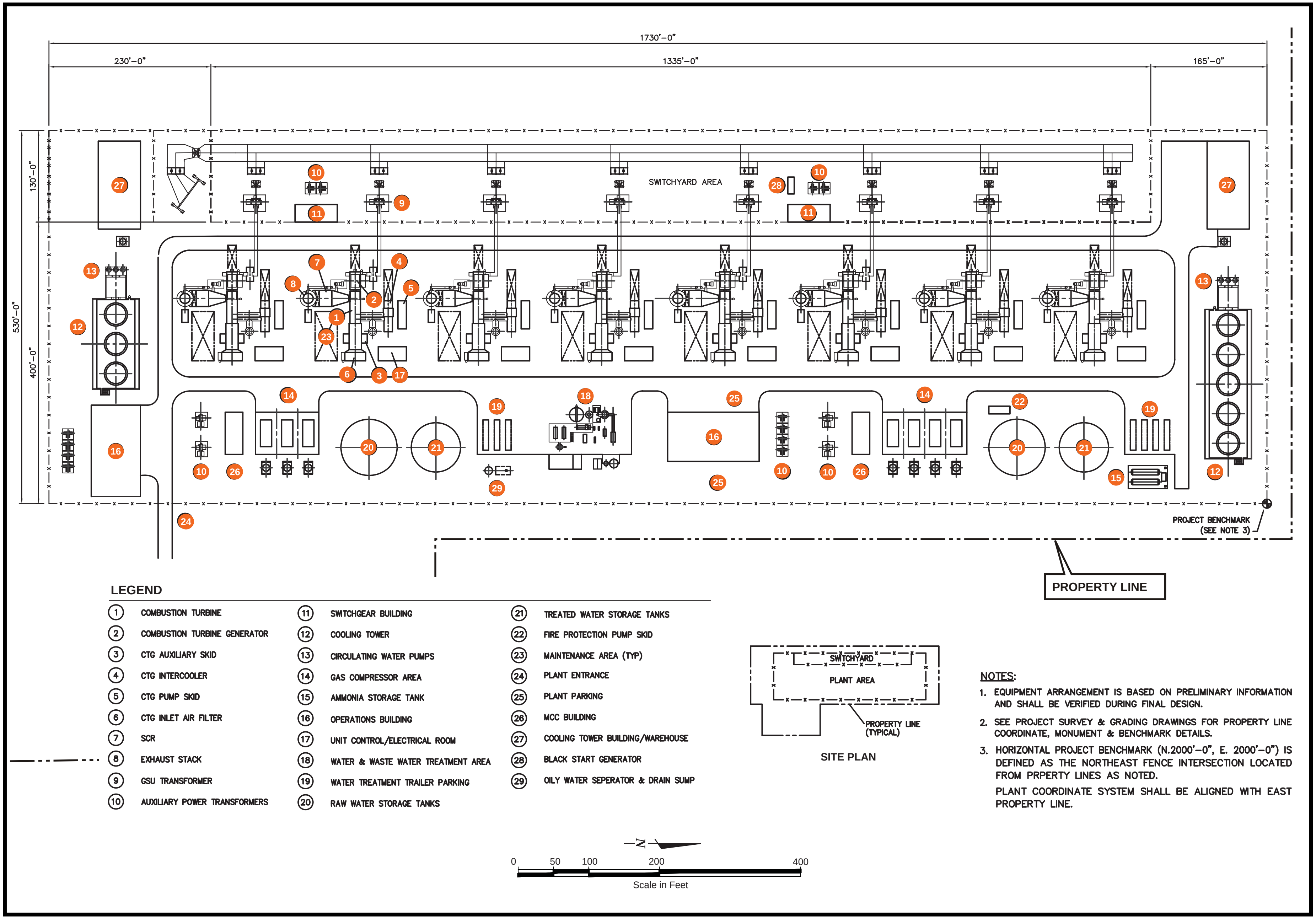
Photo 7 View towards the CPV Project site looking south-southeast from the intersection of Pierson Boulevard and Karen Avenue, next to the planned Eagle Point residential development.

Photo 8 View towards the existing Indigo Peaker power plant, looking north from the frontage road next to I-10 near Indian Avenue.

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION, OCTOBER 2008
SOURCE: WORD files with 2 photos per page, photos 2a-2h

VISUAL RESOURCES - FIGURE 3

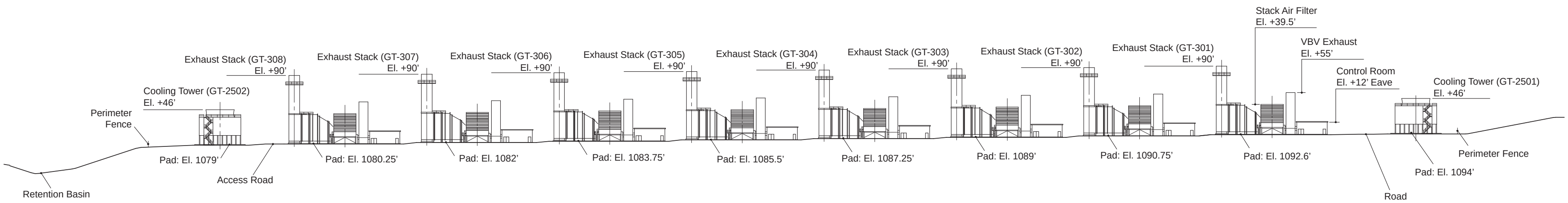
CPV Sentinel Energy Project - Site Plan



SOURCE: AFC Figure 2.4-1. Plot Plan

VISUAL RESOURCES - FIGURE 4

CPV Sentinel Energy Project - Site Elevation Looking West



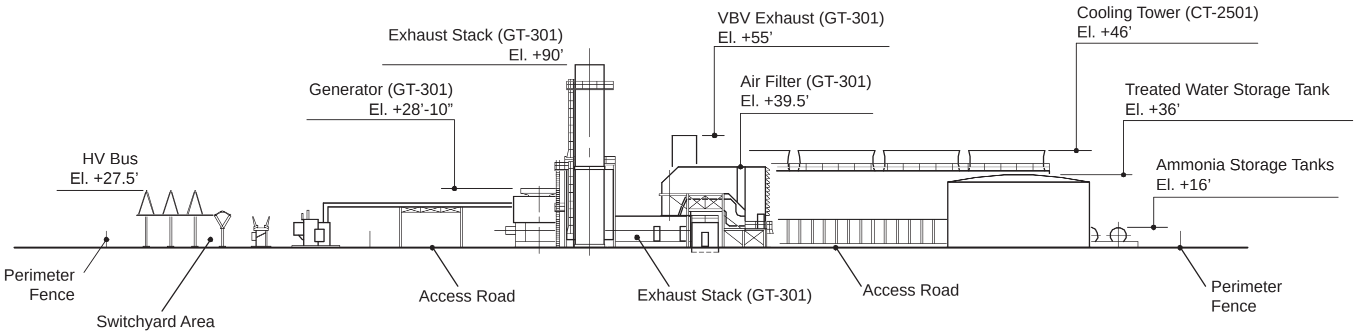
ELEVATION LOOKING WEST

NOTES:

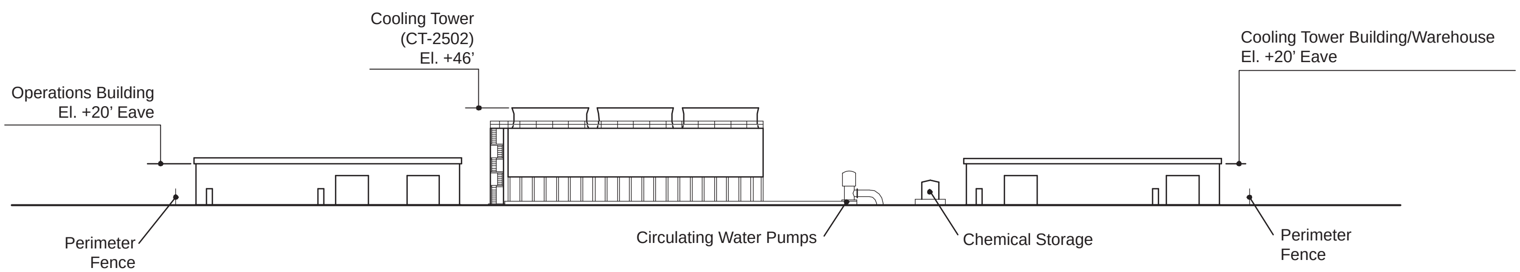
1. Equipment arrangement is based on preliminary information and shall be verified during final design.
2. Equipment elevations shown are based on best available information and shall be verified during final design.
3. Equipment elevations noted are heights above finished pads. See project grading plan for finished pad elevations not shown on this sheet.

SOURCE: AFC Figure 2.4-2. CPV Sentinel Power Plant Site Elevation Looking West

VISUAL RESOURCES - FIGURE 5
CPV Sentinel Energy Project - Site Elevation Looking North and South

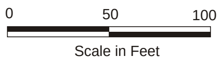


ELEVATION AT EXHAUST STACK GT-301 LOOKING NORTH



ELEVATION AT COOLING TOWER CT-2502 LOOKING SOUTH

NOTES:
1. Equipment arrangement is based on preliminary information and shall be verified during final design.
2. Equipment elevations shown are based on best available information and shall be verified during final design.
3. Equipment elevations noted are heights above finished pads. See project grading plan for finished pad elevations not shown on this sheet.

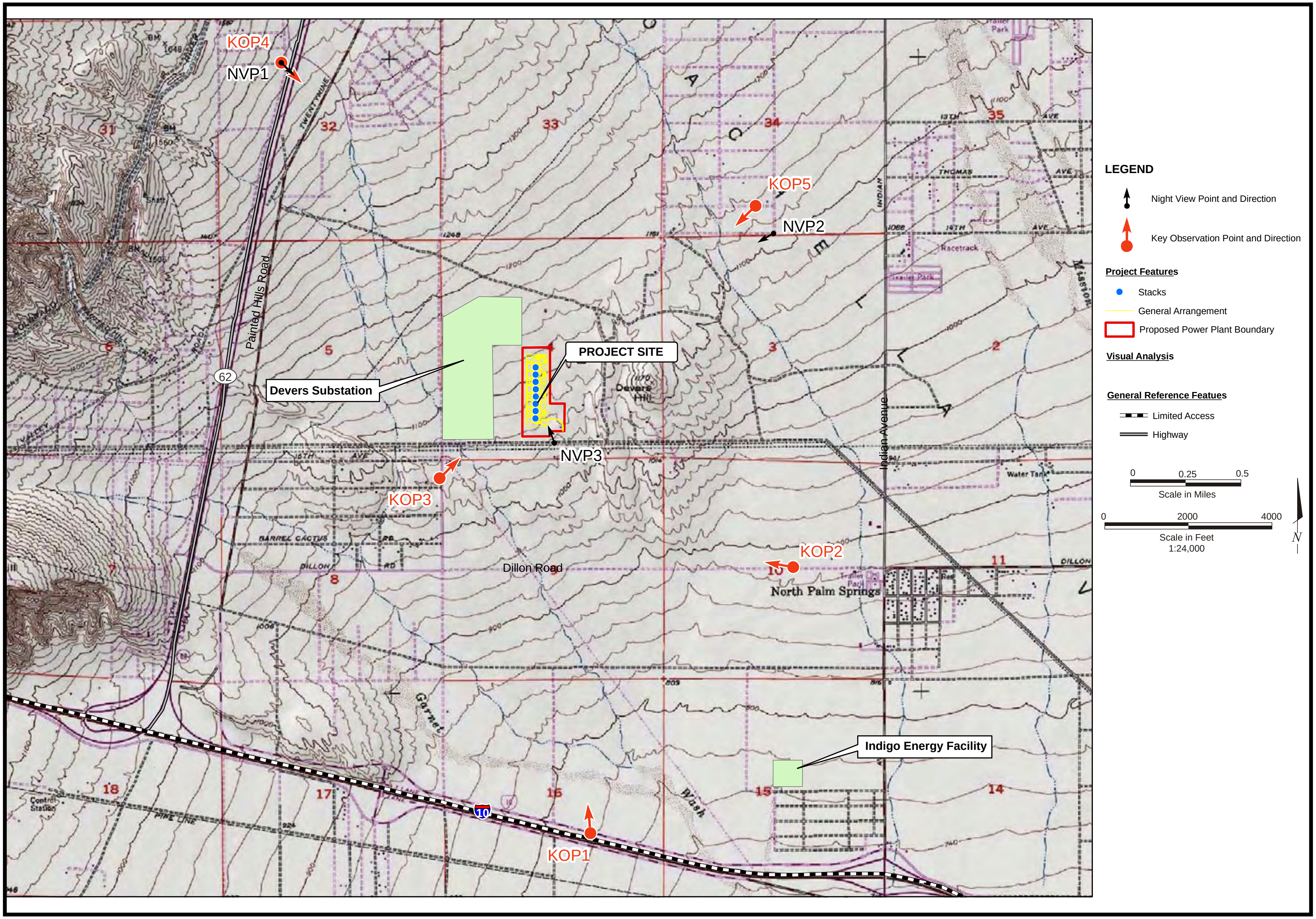


CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008
SOURCE: AFC Figure 2.4-3. CPV Sentinel Power Plant Site Elevation Looking North and South

OCTOBER 2008

VISUAL RESOURCES - FIGURE 6

CPV Sentinel Energy Project - Key Observation Point (KOP) Locations



VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: AFC Figure 7.11-3 Key Observation Point (KOP) Locations

VISUAL RESOURCES - FIGURE 7

CPV Sentinel Energy Project - KOP 1: View from I-10 Looking North - Existing Condition

Viewpoint Location Maps

LEGEND

Proposed Project Site

Proposed Transmission Line

Photograph Information

Time of photograph:	4:20 PM
Date of photograph:	Feb 21, 2007
Distance to project:	1.8 miles
Weather condition:	Clear
Viewing direction:	North
Latitude:	33°54'26.55"N
Longitude:	116°34'6.60"W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

VISUAL RESOURCES - FIGURE 8

CPV Sentinel Energy Project - KOP 1: View from I-10 Looking North - Simulation

Viewpoint Location Maps

LEGEND

- Proposed Project Site
- Proposed Transmission Line

Photograph Information

Time of photograph:	4:20 PM
Date of photograph:	Feb 21, 2007
Distance to project:	1.8 miles
Weather condition:	Clear
Viewing direction:	North
Latitude:	33°54'26.55"N
Longitude:	116°34'6.60"W

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

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SOURCE: AFC Figure 7.11-5. KOP 1: View from I-10 Looking North - Simulation

VISUAL RESOURCES - FIGURE 9

CPV Sentinel Energy Project - KOP 2: View from Dillon Road Looking Northwest - Existing Condition

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Viewpoint Location Maps

LEGEND

Proposed Project Site

Proposed Transmission Line

Photograph Information

Time of photograph:	12:28 PM
Date of photograph:	Feb 22, 2007
Distance to project:	1.25 miles
Weather condition:	Clear
Viewing direction:	Northwest
Latitude:	33°55'29.33"N
Longitude:	116°33'8.67"W

SOURCE: AFC Figure 7.11-6. KOP 2: View from Dillon Road Looking Northwest - Existing Condition

VISUAL RESOURCES - FIGURE 10

CPV Sentinel Energy Project - KOP 2: View from Dillon Road Looking Northwest - Simulation

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Viewpoint Location Maps

LEGEND

- Proposed Project Site
- Proposed Transmission Line

Photograph Information

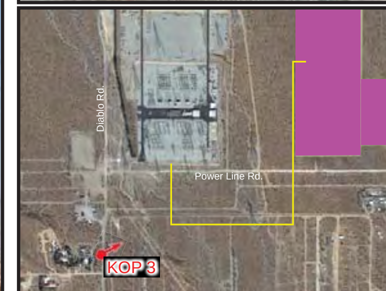
Time of photograph:	12:28 PM
Date of photograph:	Feb 22, 2007
Distance to project:	1.25 miles
Weather condition:	Clear
Viewing direction:	Northwest
Latitude:	33°55'29.33"N
Longitude:	116°33'8.67"W

SOURCE: AFC Figure 7.11-7. KOP 2: View from Dillon Road Looking Northwest - Simulation

VISUAL RESOURCES - FIGURE 11

CPV Sentinel Energy Project - KOP 3: View from Diablo Road Looking Northeast - Existing Condition

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.



Viewpoint Location Maps

LEGEND

- Proposed Project Site
- Proposed Transmission Line

Photograph Information

Time of photograph:	3:13 PM
Date of photograph:	Feb 21, 2007
Distance to project:	0.45 miles
Weather condition:	Clear
Viewing direction:	Northeast
Latitude:	33°55'50.75"N
Longitude:	116°34'48.99"W

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SOURCE: AFC Figure 7.11-8. KOP 3: View from Diablo Road Looking Northeast - Existing Condition

VISUAL RESOURCES - FIGURE 12

CPV Sentinel Energy Project - KOP 3: View from Diablo Road Looking Northeast - Simulation

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Viewpoint Location Maps

LEGEND

- Proposed Project Site
- Proposed Transmission Line

Photograph Information

Time of photograph:	3:13 PM
Date of photograph:	Feb 21, 2007
Distance to project:	0.45 miles
Weather condition:	Clear
Viewing direction:	Northeast
Latitude:	33°55'50.75"N
Longitude:	116°34'48.99"W

CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: AFC Figure 7.11-9. KOP 3: View from Diablo Road Looking Northeast - Simulation

VISUAL RESOURCES - FIGURE 13

CPV Sentinel Energy Project - KOP 4: View from Salton View Road Looking Southeast - Existing Condition

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Viewpoint Location Maps

LEGEND

- Proposed Project Site
- Proposed Transmission Line

Photograph Information

Time of photograph:	1:57 PM
Date of photograph:	Feb 21, 2007
Distance to project:	1.7 miles
Weather condition:	Hazy
Viewing direction:	Southeast
Latitude:	33°57'29.94"N
Longitude:	116°35'33.37"W

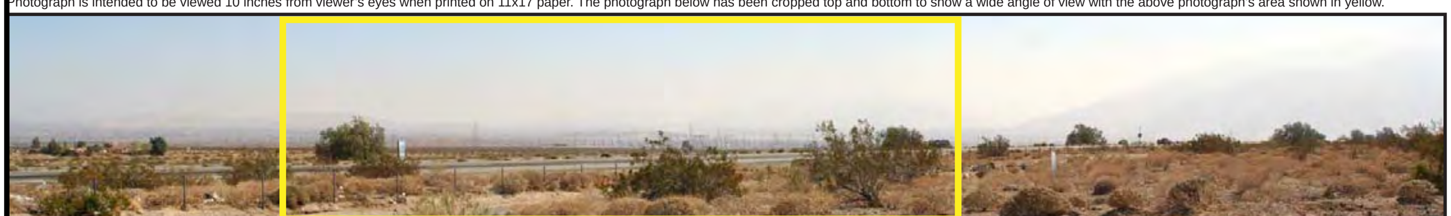
SOURCE: AFC Figure 7.11-10. KOP 4: View from Salton View Road Looking Southeast - Existing Condition

OCTOBER 2008

VISUAL RESOURCES - FIGURE 14

CPV Sentinel Energy Project - KOP 4: View from Salton View Road Looking Southeast - Simulation

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.



Viewpoint Location Maps

LEGEND

Proposed Project Site

Proposed Transmission Line

Photograph Information

Time of photograph:	1:57 PM
Date of photograph:	Feb 21, 2007
Distance to project:	1.7 miles
Weather condition:	Hazy
Viewing direction:	Southeast
Latitude:	33°57'29.94"N
Longitude:	116°35'33.37"W

VISUAL RESOURCES

SOURCE: AFC Figure 7.11-11. KOP 4: View from Salton View Road Looking Southeast - Simulation

VISUAL RESOURCES - FIGURE 15

CPV Sentinel Energy Project - KOP 5: View from Western Avenue Looking Southwest - Existing Condition

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Viewpoint Location Maps

LEGEND

- Proposed Project Site
- Proposed Transmission Line

Photograph Information

Time of photograph:	2:34 PM
Date of photograph:	March 7, 2007
Distance to project:	1.15 miles
Weather condition:	Hazy
Viewing direction:	Southwest
Latitude:	33°56'54.87"N
Longitude:	116°33'18.96"W

SOURCE: AFC Figure 7.11-12. KOP 5: View from Western Avenue Looking Southwest - Existing Condition

VISUAL RESOURCES - FIGURE 16

CPV Sentinel Energy Project - KOP 5: View from Western Avenue Looking Southwest - Simulation

Photograph is intended to be viewed 10 inches from viewer's eyes when printed on 11x17 paper. The photograph below has been cropped top and bottom to show a wide angle of view with the above photograph's area shown in yellow.

Viewpoint Location Maps

LEGEND

- Proposed Project Site
- Proposed Transmission Line

Photograph Information

Time of photograph:	2:34 PM
Date of photograph:	March 7, 2007
Distance to project:	1.15 miles
Weather condition:	Hazy
Viewing direction:	Southwest
Latitude:	33°56'54.87"N
Longitude:	116°33'18.96"W

SOURCE: AFC Figure 7.11-13. KOP 5: View from Western Avenue Looking Southwest - Simulation

WASTE MANAGEMENT

Testimony of Christopher Dennis, P.G.

SUMMARY OF CONCLUSIONS

Management of the waste generated during construction and operation of the proposed CPV Sentinel project would not result in any significant adverse impacts, and would comply with applicable waste management laws, ordinances, regulations, and standards (LORS), if the measures proposed in the Application for Certification (AFC) and staff's proposed conditions of certification are implemented. Additional information related to waste management is also covered in the **Hazardous Materials Management** and **Public Health** sections of this document. Discharge of wastewater is addressed in the **Soil and Water Resources** section of this document.

INTRODUCTION

The purpose of this section is to assess the potential impacts associated with the CPV Sentinel project's proposed generation and management of hazardous and nonhazardous wastes during its construction and operation. 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 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 during construction and operation would not result in significant adverse impacts on existing waste disposal facilities; and
- Upon project completion, the wastes from operations are managed in such a way that it would not pose a significant risk to humans or the environment.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

The following federal, state, and local environmental LORS have been established for the CPV Sentinel project and similar facilities to ensure the safe and proper management of both solid and hazardous wastes. These LORS are specifically intended to protect human health and the environment. Evaluation of project compliance with these LORS is a major component of staff's conclusions regarding acceptability of the CPV Sentinel project with respect to management of the generated 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 49, CFR, Parts 172 and 173. Hazardous Materials Regulations	These sections contain regulations promulgated by the EPA to implement the requirements of RCRA as described above. Characteristics of hazardous waste are described in terms of ignitability, corrosivity, reactivity, and toxicity, and specific types of wastes are listed.
Title 29, CFR, Part 1910.120 Occupational Safety and Health Standards for Hazardous Waste Operations and Emergency Response	This section sets forth the Occupational Safety and Health Standards (OSHA) hazardous waste operations and emergency response safety and communication requirements for facilities and employees working with toxic or hazardous materials. Among the requirements are a safety and health program, site characterization and analysis, site control, training, and medical surveillance and monitoring.
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.
California Water Code Section 13260	Requires filing with the appropriate Regional Water Quality Control Board (RWQCB) a report of waste discharge that could affect the water quality of the state, unless the requirement is waived pursuant to Water Code section 13269.
Public Resources Code, Division 30, §40000, et seq. California Integrated Waste Management Act of 1989.	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 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
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, CCR include: • Identification and Listing of Hazardous Waste (Chapter 11, §66261.1, et seq.) • Standards Applicable to Generator of Hazardous Waste (Chapter 12, §66262.10, et seq.) • Standards Applicable to Transporters of Hazardous Waste (Chapter 13, §66263.10, et seq.) • Standards for Universal Waste Management (Chapter 23, §66273.1, et seq.) • Standards for the Management of Used Oil (Chapter 29, §66279.1, et seq.) • Requirements for Units and Facilities Deemed to Have a Permit by Rule (Chapter 45, §67450.1, et seq.) The Title 22 regulations are established and enforced at the state level by DTSC. Some generator 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 CUPAs. The Riverside County Environmental Health Department is the CUPA for the CPV Sentinel 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.
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 4 year cycle, with a summary progress report due to DTSC every fourth year.
Title 22, CCR, §67100.1 et seq. Hazardous Waste Source Reduction and Management Review.	These regulations further clarify and implement the provisions of the Hazardous Waste Source Reduction and Management Review Act of 1989 (noted above). The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the Act.
Title 14, CCR Division 2, Chapter 4 Development, Regulation, and Conservation of Oil and Gas Resources	These regulations, promulgated under the authority of the Public Resources Code, Division 3 Oil and Gas, Chapter 1, apply statewide to drilling, production, and injection operations, and include specific procedures for proper abandonment of an oil or gas well.
Local	
Riverside County Ordinance 615	Permit requirements for generators of hazardous waste.
California Building Code and California Fire Code	Enforced by the local CUPA and Fire Department. Includes a requirement that businesses obtain permits for the use and storage of specified hazardous materials. This permit must be obtained before storing regulated hazardous wastes at the project site.
Policy	
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.
Colorado River Region, Water Quality Control Plan	The CPV Sentinel project is in the Mission Creek Groundwater Sub-basin of the Coachella Valley Groundwater Basin, under the jurisdiction of the Colorado River RWQCB. In compliance with the Porter-Cologne Water Quality Control Act, the Colorado River RWQCB is responsible for developing and implementing the Basin Plan for the Colorado River Region. This Basin Plan sets numerical and narrative water quality standards for controlling discharge of wastes within the Colorado River Region, including the standards that govern the CPV Sentinel project activity.
Riverside County, Countywide Integrated	This document sets forth the county's goals, policies, and programs for reducing dependence on landfilling solid wastes and increasing

Waste Management Plan	source reduction, recycling, and reuse of products and waste, in compliance with the California Integrated Waste Management Act. The plan also addresses the siting and development of recycling and disposal facilities and programs within the county.

SETTING

The proposed CVP Sentinel project is an 850-megawatt (MW) facility that would consist of eight simple-cycle natural gas-fired turbines designed to provide power during times of peak demand over the plant's projected lifespan of 30 years (CPVS2007a). The Sentinel project is proposed to be located in unincorporated Riverside County near Desert Hot Springs and Palm Springs in southern California.

Construction of the CPV Sentinel project would require approximately 37 acres, including a 3/4-acre retention basin (CPVS2007a). The project would include the construction of a 2.6-mile-long natural gas line from the Indigo power plant to the project site, a 2,300-foot long transmission line from the project site connecting to the Devers Substation, and a 3,200-foot long potable water supply line from Dillon Road to the south of the project site. The construction laydown area would be 14 acres in size.

Hazardous and non-hazardous solid and liquid waste, including wastewater, would be generated at the CPV Sentinel project during both construction and operation of the power plant (CPVS2007a). Non-hazardous solid and liquid waste would also be generated during the construction of the electric transmission and natural gas lines. All hazardous and non-hazardous waste, except wastewater, would either be recycled or transported to an appropriate landfill capable of accepting the waste.

The proposed project would use a zero liquid discharge (ZLD) system (CPVS2007a). This system would consist of membrane-based wastewater treatment processes (microfiltration and reverse osmosis) coupled with a crystallizer system. By this design, all of the plant's wastewater would be recycled within the plant. This wastewater would consist primarily of cooling tower blowdown, water from the inlet air foggers, and mobile demineralizer drains and rinses.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This Waste Management analysis addresses: (a) existing project site conditions involving potential contamination associated with prior activities at or near the project site and the appropriate management of that contamination during plant construction and operation; and (b) the impact to available disposal facilities from the management of hazardous and non-hazardous wastes generated 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 potential or existing releases of toxic/hazardous substances or contamination at the site. If potential or existing releases or contamination are identified, the potential for generating and managing hazardous or non-hazardous wastes must be addressed. Any unmitigated contamination or releases of substances that are not managed in accordance with applicable LORS 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 AFC. The Phase I ESA is conducted to identify conditions that indicate potential releases or threatened releases of toxic/hazardous substances at the site and to identify any areas known to be contaminated (or a source of contamination) at or near the site.

The Phase I ESA is completed by a qualified Environmental Professional (EP) who conducts inquiries into past uses and ownership of the site. The EP researches potential hazardous substance releases and disposal at the site and in the site vicinity. The EP also conducts a visual inspection of the site and site vicinity, making observations about potential contamination. After conducting all necessary file reviews, interviews, and site observations, the EP then provides a report of 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 soil and groundwater to verify the level of contamination and the potential for remediation at the site.

In conducting the assessment of a proposed project, Energy Commission staff would review the project's Phase I ESA and work with the appropriate oversight agencies as necessary to determine if additional site characterization is required. If any mitigation is necessary at the site, the Energy Commission staff would work with the appropriate oversight agencies to ensure protection of human health and the environment from any toxic/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 waste management methods and determines if the methods proposed are consistent with applicable LORS 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 non-

[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.

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 also reviews the capacity available at off-site treatment and disposal sites, and determines whether 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 percent 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 Phase I ESA of the proposed project site was completed in August 2006 (CPVS2007a). The Phase I was prepared by URS Corporation in accordance with the American Society for Testing and Materials (ASTM) Standard Practice E 1527-00 for ESAs, and was included as Appendix Q in Volume 3 of the project AFC (CPVS2007a). The results of the Phase I showed there were recognized environmental concerns (RECs) at the site related to past residential property use and oil/gas exploration activities. As a result of the RECs, a Phase II site investigation was recommended and completed in February 2007.

During the Phase II ESA, the soil and groundwater at the project site was tested for the presence of pesticides, herbicides, volatile and semi-volatile organic compounds, polychlorinated biphenyls, and metals (CPVS2007a). The testing consisted of the following analyses: volatile organic compounds (VOCs) using EPA Method 8260B; semi-volatile organic compounds (SVOCs) using EPA Method 8270C; California Assessment Manual (CAM) 17 metals using EPA Methods 6020 and 7471A; polychlorinated biphenyls (PCBs) using EPA Method 8082; organochlorine pesticides using EPA Method 8081A; and chlorinated herbicides using EPA Method 8151A. Detectable concentrations of metals and chemical compounds were identified in soil and detectable concentrations of metals were identified in the groundwater. Further analysis of these results and impacts of using groundwater for construction purposes is provided in the Public Health section of this document. Staff proposes Conditions of Certification **Waste-1** and **Waste-2** to ensure that the appropriate professionals oversee activities that may disturb contaminated soil, determine if further sampling and analysis is required, and comply with the requirements of the responsible regulatory authority.

The Phase I ESA also identified materials in the onsite buildings that could contain lead-based paint (LBP) or asbestos-containing materials (ACM) (CPVS2007a). CPV Sentinel stated in Data Response #29 that either the property owner or CPV Sentinel would remove these buildings. In the event that CPV Sentinel removes the buildings, the buildings would be fully surveyed for the presence of hazardous materials including LBP, ACM, mercury, and polychlorinated biphenyls (PCBs), and all hazardous wastes would be disposed of in accordance with all applicable LORS (URS2007f). Staff proposes that in any onsite building in which hazardous material is identified, the hazardous material would be removed and disposed of in accordance with Conditions of Certification **Waste-1** and **Waste-2**.

The Phase I ESA also found that, in the vicinity of the project site, there is an abandoned oil or gas well dating back to approximately 1927 (CPVS2007a). However, documentation identifying the location of the well is no longer available, and the well location could not be identified by an onsite visual site survey and geophysical survey. It is not known if the well was properly abandoned or if there is petroleum hydrocarbon contamination associated with the well or potentially heavy metal contamination associated with the well drilling muds. Staff proposes Condition of Certification **Waste-3** to ensure proper abandonment of this well if it is encountered during construction or operation of the project.

All soil and groundwater sampling was conducted at the power block property and did not include the linear facility corridors for this project (CPVS2007a). The linear facilities include a 2.6-mile long natural gas line, a 2,300-foot long transmission line, and a 3,200-foot long potable water supply line. Given the RECs identified at the site, staff proposes **Waste-4** which would require completion of a Phase 1 ESA along the project's natural gas and water pipeline corridors before construction begins.

Construction Impacts and Mitigation

Site preparation and construction of the proposed power plant and associated facilities would take approximately 18 months to complete and would generate both nonhazardous and hazardous wastes in solid and liquid forms (CPVS2007a). All wastes would be recycled to the extent possible. The maximum expected volume of wastes that would not be recycled during construction and operation are summarized in Table 2 below.

NON-RECYCLEABLE WASTE GENERATION Table 2
Estimated Maximum Quantity Generated Over the Project Lifetime

Waste Type	Construction		Operation	
	Non-Hazardous Waste	Hazardous Waste	Non-Hazardous Waste	Hazardous Waste
Solid (cubic yards)	3,816	306	33,870	360
Liquid (gallons)	858,000[1]	1,584	300,000[2]	None

1. Up to 750,000 gallons of pipe flushing and cleaning wastewater could be generated. Analytical results of the water would be needed to classify the water as hazardous or non-hazardous. Up to 108,000 gallons of sanitary water could be generated.

2. Up to 300,000 gallons of combustion turbine generator wash water could be generated. Analytical results of the water would be needed to classify the water as hazardous or non-hazardous.

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-5**. In addition, proposed Condition of Certification **Waste-6** would require the project owner to report construction or operation spills or releases of hazardous substances, material, or wastes and delineate and remediate these spills or releases as required by applicable LORS. Proposed Condition of Certification **Waste-7** would require the project owner to notify the Compliance Project Manager (CPM) within 10 days of becoming aware of any impending waste management-related enforcement action.

Non-hazardous Wastes

Non-hazardous solid wastes generated during construction would include wood, concrete, metal, paper, glass, and plastic (CPVS2007a). 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, section 17200 et seq.

Non-hazardous liquid wastes would also be generated during construction. These wastes include sanitary wastes, storm water runoff, pipe hydrotesting, and equipment wash water (CPVS2007a). Sanitary wastes would be collected in portable, self-contained toilets and pumped periodically for disposal at an appropriate facility. Potentially contaminated equipment wash water and hydrotesting water would be containerized and stored at designated areas until transported to a sanitary wastewater treatment facility. Stormwater would be managed in accordance with a site-specific Stormwater Pollution Prevention Plan (SWPPP). A draft SWPPP has been prepared for the project and, as discussed in the **Soil and Water Resources** section of this document, a final SWPPP would be developed before construction begins.

Hazardous Wastes

Hazardous wastes anticipated to be generated during construction include empty hazardous material containers, solvents, waste paint, welding materials, oil absorbents, used oil, oily rags and absorbent, batteries, and cleaning wastes. Hazardous wastes would be recycled when possible. If handled in the manner identified in the AFC (CPVS2007a), these wastes would present an insignificant risk to workers, the public, and the environment.

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-8**. Wastes would be accumulated onsite for less than 90 days and 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, 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-7**, to notify the 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-1** and **Waste-2** 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 CPV Sentinel project would generate non-hazardous and hazardous wastes in both solid and liquid forms under normal operating conditions. To ensure wastes are managed appropriately, proposed Condition of Certification **Waste-9** would require the project owner to develop and implement an Operations Waste Management Plan before operations could begin.

Non-hazardous Solid Wastes

Non-recyclable non-hazardous solid waste would be primarily from the ZLD system solids produced by that process and spent combustion turbine generator (CTG) air filters (CPVS2007a). These wastes would be disposed of at an appropriately licensed landfill. Staff proposes Condition of Certification **Waste-10** to ensure that any solids produced from the ZLD system are appropriately analyzed before disposal to a landfill.

Nonhazardous Liquid Wastes

Except for the CTG wash water, the nonhazardous liquid wastes that would be generated during facility operation, storm water runoff and sanitary wastewater, are also discussed in the **Soil and Water Resources** section of this document (CPVS2007a). The storm water runoff would be collected in an unlined, two-acre foot retention basin and allowed to percolate into the subsurface soil, contributing to groundwater recharge. The sanitary wastewater would be discharged onsite through an existing septic tank and leach field. Solids from the septic system would be removed once every three years to a Class III landfill with no significant impact to the landfill.

Over the life of the project, up to 300,000 gallons of CTG wash water could be generated (CPVS2007a). This water could be classified as hazardous depending on analytical results of the water. If this water is considered hazardous, it would be disposed of at a Class I landfill. Otherwise, the water could be sent to the unlined retention basin and allowed to percolate, contributing to groundwater recharge. This would be the preferred disposal method if allowable under existing LORS.

Hazardous Wastes

The project owner/operator would be considered the generator of hazardous wastes at the site during facility operations. Therefore, the project owner's unique hazardous waste generator identification number, obtained prior to construction in accordance with proposed Condition of Certification **Waste-8**, would be retained and used for hazardous waste generated during facility operation.

Hazardous wastes expected to be generated during routine project operation include used hydraulic fluids, oils, greases, oily filters and rags, spent selective catalytic reduction catalyst, cleaning solutions and solvents, and batteries (CPVS2007a). In addition, spills and unauthorized releases of hazardous materials or hazardous wastes could generate contaminated soils or materials that could require corrective action and management as hazardous waste. Proper hazardous material handling and good housekeeping practices would help keep spill wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils, water, or other waste materials generated from hazardous materials spills, staff proposes Condition of Certification **Waste-6** requiring the project owner/operator to report, clean-up, and remediate as necessary, any hazardous materials spills or releases in accordance with all applicable LORS.

The amounts of hazardous wastes generated during operation of the CPV Sentinel 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-7**, to notify the CPM whenever the owner becomes aware of any such action. More information on project hazardous materials management provisions, including emergency response and spill reporting and spill control and countermeasures plan requirements is provided in the **Hazardous Materials Management** and **Worker Safety and Fire Protection** sections of this document.

Impact on Existing Waste Disposal Facilities

Non-hazardous Solid Wastes

Non-hazardous solid waste would be recycled when possible, and non-recyclable solid waste would be disposed of at a Class III landfill (CPVS2007a). Approximately 3,816 cubic yards of non-recyclable solid waste are expected to be generated during construction and approximately 33,870 cubic yards during the project's lifetime operation. Table 3 summarizes information in Tables 7.13-2 and 7.13-3 of the project AFC which identify two non-hazardous (Class III) waste disposal facilities that could potentially receive the non-hazardous construction and operation wastes generated by the CPV Sentinel project: Lamb Canyon and Badlands Landfills.

NON-RECYCLEABLE NON-HAZARDOUS WASTE DISPOSAL Table 3
Class III Landfills Capable of Accepting Non-Recyclable Project Wastes

Landfill Name (Riverside County)	Permitted Capacity (million cubic yards)	Annual Usage (million tons)	Remaining Capacity (million cubic yards)	Estimated Closure Date	Approximate Distance from Site (miles)
Lamb Canyon	34.3	0.75	20.9	2023	32
Badlands	30.4	1.0	21.9	2016	40

The total amount of non-hazardous solid waste generated from project construction and operation would currently contribute less than one percent to the permitted remaining capacity of any one of the landfills shown in Table 3 (IWMB2007). The estimated date of closure of these landfills is between 2016 to 2023 (8 to 15 years). Staff expects that over the next 8 to 15 years, additional Class III landfills will be permitted and brought into operation. Therefore, staff finds that disposal of the solid wastes generated by the CPV Sentinel project can occur without significantly impacting the capacity or remaining life of any of these facilities.

Non-hazardous Liquid Wastes

As previously discussed, no non-hazardous liquid wastes would be generated that would be disposed of at a Class III landfill (CPVS2007a). All storm water would be allowed to percolate onsite in a retention basin and sanitary water would be processed through an onsite septic system.

Hazardous Solid Wastes

Hazardous solid waste would be reduced through source reduction and recycled when possible (CPVS2007a). Non-recyclable solid hazardous waste would be disposed of at a Class I landfill. Approximately 306 cubic yards of non-recyclable solid hazardous waste are expected to be generated during construction and approximately 360 cubic yards during the lifetime operation of the project (CPVS2007a). Table 4 summarizes information in Tables 7.13-2 and 7.13-3 of the project AFC which identify two hazardous (Class I) waste disposal facilities that could potentially receive these solid hazardous construction and operation wastes: the Buttonwillow and Kettleman Hills Landfills.

NON-RECYCLEABLE HAZARDOUS WASTE DISPOSAL Table 4
Class I Landfills Capable of Accepting Non-Recyclable Project Wastes

Landfill Name	Permitted Capacity (million cubic yards)	Annual Usage (million tons)	Remaining Capacity (million cubic yards)	Estimated Closure Date	Approximate Distance from Site (miles)
Buttonwillow (Kern County)	14.3	0.35	8.5	2040	238
Kettleman Hills (Kings County)	10.7	1.0	16.0	2013	282

The total amount of hazardous waste generated from project construction and operation would contribute less than one percent permitted capacity of any one of these landfills (IWMB2007) and, therefore, would not significantly impact the capacity or remaining life of these facilities.

Hazardous Liquid Wastes

No liquid hazardous waste would be generated during operation that would require disposal at a Class I landfill (CPVS2007a). All liquid hazardous waste would be reduced through source reduction and then recycled.

CUMULATIVE IMPACTS AND MITIGATION

As proposed, the amount of non-hazardous and hazardous wastes generated during construction and operation of the CPV Sentinel 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 reduction and recycling would be employed wherever practical, and sufficient capacity is available to handle the volumes of wastes generated by the project. Therefore, staff concludes that the incremental amount of waste generated by the CPV Sentinel project would not result in significant cumulative waste management impacts. To ensure ongoing oversight of the management of the wastes generated by the CPV Sentinel project, proposed Condition of Certification **Waste-11** would require the project owner to submit annual compliance reports to the CPM. Even though low-income and minority populations exist in the immediate project area, staff has not identified any significant unmitigated adverse waste management impacts with the proposed project or cumulative impacts; therefore, no significant adverse impacts to minority or low-income populations are expected to occur

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No public comments were received relating to waste management. The DTSC submitted comments regarding the AFC in a letter dated August 8, 2007 (DTSC2007a). The topics discussed in this letter have been addressed in this PSA section.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed CPV Sentinel 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 reduce waste and 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 CPV Sentinel project would be required to obtain a hazardous waste generator identification number from U.S. EPA. The CPV Sentinel 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 information that shows that there are minority populations within 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 would 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.

CONCLUSIONS

Staff has proposed Conditions of Certification **Waste-1** through **-11**. These conditions, as described below, require that:

- The project owner shall dispose of any hazardous materials or contaminated soil encountered during construction or operation of the power plant in compliance with all applicable LORS;
- If the project owner removes any onsite buildings, the project owner shall survey these onsite buildings for the presence for hazardous materials, and prepare a report that documents the results of the survey and recommends appropriate removal and disposal procedures as required by applicable LORS;
- The project owner shall properly abandon the oil/gas well in accordance with California Division of Oil, Gas, and Geothermal Resources (DOGGR) requirements;
- The project owner shall conduct a Phase I ESA along the natural gas and water pipeline corridors, such as pipelines and transmission lines in accordance with the ASTM guidelines;
- The project owner shall prepare and submit to the CPM a Construction Waste Management Plan and Operation Waste Management Plan for all wastes generated during construction and operation of the facility, respectively;
- The project owner shall ensure that the solids residue from the ZLD process are managed and disposed of in accordance with all applicable LORS;

- The project owner shall ensure that unauthorized releases of hazardous substances, materials, or wastes associated with the construction or operation of the project are reported, delineated, cleaned up, and remediated as required by applicable LORS;
- The project owner shall notify the CPM whenever the owner becomes aware of any impending waste management-related enforcement action;
- The project owner/operator shall obtain a unique hazardous waste generator identification number prior to construction and this number would be retained for hazardous waste generated during operation;
- The project owner shall submit annual waste management compliance reports to the CPM.

Staff concludes that management of the waste generated during construction and operation of the CPV Sentinel project would not result in significant adverse impacts, and would comply with applicable LORS, if staff's proposed conditions of certification are implemented.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall provide the resume of a Registered Professional Engineer or Geologist, who shall be available for consultation during soil excavation and grading activities, to the CPM for review and approval. The resume shall show experience in identification of hazardous materials, contaminated soils, and remedial investigation and feasibility studies. The Registered Professional Engineer or Geologist shall be given full authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil.

Verification: At least thirty (30) days prior to the start of site mobilization the project owner shall submit the resume to the CPM for review and approval.

WASTE-2 If potentially hazardous material or contaminated soil is identified during project construction or operation at the proposed site or natural gas and water pipeline corridors as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of the hazardous material or contamination soil, and file a written report to the project owner, appropriate regulatory agency, and CPM stating the recommended course of action.

The Registered Professional Engineer or 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 Registered Professional Engineer or Geologist, significant remediation may be required, the project owner shall contact representatives of the Riverside County Department of Environmental Health for guidance and possible oversight.

Verification: The project owner shall submit any final reports filed by the Registered Professional Engineer or Geologist to the CPM within five (5) days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-3 If an abandoned well is located during construction or operation, the project owner shall comply with Division of Oil, Gas, and Geothermal Resources (DOGGR) procedures for abandonment of an orphaned oil or gas wells and CCR Title 14, Division 2. The project owner shall also submit to the DOGGR, in writing: (1) a detailed description of the status of the oil/gas well; (2) an explanation of the results of the visual site survey and geophysical survey; and (3) a request, in accordance with DOGGR requirements to certify the well has been properly abandoned.

Verification: A copy of the project owner's written submittal to the DOGGR and a copy of the DOGGR response indicating the well has been properly abandoned, shall be forwarded to the CPM within 10 days of submittal and receipt of response.

WASTE-4 The project owner shall conduct a Phase I ESA along the proposed natural gas and water pipeline corridors before construction begins. This Phase 1 ESA shall be conducted in accordance with ASTM Standard Practice E 1527-00 or other acceptable method for ESAs. A report documenting the result of the Phase I ESA shall be submitted to the CPM. IF any RECs are indentified, the project owner shall coordinate with the CPM and identify appropriate mitigation measures and ensure all concerns are addressed prior to commencement of construction in the affected areas.

Verification: The project owner shall submit to the CPM a copy of the Phase I ESA within 30 days of completion of the Phase I ESA and 60 days before construction begins.

WASTE-5 To manage construction generated waste, the project owner shall develop and implement a Construction Waste Management Plan before beginning construction. The Construction Waste Management Plan shall include detailed information about how construction generated waste would be managed from the time it was generated to the time it is recycled or land filled. 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;
- Procedures for handling contaminated soil or water that could be encountered during construction; 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.

<u>Verification:</u> 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-6 The project owner shall ensure that spills or releases of hazardous substances, hazardous materials, or hazardous wastes associated with the construction or operation of the project are reported, delineated, cleaned-up, and remediated as necessary, under the supervision of a California Professional Geologist or Engineer and in accordance with the requirements of the Riverside County Department of Environmental Health. This responsibility excludes construction of the transmission lines, which will be installed and maintained by Southern California Edison.

<u>Verification</u>: The project owner shall document unauthorized spills or releases 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.

WASTE-7 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.

<u>Verification</u>: 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 would be required in the way project-related wastes are managed.

WASTE-8 The project owner shall obtain a hazardous waste generator identification number from the U.S. EPA prior to generating any hazardous waste during construction and operations in accordance with CCR Title 22, Division 4.5.

<u>Verification:</u> 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 all compliance reports.

WASTE-9 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 would 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 would be managed and disposed upon closure of the facility.

Verification: The project owner shall submit the Operation Waste Management Plan to the DTSC and RWQCB (copy 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 DTSC and RWQCB (copy to the CPM) within 20 days of notification from the CPM that revisions are necessary.

WASTE-10 At a minimum, the project owner shall conduct annual analyses of the solids residue from the ZLD process to determine if the solids are hazardous or non-hazardous and ensure appropriate disposal of the solids residue. The project owner shall also conduct analyses of the ZLD solids after any change in water supply to determine if the solids are hazardous or non-hazardous.

Verification: The project owner shall submit to the CPM a copy of documentation showing appropriate disposal of the ZLD solids within 10 days of the disposal.

WASTE-11 The project owner shall submit annual compliance reports to the CPM documenting the annual volumes of wastes generated and the method used to manage the waste generated, such as recycling or disposal. If such waste are disposed of offsite, the disposal facility(s) name and address shall be included in the report.

Verification: 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. The annual compliance report shall include a comparison of the actual waste generation and management methods used as compared to those proposed in the original Operation Waste Management Plan. The Operation Waste Management Plan shall be updated as necessary to address current waste generation and management practices.

REFERENCES

CPVS2007a – CPV Sentinel, LLC / D. Shileikis (tn: 41166). CPV Sentinel Application for Certification – Volume 1, 2, & 3. Dated on 6/25/2007. Submitted to CEC/Docket Unit on 6/25/2007.

DTSC2007a – Department of Toxic Substances Control / G. Holmes (tn: 43883). Letter from Department of Toxic Substances RE: Request for Agency Participation in the Review of Sentinel. Dated on 12/20/2007. Submitted to CEC/Docket Unit on 12/26/2007.

IWMB2007 – Integrated Waste Management Board, webpage http://www.ciwmb.ca.gov/landfills/tonnages/Default.aspx, May 1, 2008.

URS2007f – URS / D. Shileikis (tn: 43227). Responses to Data Requests. Dated on 11/5/2007. Submitted to CEC/Docket Unit on 11/5/2007.

WORKER SAFETY AND FIRE PROTECTION

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

SUMMARY OF CONCLUSIONS

Staff concludes that if the applicant for the proposed CPV Sentinel Energy Project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by Conditions of Certification **WORKER SAFETY -1** and **-2** and fulfils the requirements of Conditions of Certification **WORKER SAFETY-3** through **-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards. The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant will be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable laws, ordinances, regulations, and standards.

INTRODUCTION

Worker safety and fire protection is regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The purpose of this analysis is to assess the worker safety and fire protection measures proposed by the CPV Sentinel Energy Project (CPV Sentinel) and to determine whether the applicant has proposed adequate measures to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response procedures.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Worker Safety and Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 29 U.S. Code section 651 et seq. (Occupational Safety and Health Act of 1970)	This act mandates safety requirements in the workplace with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC § 651).
Title 29 Code of Federal Regulations (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 sections1910.1 to 1910.1500.
State	
Title 8 California Code of Regulations (CCR) all applicable sections (Cal/OSHA regulations)	These sections require that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during construction, commissioning, and operation of power plants, as well as safety around electrical components; fire safety; and hazardous materials use, storage, and handling.
24 CCR section 3, et seq.	This section incorporates the current addition of the Uniform Building Code.
Health and Safety Code section 25500, et seq.	This section includes Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	These sections require a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.
Local (or locally enforced)	
Title 24, California Code of Regulations (CCR) sections 3 et seq.	The 2007 edition of the California Building Code is enforced by the City of Palm Desert and is comprised of 11 parts containing building design and construction requirements as they relate to fire, life, and structural safety. It incorporates the current edition of the 2006 International Building Code.

2007 Edition of California Fire Code (24 CCR Part 9)	The California Fire Code is based upon the standards of the 2006 International Fire Code. The fire code contains general provisions for fire safety, including: 1) required road and building access; 2) water supplies; 3) installation of fire protection and life safety systems; 4) fire-resistive construction; 5) general fire safety precautions; 6) storage of combustible materials; 7) exits and emergency escapes; and 8) fire alarm systems. The 2007 edition is enforced by the Palm Springs Fire Department.

SETTING

The proposed facility would be located in the city of Palm Springs within an industrial area that is currently served by the local fire department. Fire support services to the site would be under the jurisdiction of the city of Palm Springs Fire Department (PSFD). The response time from the closest station to CPV Sentinel is about 10 minutes.

The PSFD would also be the first responder to hazardous materials incidents, with backup support provided by the Riverside County Department of Environmental Health Hazardous Materials Incident Response Team. The Riverside County Department of Environmental Health is capable of handling any hazardous materials-related incident that might occur at the proposed facility.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The Worker Safety and Fire Protection section assesses two issues:

1. the potential for impacts on the safety of workers during demolition, construction, and operations activities; and

2. fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

California Division of Occupational Safety and Health (Cal/OSHA) regulations thoroughly address worker safety issues. If all LORS are followed, workers will be adequately protected. Thus, the standard for staff's review and determination of significant impacts on workers is whether or not the applicant has demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal/OSHA standards.

Regarding fire prevention matters, staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If proposed on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates whether the local fire department's capabilities and response time are sufficient 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.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Worker Safety

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed CPV Sentinel project would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important that CPV Sentinel has well-defined policies and procedures, training, and hazard recognition and control at its facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers would be adequately protected from health and safety hazards.

The applicant would prepare a Safety and Health Program to minimize worker hazards during construction and operation. Staff uses the phrase *Safety and Health Program* to refer to the measures that would be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

CPV Sentinel encompasses construction and operation of a natural gas-fired facility. Workers would be exposed to hazards typical of construction and operation of a gas-fired simple cycle facility.

Construction Safety Orders are published in Title 8 California Code of Regulations (CCR) sections 1502 et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phase of the project. The Construction Safety and Health Program would include the following:

- Construction Injury and Illness Prevention Program (8 CCR § 1509)
- Construction Fire Prevention Plan (8 CCR § 1920)
- Personal Protective Equipment Program (8 CCR §§ 1514 to 1522)
- 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) would include:

- Electrical Safety Program
- Motor Vehicle and Heavy Equipment Safety Program
- Forklift Operation Program
- Excavation/Trenching Program
- Fall Protection Program
- Scaffolding/Ladder Safety Program

- Articulating Boom Platforms Program
- Crane and Material Handling Program
- Housekeeping and Material Handling and Storage Program
- Respiratory Protection Program
- Employee Exposure Monitoring Program
- Hand and Portable Power Tool Safety Program
- Hearing Conservation Program
- Back Injury Prevention Program
- Hazard Communication Program
- Heat and Cold Stress Monitoring and Control Program
- Pressure Vessel and Pipeline Safety Program
- Hazardous Waste Program
- Hotwork Safety Program
- Permit-Required Confined Space Entry Program

The Application for Certification (AFC) includes adequate outlines of each of the above programs (CPV Sentinel 2007a). Prior to the start of construction of CPV Sentinel, detailed programs and plans would be provided to the California Energy Commission Compliance Project Manager (CPM) and to the PSFD pursuant to Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at CPV Sentinel, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

- Injury and Illness Prevention Program (8 CCR § 3203)
- First Aid, CPR, and Automated External Defibrillator
- Fire Protection and Prevention Program (8 CCR § 3221)
- Personal Protective Equipment Program (8 CCR §§ 3401 to 3411)
- 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 be applicable to the project. Written safety programs for CPV Sentinel, which the applicant will develop, would ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Injury and Illness Prevention Program, Emergency Action Plan, Fire Prevention Program, and Personal Protective Equipment

Program (CPV Sentinel 2007a). Prior to operation of CPV Sentinel, all detailed programs and plans would be provided to the CPM and PSFD 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

The Injury and Illness Prevention Program would include the following components as presented in the AFC (CPV Sentinel 2007a):

- identity of person(s) with authority and responsibility for implementing the program;
- safety and health policy of the plan;
- definition of work rules and safe work practices for construction activities;
- system for ensuring that employees comply with safe and healthy work practices;
- system for facilitating employer-employee communications;
- procedures for identifying and evaluating workplace hazards and developing necessary program(s);
- methods for correcting unhealthy/unsafe conditions in a timely manner;
- specific safety procedures; and
- training and instruction.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 CCR § 3221). The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff (CPV Sentinel 2007a). The plan would accomplish 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 alarm and/or communication system(s);
- provide portable fire extinguishers at appropriate site locations;
- locate fixed firefighting 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 personnel to contact for information on plan contents.

Staff proposes that the applicant submit a final Fire Prevention Plan to the CPM for review and approval and to the PSFD 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 and first aid supplies whenever hazards are present that, due to process, environment, chemicals, or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (8 CCR §§ 3380 to 3400). The CPV Sentinel operational environment would require personal protective equipment.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and would carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following detail pertaining to the protective clothing and equipment:

- proper use, maintenance, and storage;
- information on when to use the protective clothing and equipment;
- benefits and limitations; and
- information on when and how to replace the protective clothing and equipment.

The Personal Protective Equipment Program ensures that employers comply with the applicable requirements for the program and provides employees with the information and training necessary to protect them from potential workplace hazards.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 CCR § 3220). The AFC contains a satisfactory outline for an emergency action plan (CPV Sentinel 2007a), which will accomplish the following:

- establish emergency escape procedures and emergency escape route for the facility;
- determine procedures to be followed by employees who remain to operate critical plant operations before they evacuate;
- provide procedures to account for all employees and visitors after emergency evacuation of the plant has been completed;
- specify rescue and medical duties for assigned employees;
- identify fire and emergency reporting procedures to regulatory agencies;

- develop alarm and communication systems for the facility;
- establish a list of personnel to contact for information on the plan contents;
- provide emergency response procedures for ammonia release; and
- determine and establish training and instruction requirements and programs.

Written Safety Program

In addition to the specific plans listed above, additional LORS called “safe work practices” apply to the project. Both the Construction and the Operations Safety Programs would address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs found under the heading “Construction Safety and Health Program” earlier in this staff assessment.

Safety Training Programs

Employees would be trained in the safe work practices described in the above-referenced safety programs.

Additional Mitigation Measures

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the National Institute for Occupational Safety and Health (NIOSH):

- More than seven million persons work in the construction industry, representing 6% of the labor force. Approximately 1.5 million of these workers are self employed.
- Of approximately 600,000 construction companies, 90 percent employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980 to 1993, an average of 1,079 construction workers were killed on the job each year, totaling more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6 percent) between 1980 and 1993.
- Construction injuries account for 15 percent of workers' compensation costs.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.
- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer work sites typical of large, complex, industrial-type projects such as the construction of 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 personnel. This reduction and/or elimination of hazards has been evident in the audits of power plants under construction recently conducted by the staff.

The federal Occupational Safety and Health Administration (OSHA) has 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 for the elimination of the four 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 those subcontractors with exemplary safety and health programs.

To date, neither OSHA nor Cal/OSHA require that an employer hire or provide for a Construction Safety Officer. OSHA and Cal/OSHA regulations do, however, require that safety be provided by an employer, and the term “Competent Person” is used in many OSHA and Ca/OSHA standards, documents, and directives. A “Competent Person” is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3,** which would require the applicant/project owner to designate and provide for a power plant site Construction Safety Supervisor.

As discussed above, the hazards associated with the construction industry are well documented, and these hazards increase in complexity in the multi-employer work sites typical of large, complex, industrial-type projects such as the construction of gas-fired power plants.

Accidents, fires, and a worker death have occurred at facilities certified by the Energy Commission in the recent past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

- lack of posted confined space warning placards/signs;
- confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;
- confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;
- dangerous placement of hydraulic elevated platforms under each other;
- inappropriate placement of fire extinguishers near hotwork;
- dangerous placement of numerous power cords in standing water on the site, thus increasing the risk of electrocution;

- construction of an unsafe aqueous ammonia unloading pad;
- inappropriate and unsecure placement of aboveground natural gas pipelines inside the facility but too close to the perimeter fence; and
- lack of adequate employee or contractor written training programs addressing proper procedures to follow in the event of finding suspicious packages or objects either on or off site.

To reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a professional Safety Monitor on site to track compliance with Cal/OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand over to operational status. These requirements are outlined in Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner, but reporting to the Chief Building Official and CPM, will serve as an extra set of eyes to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged the team in questions about its findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a fresh perspective of the site.

Fire Hazards

During construction and operation of the proposed CPV Sentinel project, there is the potential for both small fires and major structural fires. Electrical sparks; combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, or insulating fluid at the power plant switchyard; or flammable liquids, explosions, and over-heated equipment may cause small fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely to develop at power plants. Fires and explosions of natural gas or other flammable gasses or liquids are rare. Compliance with all LORS would be adequate to assure protection from all fire hazards.

The project would rely on both on-site fire protection systems and local fire protection services. The on-site fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the PSFD.

Construction

During construction, portable fire extinguishers would be placed throughout the site at appropriate intervals and periodically maintained, and safety procedures and training would be implemented in accordance with the guidelines of the Construction Fire Protection and Prevention Program.

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 National Fire Protection Association (NFPA) standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements with one exception (see below). Fire suppression elements in the proposed plant would include both fixed and portable fire extinguishing systems. The fire water would be potable water supplied from the Sweetwater Authority (CPV Sentinel 2007a).

A fixed sprinkler system would be installed in areas of risk and in administrative buildings in accordance with NFPA requirements. A carbon dioxide and dry chemical fire protection system would be provided for the combustion turbine generators and accessory equipment. This system would have fire detection sensors that would trigger alarms, turn off ventilation, close ventilation openings, and automatically actuate the CO_2 and chemical suppression system. In addition to the fixed fire protection system, the appropriate class of service portable extinguishers and fire hydrants would be located throughout the facility at code-approved intervals (CPV Sentinel 2007a). These systems are standard requirement by the NFPA and the Uniform Fire Code, and staff has determined that they would ensure adequate fire protection.

The applicant would be required by Conditions of Certification **WORKER SAFETY-1** and **-2** to provide the final Fire Protection and Prevention Program to staff and to the PSFD prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

Emergency Medical Services Response

Staff conducted a statewide survey to determine the frequency of emergency medical services (EMS) response and off-site firefighter response for natural gas-fired power plants in California. The purpose of the analysis was to determine what impact, if any, power plants may have on local emergency services. Staff has concluded that incidents at power plants that require fire or EMS response are infrequent and represent an insignificant impact on the local fire departments, except for rare instances where a rural fire department has mostly volunteer firefighting staff. However, staff has determined that the potential for both work-related and nonwork-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 nonwork-related incidents, including those involving visitors. The need for prompt response within a few minutes is well documented in the medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site automatic external defibrillator (AED); the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for the maintenance of on-site cardiac defibrillation devices at many private and public locations (e.g., airports, factories, government buildings). Therefore, staff concludes that, with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a device on site to address cardiac arrythmias resulting from industrial accidents or other nonwork-related causes.

The applicant's outline of the Operations Health and Safety Program contains a First Aid, CPR, and Automated External Defibrillator Program. This program would include specifications for general requirements, a written program, training, and maintenance of the first aid and defibrillator equipment (CPVSentinel 2007a). Staff proposes a Condition of Certification **WORKER SAFETY-5** which would require that this portable AED be located on site, that all power plant employees on site during operations be trained in its use, and that a representative number of workers on site during construction and commissioning also be trained in its use.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of the CPV Sentinel project combined with existing industrial facilities and expected new facilities, including the nearby manufacturing development, to result in impacts on the fire and emergency service capabilities of the PSFD and found that cumulative impacts were insignificant. The PSFD is adequately staffed and equipped to serve as first responder to any incident at the proposed facility, and in the case of a large-scale incident, the PSFD may utilize its mutual aid.

Given the industrial area where the project is proposed to be built and the lack of unique fire hazards associated with a modern gas-fired power plant, staff finds that this project would not have any significant incremental burden on the department's ability to respond to a fire or medical emergency.

CONCLUSIONS

Staff concluded that if the applicant for the proposed CPV Sentinel project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by Conditions of Certification **WORKER SAFETY-1**, and **-2** and fulfils the requirements of Conditions of Certification **WORKER SAFETY-3** through **-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concluded that incidents at power plants that require fire or EMS response are infrequent and represent an insignificant impact on the local fire departments.

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
- 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 programs with all applicable Safety Orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Palm Springs Fire Department for review and comment prior to submittal to the CPM for approval.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Palm Springs 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
- a Hazardous Materials Management Program
- an Operation Fire Prevention Program (8 CCR § 3221)
- a 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 comment concerning compliance of the programs with all applicable Safety Orders. The Operation Fire Prevention Plan, the Hazardous Materials Management Program, and the Emergency Action Plan shall also be submitted to the Palm Springs Fire Department for review and comment.

Verification: At least 30 days prior to the start of first fire or commissioning, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Palm Springs 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 construction activities; and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;
- assure that all construction and commissioning workers and supervisors receive adequate safety training;

- complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; and
- assure that all the plans identified in Conditions of Certification **WORKER SAFETY-1** and **-2** are implemented.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement CSS shall be submitted to the CPM within one business day.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- summary report of safety management actions and safety-related incidents that occurred during the month;
- report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO and will be responsible for verifying that the Construction Safety Supervisor, as required in Condition of Certification **WORKER SAFETY-3**, implements all appropriate Cal/OSHA and Energy Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: Prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that a portable automatic external defibrillator (AED) is located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During construction and commissioning, the following persons shall be trained in use of the AED 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 use of the AED. The training program shall be submitted to the CPM for review and approval.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM proof that a portable automatic external defibrillator (AED) exists on site and a copy of the training and maintenance program for review and approval.

REFERENCES

California Fire Code 1998. 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.

CPVS2007a – CPV Sentinel, LLC / D. Shileikis (tn: 41166). CPV Sentinel Application for Certification – Volume 1, 2, & 3. Dated 6/25/2007. Submitted to CEC/Docket Unit on 6/25/2007.

Uniform Fire Code 1997, 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.

United States Occupational Safety and Health Administration. 1993. *Process Safety Management / Process Safety Management Guidelines for Compliance*. U.S. Department of Labor, Washington, D.C.

ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Erin Bright

SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that the design, construction, and eventual closure of the CPV Sentinel Energy 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 CPV Sentinel Energy Project. The purpose of this analysis is to:

- verify that the laws, ordinances, regulations and standards (LORS) that apply to the engineering design and construction of the project have been identified;
- verify that both the project and its ancillary facilities are sufficiently described, including proposed design criteria and analysis methods, in order to provide reasonable assurance that the project will be designed and constructed in accordance with all applicable engineering LORS, in a manner that also ensures the public health and safety;
- determine whether special design features should be considered during final design to address conditions unique to the site which could influence public health and safety; and
- describe the design review and construction inspection process and establish the conditions of certification used to monitor and ensure compliance with the engineering LORS, in addition to any special design requirements.

Subjects discussed in this analysis include:

- identification of the engineering LORS that apply to facility design;
- evaluation of the applicant's proposed design criteria, including identification of criteria essential to public health and safety;
- proposed modifications and additions to the application for certification (AFC) necessary for compliance with applicable engineering LORS; and
- conditions of certification proposed by staff to ensure that the project will be designed and constructed to ensure public health and safety and comply with all applicable engineering LORS.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical, and electrical) are described in the AFC (CPVS 2007a, AFC Table 2.10-1, Appendices B through F). 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	Riverside County Code of Building Regulations
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 CPV Sentinel Energy Project (CPV Sentinel) will be located on a 37-acre parcel within an unincorporated region of Riverside County. The site lies in Seismic Risk Zone 4. For more information on the site and related project description, please see the **Project Description** section of this document. Additional engineering design details are contained in the AFC (CPVS 2007a, Appendices B through F).

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 CPVS 2007a, Appendices B through F, 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 capable of becoming potential health and safety hazards if not constructed according to applicable engineering LORS. Major structures and equipment are identified in the proposed Condition of Certification (**GEN-2),** below.

The CPV Sentinel project 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 (CPVS 2007a, AFC § 2.9.8) describes a quality program intended to ensure 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 the CPV Sentinel project is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Section 104.1 in Appendix Chapter 1 of the CBC, the CBO is authorized and directed to enforce all provisions of the CBC. The Energy Commission itself serves as the building official and has the responsibility to enforce the code for all of the energy facilities it certifies. In addition, the Energy Commission has the power to interpret the CBC and adopt and enforce both rules and supplemental regulations that clarify application of the CBC's provisions.

The Energy Commission's design review and construction inspection process conforms to CBC requirements and ensures that all facility design conditions of certification are met. As provided by Section 103.3 in Appendix Chapter 1 of the CBC, the Energy Commission appoints experts to perform design review and construction inspections and act as delegate CBOs on behalf of the Energy Commission. These delegates 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, Section 108 in Appendix Chapter 1, pays the cost of these reviews and inspections. While building permits in addition to Energy Commission certification are not required for this project, the applicant, consistent with CBC Section 108, pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will invite Riverside County or a third-party engineering consultant to act as CBO for this project. When an entity has been assigned CBO duties, Energy Commission staff will complete a memorandum of understanding (MOU) with that entity to outline both its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed conditions of certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities, and qualifications of the engineers who will design and build the proposed project (Conditions of Certification **GEN-1** through **GEN-8**). These engineers must be registered in California and sign and stamp every submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that every element of the project's construction (subject to CBO review and approval) be approved by the CBO before it is performed. They also require that qualified special inspectors perform or oversee special inspections required by all applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written so that no element of construction (of permanent facilities subject to CBO review and approval) that could be difficult to reverse or correct can proceed without prior CBO approval. Elements of construction that are not difficult to reverse may proceed without approval of the plans. The applicant bears the responsibility to fully modify construction elements in order to comply with all design changes resulting from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service (decommissioning) when it reaches the end of its useful life ranges from "mothballing" to the removal of all equipment and appurtenant facilities and subsequent restoration of the site. Future conditions that could affect decommissioning are largely unknown at this time.

In order to ensure that decommissioning will be completed in a manner that is environmentally sound, safe, and protects the public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval before the project's decommissioning begins. The plan shall include a discussion of:

- proposed decommissioning activities for the project and all appurtenant facilities that were constructed as part of the project;
- all applicable LORS, 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 CPV Sentinel 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 Riverside County Code of Building Regulations, the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering laws, ordinances, regulations and standards (LORS) in effect at the time initial design plans are submitted to the chief building official (CBO) for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility (2007 CBC, Appendix Chapter 1, § 101.2, Scope). All transmission facilities (lines, switchyards, switching stations and substations) are covered in the conditions of certification in the **Transmission System Engineering** section of this document.

In the event that the initial engineering designs are submitted to the CBO when the successor to the 2007 CBSC is in effect, the 2007 CBSC provisions shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

The project owner shall ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed and materials supplied comply with the codes listed above.

Verification: Within 30 days following receipt of the certificate of occupancy, the project owner shall submit to the compliance project manager (CPM) a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO (2007 CBC, Appendix Chapter 1, § 110, Certificate of Occupancy).

Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

GEN-2 Before submitting the initial engineering designs for CBO review, the project owner shall furnish the CPM and the CBO with a schedule of facility design submittals, master drawing and master specifications lists. The schedule shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM upon request.

Verification: At least 60 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the master drawing and master specifications lists of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **FACILITY DESIGN Table 2,** below. Major structures and equipment shall be added to or deleted from the table only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

FACILITY DESIGN Table 2
Major Structures and Equipment List

Equipment/System	Quantity (Plant)
Combustion Gas Turbine (CGT) Foundation and Connections	8
CGT Generator Foundations and Connections	8
CTG Intercooler Foundations and Connections	8
CTG Inlet Air Filter Foundations and Connections	8
Exhaust Stack Foundations and Connections	8
Selective Catalytic Reduction Skid Foundations and Connections	8
CTG Auxiliary Skid Foundations and Connections	8
CTG Pump Skid Foundations and Connections	8
GSU Transformer Foundations and Connections	8
Unit Control/Electrical Room Foundations and Connections	8
Auxiliary Power Transformers Foundations and Connections	8
Gas Compression Building Foundations and Connections	2
Cooling Tower Foundations and Connections	2
Cooling Tower Building/Warehouse Foundations and Connections	2
Switchgear Building Foundations and Connections	2
Operations Building Foundations and Connections	2
MCC Building Foundations and Connections	2
Circulating Water Pump Foundations and Connections	2
Raw Water Storage Tank Foundations and Connections	2
Treated Water Storage Tank Foundations and Connections	2
Ammonia Storage Tank Foundations and Connections	1
Waste & Wastewater Treatment Facility Foundations and Connections	1
Oil/Water Separator & Drain Sump Foundations and Connections	1
Fire Protection Pump Enclosure Foundations and Connections	1
Black State Generator Foundations and Connections	1
Prefabricated Assemblies	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 (2007 CBC, Appendix Chapter 1, § 108, Fees; Chapter 1, § 108.4, Permits, Fees, Applications and Inspections), 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, structural engineer, or civil engineer, as the resident engineer in charge of the project (2007 California Administrative Code, § 4-209, Designation of Responsibilities). All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the conditions of certification in the **Transmission System Engineering** section of this document.

The resident engineer may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided that each part is clearly defined as a distinct unit. Separate assignments of general responsibility may be made for each designated part.

The resident engineer shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;

2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these conditions of certification, approved plans, and specifications;

3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;

4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets of stamped drawings, plans, specifications, and any other required documents;

5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers who have been delegated responsibility for portions of the project; and

6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests when they do not conform to approved plans and specifications.

The resident engineer (or his delegate) must be located at the project site, or be available at the project site within a reasonable period of time, during any hours in which construction takes place.

The resident engineer shall have the authority to halt construction and to require changes or remedial work if the work does not meet requirements.

If the resident engineer or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the resident engineer and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the resident engineer and other delegated engineer(s) within five days of the approval.

If the resident engineer or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has five days to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: a civil engineer; a soils, geotechnical, or civil engineer experienced and knowledgeable in the practice of soils engineering; and an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; a mechanical engineer; and an electrical engineer. (California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 require state registration to practice as a civil engineer or structural engineer in California) All transmission facilities (lines, switchyards, switching stations, and substations) are handled in the conditions of certification in the **Transmission System Engineering** section of this document.

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (for example, proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit, to the CBO for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project (2007 CBC, Appendix Chapter 1, § 104, Duties and Powers of Building Official).

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

   1. Review the foundation investigations, geotechnical, or soils reports prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;

   2. Design (or be responsible for the design of), stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading; site preparation; excavation; compaction; and construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and

   3. Provide consultation to the resident engineer during the construction phase of the project and recommend changes in the design of the civil works facilities and changes to the construction procedures.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

   1. Review all the engineering geology reports;

   2. Prepare the foundation investigations, geotechnical, or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement or collapse when saturated under load (2007 CBC, Appendix J, § J104.3, Soils Report; Chapter 18, § 1802.2, Foundation and Soils Investigations)

   3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the 2007 CBC, Appendix J, section J105, Inspections, and the 2007 California Administrative Code, section 4-211, Observation and Inspection of Construction (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both); and

   4. Recommend field changes to the civil engineer and resident engineer.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to the predicted conditions used as the basis for design of earthwork or foundations (2007 CBC, Appendix Chapter 1, § 114, Stop Orders).

C. The engineering geologist shall:

   1. Review all the engineering geology reports and prepare a final soils grading report; and

   2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2007 California Administrative Code, section 4-211, Observation and Inspection of Construction (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both).

D. The design engineer shall:

   1. Be directly responsible for the design of the proposed structures and equipment supports;

   2. Provide consultation to the resident engineer during design and construction of the project;

   3. Monitor construction progress to ensure compliance with engineering LORS;

   4. Evaluate and recommend necessary changes in design; and

   5. Prepare and sign all major building plans, specifications, and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform to all of the mechanical engineering design requirements set forth in the Energy Commission's decision.

F. The electrical engineer shall:

   1. Be responsible for the electrical design of the project; and

   2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

<u>Verification:</u> At least 30 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer, and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, including prefabricated assemblies, the project owner shall assign to the project qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2007 CBC, Chapter 17, section 1704; Special Inspections, Chapter 17A, section 1704A, Special Inspections; and Appendix Chapter 1, section 109, Inspections. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **Transmission System Engineering** section of this document.

A certified weld inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on site requiring special inspection (including structural, piping, tanks and pressure vessels).

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;

2. Inspect the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and resident engineer. All discrepancies shall be brought to the immediate attention of the resident engineer for correction, then, if uncorrected, to the CBO and the CPM for corrective action [2007 CBC, Chapter 17, Section 1704.1.2, Report Requirements]; and

4. Submit a final signed report to the resident engineer, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications, and other provisions of the applicable edition of the CBC.

Verification: At least 15 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s) or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next monthly compliance report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend required corrective actions (2007 CBC, Appendix Chapter 1, § 109.6, Approval Required; Chapter 17, § 1704.1.2, Report Requirements). The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification and, if appropriate, applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next monthly compliance report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications, and calculations (including all approved changes) at the project site or at an alternative site approved by the CPM during the operating life of the project (2007 CBC, Appendix Chapter 1, § 106.3.1, Approval of Construction Documents). Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by the CPM.

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next monthly compliance report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing the final approved engineering plans, specifications, and calculations described above, the project owner shall submit to the CPM a letter stating both that the above documents have been stored and the storage location of those documents.

Within 90 days of the completion of construction, the project owner shall provide to the CBO three sets of electronic copies of the above documents at the project owner's expense. These are to be provided in the form of "read only" files (Adobe .pdf 6.0), with restricted (password-protected) printing privileges, on archive quality compact discs.

CIVIL-1 The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;

3. Related calculations and specifications, signed and stamped by the responsible civil engineer; and

4. Soils, geotechnical, or foundation investigations reports required by the 2007 CBC, Appendix J, section J104.3, Soils Report; and Chapter 18, section 1802.2, Foundation and Soils Investigation.

Verification: At least 15 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next monthly compliance report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area (2007 CBC, Appendix Chapter 1, § 114, Stop Work Orders).

Verification: The project owner shall notify the CPM within 24 hours when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the 2007 CBC, Appendix Chapter 1, section 109, Inspections; and Chapter 17, section 1704, Special Inspections. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM (2007 CBC, Chapter 17, § 1704.1.2, Report Requirements). The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a non-conformance report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following monthly compliance report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage work, the project owner shall obtain the CBO's approval of the final grading plans (including final changes) for the erosion and sedimentation control work. The civil engineer shall state that the work within his/her area of responsibility was done in accordance with the final approved plans (2007 CBC, Chapter 17, §1703.2, Written Approval).

<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 (2007 CBC, Appendix Chapter 1, §109.6, Approval Required);
3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures prior to the start of on-site fabrication and

installation of each structure, equipment support, or foundation (2007 California Administrative Code, § 4-210, Plans, Specifications, Computations and Other Data);

4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations, and specifications shall be signed and stamped by the responsible design engineer (2007 CBC, Appendix Chapter 1, § 106.3.4, Design Professional in Responsible Charge); and

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS (2007 CBC, Appendix Chapter 1, § 106.3.4, Design Professional in Responsible Charge).

Verification: At least 60 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of any increment of construction of any structure or component listed in **FACILITY DESIGN Table 2** of Condition of Certification **GEN-2**, above, the project owner shall submit to the CBO the above final design plans, specifications and calculations, with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM, in the next monthly compliance report, a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and comply with the requirements set forth in applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);

2. Concrete pour sign-off sheets;

3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2007 CBC, Chapter 17, section 1704, Special Inspections, and section 1709.1, Structural Observations.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM (2007 CBC, Chapter 17, § 1704.1.2, Report Requirements). The NCR shall reference the condition(s) of certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action necessary to obtain the CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 2007 CBC, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing (2007 CBC, Appendix Chapter 1, §106.1, Submittal Documents; §106.4, Amended Construction Documents; 2007 California Administrative Code, § 4-215, Changes in Approved Drawings and Specifications).

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the monthly compliance report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in the 2007 CBC, Chapter 3, Table 307.1(2), shall, at a minimum, be designed to comply with the requirements of that chapter.

Verification: At least 30 days (or within a project owner- and CBO-approved alternate time frame) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following monthly compliance report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the monthly compliance report following completion of any inspection.

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in **FACILITY DESIGN Table 2**, Condition of Certification **GEN-2**, above. 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 (2007 CBC, Appendix Chapter 1, §106.1, Submittal Documents; §109.5, Inspection Requests; §109.6, Approval Required; 2007 California Plumbing Code, §301.1.1, Approvals).

The responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations for the major piping and plumbing systems, subject to CBO design review and approval, and submit a signed statement to the CBO when the proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards (2007 CBC, Appendix Chapter 1, §106.3.4, Design Professional in Responsible Charge), which may include, but are not limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI 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);
- San Diego County codes; and
- City of Carlsbad regulations and ordinances.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency (2007 CBC, Appendix Chapter 1, §103.3, Deputies).

Verification: At least 30 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of any increment of major piping or plumbing construction listed in **FACILITY DESIGN Table 2**, Condition of Certification **GEN-2,** above, the project owner shall submit to the CBO for design review and approval the final plans, specifications, and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration

(Cal-OSHA), prior to operation, the code certification papers and other documents required by applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of that installation (2007 CBC, Appendix Chapter 1, §109.5, Inspection Requests).

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO for design review and approval, the above-listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal/OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations, and quality control procedures for any heating, ventilating, air conditioning (HVAC), or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of that construction. The final plans, specifications and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS (2007 CBC, Appendix Chapter 1, §109.3.7, Energy Efficiency Inspections; §106.3.4, Design Professionals in Responsible Charge).

Verification: At least 30 days (or within a project owner- and CBO-approved alternative time frame) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans, and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for all electrical equipment and systems 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 (2007 CBC, Appendix Chapter 1, §106.1, Submittal Documents). 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 (2007 CBC, Appendix Chapter 1, §109.6, Approval Required; §109.5, Inspection Requests). All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **Transmission System Engineering** section of this document.

A. Final plant design plans shall include:

1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and
2. system grounding drawings.

B. Final plant calculations must establish:

1. short-circuit ratings of plant equipment;
2. ampacity of feeder cables;
3. voltage drop in feeder cables;
4. system grounding requirements;
5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
6. system grounding requirements; and
7. lighting energy calculations.

C. The following activities shall be reported to the CPM in the monthly compliance report:

1. Receipt or delay of major electrical equipment;
2. Testing or energization of major electrical equipment; and

3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission decision.

Verification: At least 30 days (or within a 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

CPVS2007a – CPV Sentinel, LLC / D. Shileikis (tn: 41166). CPV Sentinel Application for Certification – Volume 1, 2, & 3. Dated on 6/25/2007. Submitted to CEC/Docket Unit on 6/25/2007.

GEOLOGY AND PALEONTOLOGY

Testimony of Michael S. Lindholm, P.G.

SUMMARY OF CONCLUSIONS

The proposed CPV Sentinel Energy Project (CPV Sentinel) would be located in an active geologic area southeast of the San Bernardino Mountains in Southern California. Because of its geologic setting, the site could be subject to intense levels of earthquake-related ground shaking. While the potential for earthquake ground rupture is low, the site is 0.25 miles from the San Andreas (Banning) Fault. Many other major active faults are within 20 miles of the site. The effects of strong ground shaking must be mitigated, to the extent practical, through structural designs required by the California Building Code (CBC, 2007). The CBC (2007) requires that structures be designed to resist seismic stresses from ground acceleration and, to a lesser extent, liquefaction potential. The design-level geotechnical investigation for the project (URS, 2007b), as required by the CBC and the County of Riverside, and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1**, presents standard engineering design recommendations for mitigation of the effects of strong ground shaking and dynamic compaction. The applicant has indicated that the potential effects of expansive clay soils, as well as excessive settlement due to compressible soils and hydrocompaction, will be addressed in an addendum to the project geotechnical report to be submitted prior to site grading (see comment numbers 213, 214 and 215, URS, 2008).

There are no known viable geologic or mineralogical resources at the CPV Sentinel site. Paleontological resources have been documented within 6 miles of the project, but no significant fossils were found during cursory field evaluation of the plant site, near ancillary facilities or at the off-site lay down area. Potential impacts to paleontological resources due to construction activities would be mitigated through worker training and monitoring by qualified paleontologists, as required herein by proposed Conditions of Certification **PAL-1** through **PAL-7**.

Based on this information, the California Energy Commission staff believes that the potential for significant adverse cumulative impacts to the project from geologic hazards during its design life and to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project, is low. It is staff's opinion that the CPV Sentinel project can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards, and in a manner that both protects environmental quality and assures public safety, to the extent practical.

INTRODUCTION

In this section, Energy Commission staff discusses the potential impacts of geologic hazards on the proposed CPV Sentinel project as well as the CPV Sentinel project's impact to geologic, mineralogic, and paleontologic resources. Staff's objective is to ensure that there would be no consequential adverse impacts to significant geological and paleontological resources during the project construction, operation, and closure and that operation of the plant would not expose occupants to high-probability geologic hazards. A brief geological and paleontological overview is provided. The section concludes with staff’s proposed monitoring and mitigation measures for geologic hazards and geologic, mineralogic, and palentologic resources, with proposed Conditions of Certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS are listed in the Application for Certification (AFC) (CPVS, 2007a). 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 CPV Sentinel project site is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
State	
California Building Code (2007)	The CBC (2007) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control). The CBC has adopted provisions in the International Building Code (IBC, 2006).
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), section 2621–2630	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. The power plant site is not located within a designated Alquist-Priolo Fault Zone, although the temporary lay down area and several project linears cross Earthquake Fault Zones.
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.
Society for Vertebrate Paleontology (SVP), 1995	The “Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures” is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.
Local	
County of Riverside General Plan, 2003	Will adopt building specifications in the CBC (2007), which is based on the IBC (2006), and UPC (2006) in January, 2008. Requires geotechnical/soils report for grading activities and compliance with the Alquist-Priolo Earthquake Fault Zoning Act. The county has also compiled a Paleontological Resources Sensitivity Map, and addresses monitoring and collection of discovered resources.
County of Riverside Flood Control & Water Conservation	Provides design specifications for site grading and drainage.
City of Palm Springs (COPS) Planning Department	Portions of the temporary lay down area and gas transmission line would cross COPS land, and are subject to the CBC (2007) and California Plumbing Code (CPC, 2007) as of January, 2008.

SETTING

The proposed CPV Sentinel project would be constructed on 37 acres located north of Interstate 10 and northeast of North Palm Springs in Riverside County, California. The peaker power plant would be capable of generating up to 850 megawatts (MW) of electricity from 8 natural gas-fired combustion turbine generators (CTG). Each CTG would discharge exhaust via 13.5-foot-diameter, 90-foot-tall exhaust stacks. Auxillary components include a spray-mist fogging system, a turbine intercooler, natural gas compressors, generator step-up transformers, an emergency generator and a fire water pump skid. A single control building, multiple water storage tanks and a wastewater treatment facility would be located along the east side of the property, and cooling towers for the turbine intercoolers would be located at the north and south ends. A septic system is proposed for construction in the southeast corner of the parcel.

The facility would require up to 1,100 acre-feet of water, per year, when operating at full capacity (LW, 2008a). Make-up water for evaporative cooling, the demineralizer system and service water system would be provided by one existing and approximately 5 future on-site wells. Potable water would be supplied by the Mission Springs Water District (MSWD) via a new buried pipeline that would extend 3,200 feet southward from the southeast corner of the parcel to an existing main on the paved Dillon Road. A gas transmission line and the construction access road would also be constructed along the same 200-foot-wide corridor. The gas transmission line, which would be a total of 2.6 miles in length, would continue eastward from the 200-foot-wide corridor along a 75-foot-wide corridor adjacent to Dillon Road to an unpaved road in the center of Section 10, then turn south and connect to the existing Indigo Energy Facility.

A new 2,300-foot-long single-circuit, 220 kilovolt (kV) transmission line would connect the proposed on-site 220-kV switchyard on the west side of the plant site to the south end of Southern California Edison's (SCE) Devers substation. Part of the route would follow the south side of Powerline Road North just south of the new facilities and the substation. A 14-acre laydown area is to be located adjacent to the access road. The power plant, and most of the linear facilities would be on property administered by Riverside County. However, the west half of the construction laydown area and the southeast end of the gas transmission line would be within the city limits of Palm Springs.

The site slopes to the southeast at a gradient of approximately 5 percent (CPVS, 2007a). Elevation ranges from 1,042 to 1,126 feet above mean sea level (msl) with a total elevation change of 84 feet. Cuts of up to 20 feet and fills up to 20 feet are anticipated during grading on the north and south ends of the power plant site, respectively.

REGIONAL SETTING

The CPV Sentinel site is located on the west side at the northwest end of the Coachella Valley approximately 1.5 miles northwest of the town of North Palm Springs, California. The Coachella Valley extends southward beyond the Salton Sea into Imperial Valley and Mexico. The San Bernardino Mountains lie to the west and northwest, the Little San Bernardino Mountains lie to the northeast, and the San Jacinto Mountains lie to the southwest. The site is at the east end of the Transverse Ranges geomorphic province (Norris and Webb, 1990). The Banning Fault, located roughly 0.25 miles to the south, is considered to be the southern boundary of the Transverse Ranges geomorphic province (Allen, 1957; Norris and Webb, 1990). The Transverse Ranges geomorphic province is characterized by compressional tectonics and east-west-striking thrust and reverse faults. The Banning Fault in San Gorgonio Pass west of the plant site, has been mapped as a north-dipping reverse structure. Across the Banning Fault to the south are the Penninsular Ranges geomorphic province (west) and the Colorado Desert geomorphic province. Both regions are characterized by northwest-trending right-lateral strike-slip faults such as the San Andreas Fault.

The Salton Sea, which is part of the Colorado Desert geomorphic province, lies southeast of the site and is the central drainage basin within Coachella Valley. The nearest occurrence of sediments deposited in ancient Lake Cahuilla is approximately 8 miles to the southeast (Van de Kamp, 1973). The highest lake level was at an elevation of approximately 40 feet above sea level. The lake persisted for about 1,600 years, and dried up completely roughly 300 years ago.

PROJECT SITE DESCRIPTION

The power plant site is located on a broad alluvial fan deposited on the eastern flank of the San Bernardino Mountains. Alluvial and fluvial deposits were shed eastward and southeastward from the nearby mountains. Source rocks include pre-Cambrian igneous and metamorphic rocks and Miocene to Pliocene sedimentary and volcanic rocks (CDMG, 1966; CDMG, 1968; Dibblee, 2004). Tertiary age sediments in the region are predominantly non-marine in origin, with less abundant marine sedimentary and volcanic rocks. Quaternary sediments overlie the Miocene to Pliocene non-marine deposits exposed in the mountains to the west, and in turn overlie metamorphic and crystalline basement rocks of the pre-Cambrian San Gorgonio/Chuckwalla Complex (CDMG, 1968). The Quaternary deposits are approximately 900 to 1,000 feet thick in the project area (CPVS, 2007a). Braided stream sediments deposited by Mission Creek and the Whitewater River are present to the east and south, respectively.

GEOLOGY AND PALEONTOLOGY Table 2 summarizes the stratigraphic nomenclature and some characteristics used by various authors for mapped geologic units in the CPV Sentinel area. The youngest and most extensive is unconsolidated alluvial and fluvial sand and gravel of Holocene age (CDMG, 1966; CDMG, 1968; USGS, 2002; Dibblee, 2004). Devers Hill, adjacent to the power plant site to the east, is mapped as older alluvium. The material has also been shown in the extreme southeast corner of the plant site, the north end of the access road and utility corridor, at the south end of the lay down area, and on a short section of the utility corridor south of the Banning Fault. The occurrence of older alluvium at the CPV Sentinel site and along project linears, however, varies depending on the author. Proctor (CDMG, 1968) identifies the older alluvium as the Cabezon Fanglomerate, which is light brown, poorly sorted, poorly bedded, arkosic sand, gravel, cobbles and boulders. Particle size averages 6 inches in diameter, however, boulders up to 19 feet have been observed on Garnet Hill to the southeast (CDMG, 1968). Matti and others (USGS, 2002) separate older alluvium into several units based on degree of dissection and soil development (**GEOLOGY AND PALEONTOLOGY Table 2**).

GEOLOGY AND PALEONTOLOGY Table 2
Stratigraphic Units

Rogers (CDMG, 1966)	Proctor (CDMG, 1968)	Matti and others (USGS, 2002)	Dibblee (2004)	Age	Degree of Dissection	Soil Development
Qal	Qal	Qw	Qa	Holocene (Unconsolidated)	only recent	negligible
--	Qt* on Qc	Qyf	--	Holocene to Pleistocene	slightly to moderately	negligible to weak
Qc_o	Qc	Qof	Qoa	Pleistocene	moderately to deeply	moderate
Pml**	Ti**	Ti**	Ti**	Miocene to Pliocene	NA	NA
* - Thin mantle of terrace deposits covering older alluvium; ** - Imperial Formation – marine sediments						

Miocene to Pliocene marine deposits of the Imperial Formation are exposed on Garnet Hill to the southeast. The sediments are comprised of fossiliferous sandstone and silty claystone (Dibblee, 2004). Older alluvium on the south side of the Banning Fault is shown to be overlain by terrace deposits, which consist of a “thin orange mantle of gravel” (CDMG, 1968). Wind-blown sand of variable thickness commonly covers the present ground surface, but is not shown on geologic maps.

The project geotechnical investigation reports that the CPV Sentinel site is underlain by silty and poorly graded sands with gravel to the maximum depth of exploration of 51 feet (URS, 2007b). Large cobbles and boulders are abundant. Sieve analyses indicate the content of fines ranges from 8.4 to 30 percent. The soils are medium dense to dense, and locally loose, to a depth of 10 feet, and dense to very dense below. Several 25-foot borings were advanced just east of the project boundary, which encountered light brown silty sands and gravels (BE, 1983). Exploration for the Geologic Technical Report for the Ocotillo Power Plant (OPP), located across the Banning Fault to the south, encountered a monotonous section of silty sand with gravel and well-graded sand with silt and gravel (OEP, 2001; CPVS, 2007a). Maximum boring depth was 101.5 feet, and the soils were consistently dense to very dense. The maximum content of fines indicated by sieve analyses was 17 percent. No potentially expansive, clayey material was noted, although plasticity index testing was not performed. Consolidation testing yielded a vertical strain value of less than 2 percent.

All soils encountered in drilling at CPV Sentinel and the OPP are typical alluvial fan sediments and are interpreted to be Holocene in age (CPVS, 2007a). Although similar materials were observed at both sites, other subsurface conditions such as ground water levels and depths to older stratigraphic units could differ greatly across the Banning Fault. The proximity of the CPV Sentinel site to Devers Hill suggests that the Cabezon Fanglomerate may lie at relatively shallow depths below the surface.

Numerous active faults are present within a 100-mile radius of the proposed CPV Sentinel site. Several active and potentially active faults related to regional strike-slip faulting are present in the CPV Sentinel project area and to the south. Active regional reverse and thrust faulting, associated with compressional tectonics, continues to cause uplift on the site and in the Transverse Ranges to the north. EQFAULT Version 3.00, a computer program for the deterministic estimation of peak site acceleration using three-dimensional articulated planar elements (faults), was used to model seismogenic sources (Blake, 2006a). The site latitude and longitude inputs were 33.9363 degrees and -116.5730 degrees, respectively, which is centrally located within the CPV Sentinel plant site. The search radius was 100 miles. The attenuation relationship used was that recommended by Boore and others. (1997) for Site Class D. The most significant faults are listed in **GEOLOGY AND PALEONTOLOGY Table 3** - Active Faults in the project area, along with the distance from the project site, maximum anticipated earthquake magnitude, and fault type, orientation and class. The peak acceleration and estimated intensity the site would experience during a maximum magnitude earthquake on each fault is also given. The fault locations can be found on the Fault Activity Map of California (CDMG, 1994a) and on the Southern California Earthquake Data Center website (SCEC, 2008). Because of the large number of faults present, only those with the potential to produce a peak ground acceleration of at least 0.1g at the CPV Sentinel site are listed.

GEOLOGY AND PALEONTOLOGY Table 3
Active Faults in the Project Area

Fault Name	Distance From Site (mi)	Maximum Earthquake Magnitude (Mw)	Estimated Peak Site Acceleration (g)	Fault Type* and Strike	Fault Class
San Andreas (Banning) – Southern	0.4	7.4	0.756	RL-SS, R (NW)	A
San Andreas – Coachella	6.0	7.1	0.378	RL-SS (NW)	A
Pinto Mountain	10.0	7.0	0.258	LL-SS (E-W)	B
Burnt Mountain	11.2	6.4	0.173	RL-SS (N-S to NW)	B
Eureka Peak	13.8	6.4	0.150	RL-SS (N-S to NW)	B
Landers	18.1	7.3	0.197	RL-SS (N-S to NW)	B
North Frontal Fault Zone (East)	18.1	6.7	0.174	R (E-W)	B
San Jacinto – Anza	23.1	7.2	0.155	RL-SS (NW)	A
San Jacinto – San Jacinto Valley	23.9	6.9	0.129	RL-SS (NW)	B
South Emerson – Copper Mountain	26.4	6.9	0.120	RL-SS (NW)	B
North Frontal Fault Zone (West)	26.7	7.0	0.152	R (E-W to NE)	B
Johnson Valley (Northern)	27.3	6.7	0.105	RL-SS (NW)	B
San Jacinto – Coyote Creek	33.3	7.3	0.137	RL-SS (NW)	B
Calico – Hidalgo	34.2	6.8	0.095	RL-SS (NW)	B
Helendale – S. Lockhart	34.5	7.1	0.109	RL-SS (NW)	B
Pisgah – Bullion Mtn. – Mesquite Lake	34.6	7.1	0.108	RL-SS (NW)	B
San Jacinto – San Bernardino	38.5	7.1	0.108	RL-SS (NW)	B
Cleghorn	43.4	6.7	0.081	R (E-W)	B
Elsinore – Temecula	45.4	6.5	0.066	RL-SS (NW)	B
Elsinore – Julian	46.2	6.8	0.075	RL-SS (NW)	A
Elsinore – Glen Ivy	48.8	7.1	0.086	RL-SS (NW)	B
Earthquake Valley	52.1	6.8	0.071	RL-SS (NW)	B
Cucamonga	52.3	7.0	0.091	R (E-W)	A
San Jacinto – Borrego	55.3	6.6	0.058	RL-SS (NW)	B
Chino – Central Avenue – (Elsinore)	57.5	6.7	0.072	RL-SS (NW)	B
San Andreas / 1857 Rupture	60.6	7.8	0.101	RL-SS (NW)	A
* RL-SS, LL-SS – Right-Lateral and Left-Lateral Strike-Slip; R – Reverse; N – Normal; BT – Blind Thrust					

The nearest active fault in the CPV Sentinel project area is the Southern segment of the San Andreas Fault, also referred to as the Banning Fault. The structure is located approximately 0.25 miles southwest of the southwest corner of the plant site, passes through the temporary lay down area and utility corridor, and is crossed by the proposed gas transmission line two additional times south and east of the utility corridor. Right-lateral strike-slip movement began before the Pliocene, and between 5 and 15 miles of lateral offset has been suggested (Allen, 1957; CDMG, 1994b). Relative sense of motion on the portion of the fault in San Gorgonio Pass, located west of the site, changed to reverse movement in the Quaternary in response to Transverse Ranges-style tectonics. This segment of the Banning Fault has commonly been referred to as the San Gorgonio Pass Fault (CDMG, 1994a and b). Several thousand feet of reverse offset on the north-dipping, down-to-the-north structure has been demonstrated on the structure in the pass, where pre-Tertiary rocks are juxtaposed over Tertiary sediments (Allen, 1968). Strike-slip movement still predominates on the segments in Coachella Valley and west of the city of Beaumont (Jones and others, 1986; CDMG, 1994b).

The Banning Fault has been the subject of several Fault Evaluation Reports (FER) conducted under the Alquist-Priolo Earthquake Fault Zoning Act (CDMG, 1979a and b; CDMG, 1987; CDMG, 1994b). Several fault investigation reports have also been written for local development sites within Alquist-Priolo Fault Zones (R&A, 1981; R&A, 1983). The surveyed location of the Banning Fault was confirmed using trenching and geophysical methods in the two fault evaluation reports (R&A, 1981; R&A, 1983), and for the Geologic Technical Report for the Ocotillo Power Plant (CPVS, 2007a). Ground breakage resulting from the North Palm Springs earthquake has also helped to define the surface expression of the structure (Jones and others, 1986; CDMG, 1987). The Banning, Mission Creek and Garnet Hill Faults were mapped in detail in Coachella Valley in FER-86 (CDMG, 1979b). Faults and fractures associated with reverse and strike-slip structures in San Gorgonio Pass west of the CPV Sentinel site, including the Banning, San Gorgonio Pass, San Bernardino segment of the San Andreas, Whitewater, and Garnet Hill Faults, were mapped in FER-87 and FER-235 (CDMG, 1979a; CDMG, 1994b).

The Devers Hill Fault is a secondary structure with reverse movement associated with the Banning Fault. A new Special Studies Zone was added to the Desert Hot Springs Quadrangle in 1980 that includes this poorly-defined fault (CDMG, 1980). The north-south to northeast-striking fault is located at the base of the west side of Devers Hill roughly 1000 feet east of the CPV Sentinel site. It was investigated in conjunction with a proposed wind farm to be located on the hill. The preliminary geotechnical report determined that the fault is active, but trenched locations show the structure trends southward parallel to the CPV Sentinel site boundary (BE, 1983). The fault is not shown on more recent geologic maps of the area (Dibblee, 2004).

GEOLOGY AND PALEONTOLOGY Table 3 presents only the active faults with Holocene age (less than 10,000 years) activity. Many other faults that have experienced movement in the Quaternary that are not included in the EQFAULT database are present in the vicinity of the CPV Sentinel site (CDMG, 1994a). The closest is the Garnet Hill Fault, located 2 miles south of the plant site and 0.9 miles south of the southern terminus of the gas transmission line. The Mission Creek Fault (Northern Branch of the San Andreas) lies approximately 4 miles to the northeast, and passes through the city of Desert Hot Springs. Both faults are right-lateral strike-slip faults, transition to reverse faults at their west ends (SCEC, 2008), strike northwesterly parallel to the Banning Fault, and have had movement in the late Pleistocene (CDMG, 1994a). Offset on each fault also has a vertical component, with down-to-the south sense of motion (CDMG, 1968). Jennings (CDMG, 1994a) indicates Holocene movement on a segment of the Mission Creek Fault southeast from Desert Hot Springs. Several historic earthquakes, including the 1947 Morongo Valley earthquake (M5.5) and 1948 Desert Hot Springs (M6.5) earthquakes, have been tentatively attributed to the Mission Creek Fault (Jones and others, 1986). Historic earthquakes would suggest the Mission Creek Fault is currently active.

The Morongo Valley Fault, located 7.2 miles to the northeast, is a northeast-striking left-lateral strike slip fault with movement in the Holocene. Additional late Pleistocene structures include the Mill Creek and San Gorgonio Mountain Faults, which are northwest-striking right-lateral strike-slip faults located approximately 6 and 13.2 miles to the northwest, respectively.

Rogers (CDMG, 1966) has described exposures of Cabezon Fanglomerate on Devers Hill as "extensively folded, faulted, and dissected alluvial fan deposits". Similarly, Proctor (1968) maps many elongate anticlinal features adjacent to faults with reverse movement, including Devers Hill, Garnet Hill, and Whitewater Hill. Deformation and uplift of these features has resulted from compression associated with reverse movement along the Banning and Garnet Hill Faults.

GEOLOGY AND PALEONTOLOGY Table 4 summarizes the historic seismicity in the region between 1800 and 2008. EQSEARCH Version 3.00 software was used to search an abbreviated and modified version of the published CGS earthquake catalog for California (Blake, 2006b). The site latitude and longitude inputs were 33.1417 degrees and -117.3335 degrees, respectively. The range of historic earthquake magnitudes selected was 5.5 to 9.0, and the search radius was 80 miles. The attenuation relationship used was that recommended by Boore, et al. (1997) for Site Class D. The locations of each seismic was obtained from the California Historical Online Database (CGS, October 2007) and the Fault Activity Map of California (CDMG, 1994).

GEOLOGY AND PALEONTOLOGY Table 4
Historic Estimated Deterministic Peak Ground Accelerations

Latitude North	Longitude West	Date	Depth (km)	Earthquake Magnitude	Site Acc. (g)	Site Modified Mercali Scale Intensity	Approx. Distance (mi)	Location of Epicenter
33.998	116.606	07/08/1986	11.7	5.60	0.197	VIII	4.7	N. Palm Springs
34.017	116.500	07/24/1947	0.0	5.50	0.149	VIII	7.0	Morongo Valley
33.933	116.383	12/04/1948	0.0	6.50	0.187	VIII	10.9	Desert Hot Springs
33.961	116.318	04/23/1992	12.0	6.10	0.122	VII	14.7	Joshua Tree
34.201	116.436	06/28/1992	1.0	7.60	0.214	VIII	19.9	Landers
34.203	116.827	06/28/1992	5.0	6.70	0.118	VII	23.4	Landers
33.800	117.000	12/25/1899	0.0	6.40	0.092	VII	26.2	San Jacinto and Hemet
33.750	117.000	04/21/1918	0.0	6.80	0.109	VII	27.7	San Jacinto
33.501	116.513	02/25/1980	13.6	5.50	0.051	VI	30.2	Anza
34.267	116.967	08/29/1943	0.0	5.50	0.049	VI	32.1	Big Bear Lake
34.000	116.000	04/03/1926	0.0	5.50	0.048	VI	33.1	Pinto Mountains ?
34.200	117.100	09/20/1907	0.0	6.00	0.060	VI	35.2	San Bernardino Region
33.900	117.200	12/19/1880	0.0	6.00	0.059	VI	36.0	East of San Bernardino
34.000	117.250	07/23/1923	0.0	6.25	0.063	VI	39.0	San Bernardino Region
33.400	116.300	02/09/1890	0.0	6.30	0.063	VI	40.2	San Jacinto fault?
33.408	116.261	03/25/1937	10.0	6.00	0.053	VI	40.6	Buck Ridge
33.343	116.346	04/28/1969	20.0	5.80	0.046	VI	43.0	Borrego Springs
34.594	116.271	10/16/1999	0.0	7.10	0.083	VII	48.6	Hector Mine
33.700	117.400	05/15/1910	0.0	6.00	0.045	VI	50.2	Glen Ivy Hot Springs
33.283	116.183	03/19/1954	0.0	5.50	0.035	V	50.4	Arroyo Salada
33.283	116.183	03/19/1954	0.0	6.20	0.050	VI	50.4	Arroyo Salada
34.200	117.400	07/22/1899	0.0	5.50	0.035	V	50.7	Lytle Creek / Cajon Pass
34.017	115.683	05/02/1949	0.0	5.90	0.042	VI	51.3	Pinto Mountains
34.333	115.800	12/22/1943	0.0	5.50	0.034	V	52.0	Bullion Mountains
33.500	115.820	05/00/1868	0.0	6.30	0.051	VI	52.7	East of Salton Sea
34.533	115.983	07/18/1946	0.0	5.60	0.035	V	53.2	North of Bullion Mtns.
34.000	117.500	12/16/1858	0.0	7.00	0.073	VII	53.3	San Bernardino Region?
34.680	116.280	10/16/1999	8.0	5.80	0.039	V	54.0	Hector Mine
33.200	116.200	05/28/1892	0.0	6.30	0.049	VI	55.2	San Jacinto Fault?
33.217	116.133	08/15/1945	0.0	5.70	0.036	V	55.7	San Jacinto
33.699	117.511	05/31/1938	10.0	5.50	0.032	V	56.2	Santa Ana Mtns.
33.190	116.129	04/09/1968	11.1	6.40	0.050	VI	57.5	Borrego Mountain
34.300	117.500	07/22/1899	0.0	6.50	0.052	VI	58.6	Cajon Pass
34.300	117.600	07/30/1894	0.0	6.00	0.038	V	63.8	Lytle Creek Region
34.370	117.650	12/08/1812	0.0	7.00	0.060	VI	68.4	Orange County, Los Angeles, Wrightwood
33.233	115.717	10/22/1942	0.0	5.50	0.027	V	69.2	Salton Sea

Latitude North	Longitude West	Date	Depth (km)	Earthquake Magnitude	Site Acc. (g)	Site Modified Mercali Scale Intensity	Approx. Distance (mi)	Location of Epicenter
34.983	116.550	04/10/1947	0.0	6.20	0.038	V	72.3	East of Barstow
32.967	116.00	10/21/1942	0.0	6.50	0.043	VI	74.6	Fish Creek Mtns.
33.082	115.775	11/24/1987	4.9	5.80	0.030	V	74.8	Superstition Hills

The Magnitude 5.6 (M5.6) North Palm Springs earthquake occurred on the Banning Fault on July 8, 1986 (SCEC, 2008). The epicenter was located roughly 4.5 miles northwest of the CPV Sentinel site at a depth of 7.3 miles (**GEOLOGY AND PALEONTOLOGY Table 4**). Subsurface locations of measured main shocks and aftershocks indicate the earthquake took place along a plane that strikes N60°W and dips 45° to 55° to the north (Jones and others, 1986). Ground breakage along the surface trace of the Banning Fault associated with the earthquake has been mapped from just south of the CPV Sentinel site to the west-northwest to Whitewater Canyon (Sharp and others, 1986). No offset was observed along any of the fractures by Sharp and others (1986). However, surface rupture with right lateral strike-slip offset was documented by Kahle and others (CDMG, 1987). Ground breakage associated with the North Palm Springs earthquake was reported on the Mission Creek and Garnet Hills Faults as well.

The epicenter of the M6.5 Desert Hot Springs earthquake, which occurred on December 4, 1948, is approximately 11 miles east of the site (**GEOLOGY AND PALEONTOLOGY Table 4**). The SCEC (2008) indicates the earthquake is associated with the Banning Fault, although other sources attribute movement to the Mission Creek Fault (Jones and others, 1986). The 1947 Morongo Valley earthquake (M5.5) may also have occurred on the Mission Creek Fault approximately 7 miles northeast of the site.

Ground water measured in a well on the CPV Sentinel site is at an approximate depth of 350 feet below ground surface (bgs) (CPVS, 2007a). Other available local information indicates that ground water does not occur within 51 feet of the existing ground surface in borings advanced on the CPV Sentinel and adjacent properties (BE, 1983; URS, 2007b). The Geologic Technical Report conducted for the Ocotillo Power Plant provides data that places the ground water table below 100 feet (CPVS, 2007a). As previously noted, ground water conditions are expected to change across the Banning Fault. The Banning Fault acts as a dam for subsurface flow, causing water levels to be higher on the north side of the fault (Allen, 1957; CDMG, 1968). Vegetation growing on the north side of the Banning Fault in parts of the Coachella Valley indicates that water in the vicinity of the CPV Sentinel site could be near-surface. The California Department of Water Resources Ground water Level Data website documents shallowest water levels between 132 and 154 feet bgs in wells located approximately 3 miles to the southwest (CDWR, 2008). These wells are located south of the Garnet Hills Fault. Water wells drilled in the vicinity of Desert Hot Springs, located roughly 3.5 miles to the northeast, encountered geothermal ground water up to 184°F at depths ranging from 16 to 340 feet below ground surface (CDMG, 1968). The top of the aquifer drops 75 to 175 feet in elevation from north to south across the Mission Creek Fault.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section considers two types of impacts. The first is geologic hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

No federal LORS concerning geologic hazards and geologic and mineralogic resources apply to this project. 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. When available, staff also reviewed the operating procedures of the proposed facility—in particular ground water extraction and mass grading—to determine if those operations could adversely affect geologic and mineralogic resources.

Staff reviewed existing paleontologic information and requested records searches from the Natural History Museum of Los Angeles for the surrounding area. The University of California (at Berkeley) Museum of Paleontology’s website, which gives generalized information for locality records of their collection, was consulted as well (UCMP, 2008). Site-specific information generated by the applicant for the CPV Sentinel project was also reviewed. All research was conducted in accordance with accepted assessment protocol (SVP, 1995) to determine whether any known paleontologic resources exist in the general area. If present or likely to be present, Conditions of Certification which outline required procedures to mitigate impacts to potential resources, and proposed as part of the projects approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking and potential settlement represent the main geologic hazards at this site. These potential hazards can be effectively mitigated through facility design by incorporating recommendations contained in the project-specific geotechnical report (URS, 2007b) per CBC (2007) and County of Riverside requirements. Proposed Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section should also mitigate these impacts to a less than significant level. The applicant has indicated that the potential effects of expansive clay soils, as well as excessive settlement due to compressible soils and hydrocompaction, will be addressed in an addendum to the project geotechnical report to be submitted prior to site grading (see comment numbers 213, 214 and 215, URS, 2008).

No viable geologic or mineralogic resources are known to exist within 3 miles of the CPV Sentinel plant site and off-site lay down area, or within 1 mile of the project linears. The entire CPV Sentinel site, including linears, is mapped as Mineral Resource Zone 3 (CDMG, 1988). MRZ-3 refers to "areas containing mineral deposits the significance of which cannot be evaluated from available data." Given the extent of the alluvial fan deposits south of the San Bernardino Mountains and the industrialized nature of the area, there is low potential for this site to have economically valuable sand and gravel or other mineral deposits that are unique to the region. No productive oil or gas fields will be affected by project development (CDMG, 1968; Dibblee, 2004).

Regarding paleontological resources, Energy Commission staff has reviewed the paleontological resources assessment in Section 7.16 of the AFC (CPVS, 2007a) and the attached confidential paleontologic site report (URS, 2007a). Staff has also reviewed paleontological literature and records searches conducted by the Natural History Museum of Los Angeles County (McCleod, 2008), as well as the online records database maintained by the University of California, Museum of Paleontology (UCMP, 2008). No paleontological finds have been documented on the CPV Sentinel plant site, at the proposed lay down area, or along the project linears.

Since the proposed CPV Sentinel site construction will include significant amounts of grading, foundation excavation, and utility trenching, staff considers the probability that paleontological resources will be encountered during such activities to be high in older alluvial and fluvial materials both at the surface and below younger alluvial, fluvial and eolian sediments. 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 to less than significant levels. These conditions essentially require a worker education program in conjunction with the monitoring of earthwork activities by a qualified professional paleontologist (paleontologic resource specialist; PRS).

The proposed Conditions of Certification allow the Energy Commission's compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

Based on the information below, it is staff's opinion that the potential for significant adverse impacts to the project from geologic hazards, and to potential geologic, mineralogic, and paleontologic resources from the proposed project, is very low.

GEOLOGICAL HAZARDS

The AFC (CPVS, 2007a) and project geotechnical report (URS, 2007b) provide documentation of potential geologic hazards at the CPV Sentinel plant site. Review of the AFC and geotechnical report, coupled with staff's independent research, indicate that the possibility of fault-related geologic hazards at the plant site, during its practical design life, is moderate. Geologic hazards, such as potential for expansive clay soils and settlement due to compressible soils, hydrocompaction, or dynamic compaction, are addressed in the project geotechnical report, or will be addressed in an addendum to the report, per CBC (2007) and County of Riverside requirements (see comment numbers 206 through 215, URS, 2008).

Staff's independent research included the review of available geologic maps, reports, and related data of the CPV Sentinel 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* (1994a) and Alquist-Priolo Special Studies Zone mapping and reports (CDMG, 2003; CGS, 2002; and Hart and Bryant, 1999). No active faults are shown on published maps as crossing the boundary of new construction on the proposed CPV Sentinel power plant site. The San Andreas (Banning) Fault, a major active strike-slip fault, crosses the temporary lay down area, utility corridor and gas transmission line (twice). Faults with movement in the Holocene in the vicinity of the CPV Sentinel site are presented in **GEOLOGY AND PALEONTOLOGY Table 3** and discussed earlier under **PROJECT SITE DESCRIPTION**. The Devers Hill Fault is part of an Alquist Priolo Special Studies Zone, in addition to the Banning Fault, and is a north- to northeast-striking structure located roughly 1000 feet to the east.

Most faults listed on **GEOLOGY AND PALEONTOLOGY Table 3** are northwest-striking right-lateral strike-slip faults related to regional transform faulting centered on the San Andreas Fault Zone. Some are reverse structures and blind thrusts associated with transverse ranges compressional tectonics that are generally north-dipping and trend east-west. Fault geometries become complex and variable in areas where both San Andreas-style transform tectonics and Transverse Range-style compressional tectonics are active.

Nine earthquakes of Magnitude 5.5 or greater have occurred on active faults between 4.5 and 30 miles of the site, and a total of 40 have taken place within 100 miles of the site (**GEOLOGY AND PALEONTOLOGY Table 4**). The most significant relative to the CPV Sentinel site are associated with strike-slip faulting or a combination of strike-slip and reverse faulting on the Banning Fault (1986 North Palm Springs earthquake, M7.3) and possibly the Mission Creek Fault (1948 Desert Hot Springs earthquake, M6.5; 1947 Morongo Valley earthquake, M5.5).

Historic surface rupture (within 200 years) is associated with several active faults near the site fault. The nearest is ground breakage on the Banning Fault associated with the

M5.6 North Palm Springs earthquake of 1986 (Sharp and others, 1986; CDMG, 1987). The M7.3 Landers earthquake caused surface rupture on many faults in 1992, including the Johnson Valley, Landers, Emerson, Pinto Mountain, Burnt Mountain and Eureka Peak Faults (CDMG, 1994; SCEC, 2008).

Fault types, as well as orientation and sense of movement, are given in **GEOLOGY AND PALEONTOLOGY Table 3**. Segments of the San Andreas Fault in the vicinity of the CPV Sentinel project, including the Banning Fault, are categorized as Type A faults (CDMG, 1994a; ICBO, 1998). Type A faults have slip-rates of $\geq$5 mm/yr and are capable of producing an earthquake of magnitude 7.0 or greater. Type B faults have slip-rates of 2 to 5 mm/yr and are capable of producing an earthquake of magnitude 6.5 to 7.0.

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. Special Studies Zones near the CPV Sentinel plant site have been established along the Banning and Devers Hill Faults, and portions of the Banning Fault are known to cross the temporary lay down area and project linears in several locations. However, the precise locations of the Banning and Devers Hill Faults have been determined by trenching and seismic methods, and both structures are outside the plant site boundaries (CPVS, 2007a); BE, 1983). Since no active faults have been documented within the CPV Sentinel power plant site and occupied structures are not a part of project linear construction, setbacks from most occupied structures would not be required. However, setbacks from any occupied structures on the temporary lay down area may be necessary. Pressure-sensitive shut-off valves, or other suitable safety mechanisms, should be included in the natural gas pipeline since it crosses the active Banning Fault at several locations (refer to **Facility Design**).

The soil profile for this site is Type D (URS, 2007b). The estimated peak horizontal ground acceleration for the power plant site is 1.25 times the acceleration of gravity (1.25g) for bedrock acceleration based on a 2 percent probability of exceedence in 50 years (CBC 2007 criteria), and 0.75 times the acceleration of gravity (0.75g) based on a 10 percent probability of exceedence in 50 years (USGS, 2007). Seismic design parameters based on the soil profile, maximum anticipated peak ground acceleration and other factors are presented in the project geotechnical report (URS, 2007b) per CBC (2007) requirements.

Liquefaction

Liquefaction is a condition where in a cohesionless soil may lose shear strength because of sudden increase in pore water pressure caused by an earthquake. The depth to ground water on the CPV Sentinel site is not known. The project geotechnical report indicates ground water is deeper than 51 feet in soil borings (URS, 2007b). Dense to very dense alluvial sands and gravels that are present on the CPV Sentinel site below a depth of 10 feet are not generally susceptible to liquefaction, especially in the absence of ground water.

Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase is soil density). The decrease in volume can result in settlement of overlying structural improvements. The potential for and mitigation of the effects of dynamic compaction of site soils during an earthquake are addressed in the project-specific geotechnical report (URS, 2007b), per CBC (2007), County of Riverside, and **Facility Design GEN-1**, **GEN-5**, and **CIVIL-1** requirements. 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 potential for and mitigation of the effects of hydrocompaction of site soils should be addressed in a project-specific geotechnical report, per CBC (2007), County of Riverside, and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1**. The applicant has indicated that the issue of hydrocompaction will be addressed in an addendum to the project geotechnical report (URS, 2007b) prior to site grading (see comment numbers 206 and 213, URS, 2008). Typical mitigation measures would include over-excavation/replacement, mat foundations or deep foundations, depending on severity and foundation loads.

Subsidence

Local subsidence or settlement may occur when areas containing compressible soils are subjected to foundation loads. The potential for and mitigation of the effects of subsidence due to compressible soils on the site should be addressed in a project-specific geotechnical report, per CBC (2007), County of Riverside, and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1**. The applicant has indicated that the issue of subsidence due to compressible soils will be addressed in an addendum to the project geotechnical report (URS, 2007b) prior to site grading (see comment numbers 206 and 214, URS, 2008). Mitigation is normally accomplished by over-excavation and replacement of the collapsible soils. For deep-seated conditions, deep foundations are commonly used.

Regional ground subsidence is typically caused by petroleum or ground water withdrawal that increases the effective unit weight of the soil profile, which in turn increases the effective stress on the deeper soils. This results in consolidation or settlement of the underlying soils. The nearest known producing petroleum or gas fields are located in the Los Angeles Basin roughly 60 miles west of the project site (CDC, 2001). Several abandoned oil wells that were drilled in 1920 to 1921 are present between 500 feet and 3 miles of the plant site. However, any subsidence due to hydrocarbon withdrawal from these wells has ceased, and further subsidence is not anticipated unless further extraction of oil from new wells were to occur. The nearest water wells are located in the vicinity of Desert Hot Springs and to the southwest, all of which are roughly 3 miles from the plant site (CDMG, 1968; CDWR, 2008). The aquifer in the CPV Sentinel site area is isolated from the production well to the southwest by the Banning and Garnet Hill Faults (Allen, 1957; CDMG, 1968), and many of the wells near Desert Hot Springs are located on the north side of the Mission Creek Fault (CDWR, 2008).

Ground water supplied by on-site wells would be utilized for plant operations (LW, 2008A). Approximately 1,100 acre-feet per year (afy) of water would be required for plant operations at maximum capacity. As part of a revised water supply plan involving the Palm Springs National Golf Course and the California Aqueduct, imported water will be used to recharge the Mission Creek sub-basin in order to offset ground water withdrawal for plant operations (LW, 2008a). Since no net loss of ground water from the Mission Creek Sub-basin will be incurred by extraction from on-site wells at CPV Sentinel,no subsidence on the project site is anticipated.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist in-place at a moisture content below their plastic limit. The addition of moisture from irrigation, capillary tension, water line breaks, etc. allows the clay to absorb water molecules into its structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can cause movement (heave) of overlying structural improvements. The potential for and mitigation of the effects of expansive soils on the site should be addressed in a project-specific geotechnical report, per CBC (2007), County of Riverside, and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1**. The applicant has indicated that the issue of expansive soils will be addressed in an addendum to the project geotechnical report (URS, 2007b) to be completed prior to site grading (see comment numbers 206 and 215, URS, 2008). Mitigation is normally accomplished by over-excavation and replacement of the collapsible soils. For deep-seated conditions, deep foundations are commonly used. Lime-treated (chemical modification) is often used to mitigate expansive clays in pavement areas.

Landslides

Landslide potential at the CPV Sentinel site is negligible, since the proposed energy facility is located on a broad, relatively flat to gently south-sloping alluvial fan. Landsliding has been documented in the hills north of San Gorgonio Pass west of the site (CDMG, 1994b).

Flooding

The Federal Emergency Management Agency (FEMA) has identified the CPV Sentinel site, lay down area, and the northern and western project linears as lying in Unshaded Zone X, which denotes areas determined to be outside the 0.2 percent annual chance (or 500-year flood) flood plain. Eastern and southern project linears lie in Shaded Zone X, which denotes areas subject to 500-year floods, as well as 100-year floods with average depths of less than 1 foot or with drainage areas less than 1 square mile. Shaded Zone X also indicates "areas protected by levees from 1 percent annual chance (100-year) floods" (FEMA, 2008).

Tsunamis and Seiches

The proposed CPV Sentinel power plant site is not near a large body of water such as a lake or open ocean and cannot be affected by a seiche or tsunami.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff has reviewed applicable geologic maps and reports for this area (CDC, 2001; CDC, 1992; CDMG, 1966; CDMG, 1968; CDMG, 1979 a and b; CDMG, 1980; CDMG, 1988; CDMG, 1990; CDMG, 1994 a and b; CDMG, 1998; CDMG, 1999; CDMG, 2003; Dibblee, 2004; McCleod, 2008; Scott, 2008; UCMP, 2008). Staff did not identify any geological resources at the energy facility location, at the temporary lay down area, or along project linears. Sand and gravel has been produced from 2 pits in the area. One is located 1 mile southeast of the southern terminus of the gas transmission line, and the other is located approximately 3.5 miles west of the plant site (CDMG, 1999; CDMG, 1988). The alluvial fan deposits shed southward from the San Bernardino Mountains are characterized as "containing mineral deposits the significance of which cannot be evaluated from available data" (CDMG, 1988).

Given the extent of the alluvial fan deposits south of the San Bernardino Mountains and the industrialized nature of the area, there is low potential for this site to have economically valuable sand and gravel or other mineral deposits that are unique to the region.

Decomposed granite was mined from a pit located several miles east of Garnet Hill. Decorative rock has been produced from a quarry near Painted Hill in the San Bernardino Mountains 4 miles northwest of the plant site.

Minor quantities of gold and tungsten were produced until the early 1900's from small districts in the San Bernardino Mountains and Little San Bernardino Mountains to the north and east, respectively (CDMG, 1998). Productive districts include the Morongo, located approximately 9 miles to the north, and the Lost Horse and Piñon mining areas, located 20 to 25 miles to the east. All gold from these areas is associated with quartz veins in granitic, metamorphic, and carbonate bedrock.

The CDC (2001) shows the nearest producing oil or gas fields are located in the Los Angeles Basin roughly 60 miles to the west. However, several abandoned oil wells are shown in the area (CDMG, 1968; Dibblee, 2004). Two wells are located on the west flank of Devers Hill, one of which is within 500 feet of the eastern boundary of the plant site (CDMG, 1968). These wells, one of which was advanced to a depth of 975 feet, probably targeted Quaternary sediments within the Devers Hill anticlinal structure produced by movement on the Banning Fault (CDC, 1982). At least three other wells were drilled on the eastern flank of the San Bernardino Mountains roughly 2.5 to 3 miles to the west and northwest. No production records were obtained for any of the abandoned wells, which were drilled in 1920 to 1921 (CDC, 1982).

A geothermal field is shown by the CDC (2001) in the Desert Hot Springs area 3 miles to the northeast. As previously noted, water temperatures as high as 184°F have been recorded in wells drilled into a shallow aquifer that is dammed on the north side of the Mission Creek Fault (CDMG, 1968).

No important paleontological resources were observed on the CPV Sentinel site or at the off-site lay down area during the paleontological field survey conducted for the AFC (CPVS, 2007a). Younger alluvial fan sediments which represent nearly all soils that are mapped at the surface of the power plant site and along most of the linear routes, would be the primary unit impacted by project grading and trenching. These deposits are considered to have a low paleontological sensitivity. Pleistocene age, older alluvial fan deposits such as those exposed on Devers Hill, however, have a high paleontological sensitivity due to the occurrence of vertebrate fossils within 4 to 5.5 miles of the gas transmission route and plant site, respectively (McLeod, 2008; Scott, 2008). The possibility of impacting significant paleontological resources in these older fan deposits is high where the deposits are mapped at the surface, and in deeper excavations elsewhere on the remainder of the project. Miocene to Pliocene marine sandstones and claystones of the Imperial Formation have a high paleontological sensitivity because fossil remains have been found on Garnet Hill. However, the potential to impact paleontological resources in this unit is low on the plant site and most of the project linear routes because the unit is expected to lie well below depths of project grading and trenching. The only area of high potential to impact Imperial Formation paleontological resources is in deep excavations at the southern terminus of the gas transmission route, which is only one mile from Garnet Hill. The potential to encounter significant paleontological resources in Holocene terrace deposits and surficial eolian sands, which may only occur as veneers several feet thick over alluvial fan deposits, is low to negligible because the sediments represent a high energy environment and/or are too young to yield fossils of scientific significance.

Several paleontological sites are documented within 6 miles of the CPV Sentinel project area. Abundant ichnofossils, which are preserved root casts and burrows, were found on Garnet Hill only one mile south of the southern terminus of the gas transmission line (URS, 2007a). The fossils, which occur in the Miocene to Pliocene age Imperial Formation, were found during the paleontological field survey conducted for the Sentinel Energy Project AFC (CPVS, 2007a). The University of California Museum of Paleontology website refers to numerous gastropod and bivalve specimens from the Imperial Formation at a locality near San Gorgonio Pass (UCMP, 2008). Many other marine invertebrate remains, including snails, limpets, sea stars, sea urchins, sand dollars, clams, and oysters have been reported from the Imperial Formation in Coachella Valley (URS, 2007a; Dibblee, 2004; Powell, 1995; Schremp, 1981).

The closest vertebrate specimens in the collection maintained by the Natural History Museum of Los Angeles County are remains of fossil horse (*Equus*) that were found in older Quaternary Age alluvium (McLeod, 2008). The specimens were recovered from the south side of Seven Palms Valley approximately 5.5 miles east of the power plant site and 4 miles east of the southern terminus of the gas transmission main. Several paleontological sites located roughly 4 miles to the southeast contain vertebrate fossils of extinct mastodon, bison and camel. The Paleontological Resources Impact Assessment (URS, 2007a) attached to the AFC notes that scientifically significant bird fossils have been recovered from the Sentinel Conglomerate, an older unit of Quaternary Age alluvium in Imperial Valley and the Salton Sea region. However, the report also indicates that the bird remains were recovered from finer-grained, lower-energy alluvial deposits rather than the high-energy, coarse boulder and cobble-dominant sediments that underlie the CPV Sentinel plant site and linear routes in Coachella Valley. PaleoResource Consultants (URS, 2007a) conclude that although the Sentinel Conglomerate, and Pleistocene Age alluvium in general, is judged to have a high sensitivity, the potential for impacting sediments that may contain significant bird fossils is low. Because of fossil remains documented by Natural History Museum of Los Angeles County within 6 miles of the CPV Sentinel project area, the potential to impact significant paleontological resources in deposits of older Quaternary alluvium is considered in this report to be high in deeper excavations and in areas where the Pleistocene deposits are mapped at the surface.

Construction Impacts and Mitigation

The design-level geotechnical investigation (URS, 2007b) required for the project by the CBC (2007) and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** should provide standard engineering design recommendations for mitigation of potential ground shaking and dynamic compaction during an earthquake. Mitigation of the effects of expansive clay soils, as well as any excessive settlement due to liquefaction, compressible soils, or hydrocompaction, will be addressed in an addendum to the geotechnical report to be submitted prior to site grading (Comment numbers 213, 214 and 215, URS, 2008).

As noted above, no viable geologic or mineralogic resources are known to exist within 1 mile of the CPV Sentinel construction site, temporary lay down area or linear routes, although several sand, gravel and decomposed granite pits, and a decorative stone quarry, are present within 5 miles.

Significant paleontological resources have been documented in Miocene to Pliocene marine deposits and Pleistocene older alluvial fan sediments that would likely be encountered during construction of the power plant and linear facilities. The nearest vertebrate fossil locality of Pleistocene age is 4 miles away. Marine invertebrate remains and ichnofossils are present within one mile of the proposed gas transmission alignment. Older alluvium is mapped over portions of the plant site, temporary lay down area and project linear routes, and may be present below locally thin, low sensitivity Holocene younger alluvium. Similarly, Miocene to Pliocene marine deposits may be present at shallow depths in the vicinity of Garnet Hill. The Pleistocene alluvial fan deposits, as well as the older marine sediments, may exhibit a high sensitivity rating with respect to containing significant paleontologic resources. Construction of the proposed project would include grading, foundation excavation, and utility trenching. Staff considers the probability of encountering paleontological resources to be generally high on portions of the plant site, temporary lay down area and buried pipelines connecting to the plant that are mapped as Pleistocene alluvium (CDMG, 1966; CDMG, 1968; USGS, 2002; Dibblee, 2004) based on the soils profile, SVP assessment criteria, and the near surface occurrence of the sensitive geologic units. The potential for encountering fossils will increase with the depth of cut. In areas mapped as Holocene alluvium, excavations for ancillary facilities, new pipelines and on-site excavations deeper than 5 feet may have a higher probability of encountering potentially high sensitivity materials, although sensitive materials could occur nearer the surface.

Proposed Conditions of Certification **PAL-1 to PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level. Essentially, these conditions require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (paleontologic resource specialist; PRS). Earthwork is halted any time potential fossils are recognized by either the paleontologist or the worker. When properly implemented, the Conditions of Certification yield a net gain to the science of paleontology since fossils that would not otherwise have been discovered can be collected, identified, studied, and properly curated. A paleontological resource specialist is retained, for the project by the applicant, to produce a monitoring and mitigation plan, conduct the worker training, and provide the on the monitoring. During the monitoring, the PRS can and often does petition the CEC for a change in the monitoring protocol. Most commonly, this is a request for lesser monitoring after sufficient monitoring has been performed to ascertain that there is little chance of finding significant fossils. In other cases, the PRS can propose increased monitoring due to unexpected fossil discoveries or in response to repeated out-of-compliance incidents by the earthwork contractor.

Based upon the literature and archives search, field surveys, and compliance documentation for the CPV Sentinel project, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the CPV Sentinel project. Energy Commission staff believes that the facility can be designed and constructed to minimize the effect of geologic hazards at the site during project design life and that impacts to vertebrate fossils encountered during construction of the power plant and associated linears would be mitigated to a level of insignificance.

Operation Impacts and Mitigation

Operation of the proposed plant facilities should not have any adverse impact on geologic, mineralogic, or paleontologic resources. Potential geologic hazards, including strong ground shaking; liquefaction; settlement due to compressible soils, ground water withdrawal, hydrocompaction, or dynamic compaction, and the possible presence of expansive clay soils can be effectively mitigated through facility design (See proposed Conditions of Certification **GEN-1, GEN-5**, and **CIVIL-1** in the **Facility Design** section) such that these potential hazards should not affect operation of the facility.

CUMULATIVE IMPACTS AND MITIGATION

The proposed CPV Sentinel site is situated in an active geologic environment. Strong ground shaking potential must be mitigated through foundation and structural design as required by the CBC (2007). Expansive materials, as well as compressible soils and soils that may be subject to subsidence due to dynamic compaction and hydrocompaction, must be mitigated in accordance with the design-level geotechnical investigation (URS, 2007b) and the future addendum to the geotechnical report (Comment numbers 206 through 215, URS, 2008) as required by the CBC (2007), and proposed Conditions of Certification **GEN-1, GEN-5**, and **CIVIL-1** under **Facility Design**. Paleontological resources have been documented in the general area of the project and in sediments similar to those that are present on the site. However, to date, none have been found on the plant site, lay down areas or along project linear routes during field studies of the CPV Sentinel project. The potential impacts to paleontological resources due to construction activities would be mitigated as required by proposed Conditions of Certification **PAL-1 to PAL-7**.

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 potential for impacts to geologic, mineralogic, and paleontologic resources is very low.

Based upon the literature and archives search, field surveys and compliance documentation for the CPV Sentinel site, the applicant proposes monitoring and mitigation measures for construction of the CPV Sentinel project. Energy Commission staff agrees with the applicant that the project can be designed and constructed to minimize the effects of geologic hazards at the site, and that impacts to scientifically significant vertebrate and invertebrate fossils encountered during construction would be mitigated to levels of insignificance.

The proposed Conditions of Certification allow the 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 not received any agency or public comments regarding geologic hazards, mineral resources, or paleontology at this time.

CONCLUSIONS

The applicant would easily be able to comply with applicable LORS, provided that the proposed Conditions of Certification were followed. The design and construction of the project should have no adverse impact with respect to geologic, mineralogic, and paleontologic resources. Staff proposes to ensure compliance with applicable LORS through the adoption of the proposed Conditions of Certification listed 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 below. Proposed paleontological Conditions of Certification follow in **PAL-1** through **PAL-7**. It is staff's opinion that the likelihood of encountering paleontologic resources is high on portions of the plant site, temporary lay down area and along buried pipelines connecting to the plant. 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 CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995. The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;
2. Ability to recognize and collect fossils in the field;
3. Local geological and biostratigraphic expertise;
4. Proficiency in identifying vertebrate and invertebrate fossils; and
5. At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontologic Resource Monitors (PRMs) shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of experience monitoring in California; or

- AS or AA in geology, paleontology, or biology and four years' experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification:

1. At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.

2. At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project, stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor's beginning on-site duties.

3. Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction lay down areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale 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.

Verification:

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

2. If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

3. If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner submits to the CPM for review and approval, a paleontological resources monitoring and mitigation plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities, and may be modified with CPM approval. This document shall be used as the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of Vertebrate Paleontology (SVP, 1995) and shall include, but not be limited, to the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to PRMMP procedures;

2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the Conditions of Certification;

3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;

4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;

5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling;

6. A discussion of procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;

7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meet the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed to receive data and fossil materials collected, requirements or specifications for materials delivered for curation, and how they will be met, and the name and phone number of the contact person at the institution; and

10. A copy of the paleontological Conditions of Certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for the following workers: project managers, construction supervisors, foremen and general workers involved with or who operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Initial worker training during project kick-off, as well as follow-up training for new employees, shall consist of a CPM-approved video or in-person training. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. No ground disturbance shall occur prior to CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those resources.

The training shall include:

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

2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontologic sensitivity;

3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;

4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;

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

6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and

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

Verification:

1. At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP, including the brochure, with the set of reporting procedures for workers to follow.

2. At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning to use a video for interim training.

3. If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

4. In the monthly compliance report (MCR, the project owner shall provide copies of the WEAP certification of completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor 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 consistent with the PRMMP . In the event that the PRS determines full-time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring and will be included in the monthly

compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keep a daily monitoring log of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.

3. The project owner shall ensure that the PRS notifies the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources Conditions of Certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the Conditions of Certification.

4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM within 24 hours, or Monday morning in the case of a weekend event where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities, and general locations of excavations, grading, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during project construction.

Verification: The project owner shall maintain in his/her compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after project completion and approval of the CPM-approved paleontological resource report (see **PAL-7**). The project owner shall be responsible for paying any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information, and submit it to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
CPV Sentinel Energy Project (07-AFC-3)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on cultural, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials. Include this completed form in the Monthly Compliance Report.

No.	Employee Name	Title/Company	Signature
1.			
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Cultural Trainer: ______________ Signature:___________________ Date: ___/___/____

PaleoTrainer: _______________ Signature:___________________ Date: ___/___/____

Biological Trainer: ______________Signature:________________ Date:___/___/__

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POWER PLANT EFFICIENCY

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 779 MW of peaking electric power at an overall project fuel efficiency of 42 percent lower heating value (LHV) at maximum full load and average annual ambient conditions[1]. While it would consume substantial amounts of energy, it would do so in the most efficient manner practicable. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

INTRODUCTION

The Energy Commission makes findings as to whether energy use by the CPV Sentinel Energy Project (CPV Sentinel) would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the CPV Sentinel's consumption of energy would create a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize the impacts. In this analysis, staff addresses the issue of inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- examine whether the facility would likely present any adverse impacts upon energy resources;
- examine whether these adverse impacts are significant; and if so,
- examine whether feasible mitigation measures exist that would eliminate the 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

CPV Sentinel, LLC, the applicant, proposes to construct and operate the simple cycle, quick start[2], CPV Sentinel, providing flexible peaking power and ancillary services to the

[1] At average annual temperature of 72 °F with 40 percent humidity (CPVS 2007a, AFC §2.4.2.2, Table 2.4-3).

[2] The LMS100 machines to be employed in this project can achieve full load from a cold start in ten minutes (CPVS 2007a, AFC §2.7.1.3; GE 2008).

Los Angeles area (CPVS 2007a, AFC §2.1). The project would consist of eight General Electric (GE) LMS100 gas turbine generators and ancillary equipment. The applicant intends for the project to operate at an annual capacity factor of no more than 35 percent (CPVS 2007a, AFC §2.9.3). The gas turbines would be equipped with evaporative inlet air cooling and compressor intercooling (via one five-cell and one three-cell evaporative cooling towers) to enhance power, as well as combustor water injection and selective catalytic reduction (SCR) to control oxides of nitrogen emissions and a combustion catalyst to control carbon monoxide (CPVS 2007a, AFC §§1.1, 2.1, 2.4, 1.10.1).

Natural gas would be delivered to the project site via a new 2.6-mile long natural gas pipeline that would be connected to an existing Southern California Gas Company (SoCalGas) natural gas transmission pipeline at the existing Indigo Energy Facility (IEF) (CPVS 2007a, AFC §§1.3, 1.8, 2.1, 2.9.6).

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING 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" (Cal. Code Regs., tit. 14, § 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 wasteful, inefficient and unnecessary consumption of energy (Cal. Code Regs., tit. 14, § 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 will consume large amounts of energy. CPV Sentinel would burn natural gas at a rate of approximately 6,139 million Btu[3] per hour LHV (CPVS 2007a, AFC §5.2, Table 2.9-1). This is a substantial rate of energy consumption, and holds the potential to impact energy supplies. Under average annual ambient conditions, electricity would be

[3] British thermal units.

generated at a full load efficiency of approximately 42 percent LHV (CPVS 2007a, AFC §2.4.2.2, Table 2.4-3). This efficiency level compares favorably with the average fuel efficiency of a typical simple cycle power plant.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of supply of natural gas for the project (CPVS 2007a, AFC §§1.3, 1.8, 2.1, 2.9.6). Natural gas for the CPV Sentinel project would be supplied from an existing SoCalGas natural gas transmission pipeline at the existing IEF. The SoCalGas natural gas system has access to gas from the Rocky Mountains, Canada and the southwest. This represents a resource of considerable capacity, an adequate source for a project of this size. It is therefore highly unlikely that the project could pose a significant adverse impact on natural gas supplies in California.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas would be delivered to the project site via a new 2.6-mile long natural gas pipeline that would be connected to an existing SoCalGas natural gas transmission pipeline at the existing IEF (CPVS 2007a, AFC §§1.3, 1.8, 2.1, 2.9.6). This is a resource with adequate delivery capacity for a project of this size. There is no real likelihood that the CPV Sentinel project would require the development of additional energy supply capacity.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of the CPV Sentinel project or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT AND UNNECESSARY ENERGY CONSUMPTION

CPV Sentinel could be deemed to create significant adverse impacts on energy resources if alternatives existed that would reduce the project’s use of fuel. Evaluation of alternatives to the project that could reduce wasteful, inefficient or unnecessary energy consumption first requires examination of the project’s energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by the configuration of the power producing system and by the selection of equipment used to generate power.

Project Configuration

The project objective is to provide flexible peaking and ancillary services during periods of high demand (typically hot summer days) as dispatched by the California Independent System Operator (CPVS 2007a, AFC §1.2). A simple cycle configuration is consistent with this objective. The CPV Sentinel project would be configured as eight simple cycle power plants in parallel, in which electricity is generated by eight natural gas-fired turbine generators (CPVS 2007a, AFC §§1.1, 2.1, 2.4.2). This configuration, with its short start-up time and fast ramping[4] capability, is well suited to providing peaking power. Further, when reduced output is required, one or more turbine

[4] Ramping is increasing and decreasing electrical output to meet fluctuating load requirements.

generators can be shut down, allowing the remaining machine(s) to produce a percentage of the full power at optimum efficiency, rather than operating a single, larger machine at a less efficient part load output.

Equipment Selection

Modern gas turbines embody the most fuel-efficient electric generating technology available today. The CPV Sentinel project would employ eight GE LMS100 gas turbine generators, the newest and most efficient such machine available (CPVS 2007a, AFC §§1.1, 2.1, 2.4.2; Figure 2.4-1). This model of the LMS100[5] is nominally rated at 98.8 MW at a fuel efficiency of 45.1 percent (GTW 2006). The CPV Sentinel project would actually produce 779 MW (97.4 MW per machine) at a site rated fuel efficiency of 42 percent LHV, based on average annual ambient conditions (CPVS 2007a, AFC Table 2.4-3). This site rating differs from nominal figures due to site specific ambient conditions (altitude and temperature), power losses from parasitic loads, and reduced system output due to flow losses caused by the inlet air cooling system and the SCR unit installed on the exhaust of each turbine.

Efficiency of Alternatives to the Project

Alternative Generating Technologies

Alternative generating technologies for the CPV Sentinel project are considered in the AFC (CPVS 2007a, AFC §§1.11, 8.5.1). Other fossil fuels, nuclear, geothermal, biomass, wind, and solar power were all considered. Solar is not dispatchable, so is incapable of producing the ancillary services[6] needed. Wind energy is not always available at the project area. Coal and oil are too highly polluting to be viable in California. Geothermal is not available at the CPV Sentinel project site, and biomass presents problems with availability. Staff agrees with the applicant that only natural gas-burning technologies are feasible for this project.

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-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 thus strongly motivated to purchase fuel-efficient machinery.

Capital cost is also important in selecting generating machinery. Current 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 made available machines that not only offer the lowest available fuel costs, but at the same time sell for the lowest per-kilowatt capital cost.

[5] CPV Sentinel would employ LMS100PA machines with single annular combustors equipped with water injection for NOx control.

[6] CPV Sentinel proposes to offer peaking power service, including flexible output, rapid start, and automatic generation control.

The GE LMS100

The applicant would employ eight General Electric LMS100 gas turbine generators in the CPV Sentinel project (CPVS 2007a, AFC §§1.1, 2.1, 2.4.2.1; Figure 2.4-1). The LMS100 gas turbine represents the most modern and efficient such machine now available. This machine is nominally rated at 98.8 MW and 45.1 percent efficiency LHV at ISO[7] conditions (GTW 2006). (Staff compares alternative machines' ISO ratings as a common baseline, since project-specific ratings are not available for the alternative machines.)

In the LMS100, GE has taken a novel approach by combining technology from both aircraft engines and heavy industrial machines. Like most aeroderivatives, the LMS100 is basically a two-shaft engine, in which an initial low-pressure compressor section is driven by the final low-pressure turbine section. An independent high-pressure compressor section, spinning on a concentric shaft, is driven by the high-pressure turbine section. GE has done three things differently on the LMS100.

First, while the high-pressure compressor and turbine spool is taken from an aero engine (the GE CF6-80C2 that powers the Boeing 747 and the CF6-80E1 that powers the Boeing 767), the low pressure spool is taken from GE's industrial Frame 6 machine. Where the airflow (and, thus, power output) of GE's popular LM6000 aeroderivative engine (see below) was limited by airflow through the low pressure spool, this limit is removed by substituting these parts from the Frame 6.

Second, GE has employed a much more effective compressor interstage cooling system. On the LM6000 SPRINT[8] machine, after air has been partially compressed in the low pressure compressor, it is evaporatively cooled by spraying water into the interstage space. Since the air entering the high pressure compressor is now cooler than it would be without intercooling, less power is required to drive the high pressure compressor. This leaves more power to drive the electric generator, increasing both power output and fuel efficiency. On the LMS100, GE ducts the air discharged from the low pressure compressor away from the machine, where it can be more effectively cooled by a separate cooling system (once-through, evaporative or dry cooling systems can be employed). The cooled air is then ducted back into the high pressure compressor.

Third, GE has provided a third shaft, independent of the first two spools, to carry the power turbine, which is in turn coupled to the electric generator[9]. On most aeroderivative gas turbine generators, the generator is coupled directly to the low pressure turbine shaft. Since the generator must turn at synchronous speed (3,600 rpm in North America), the low pressure spool must also turn at this speed. This restricts design of the machine, preventing the turbine from operating at optimum levels. Since the LMS100's power turbine and generator are not mechanically coupled to the low pressure spool, this spool is free to spin at optimum speed (approximately 5,300 rpm at full load) (Morton 2005).

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[7] International Standards Organization (ISO) standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure (equivalent to sea level).

[8] SPRINT stands for "SPRay INTercooling."

[9] This configuration is commonly found in helicopter engines.

The net result of these design improvements is a doubling of power output, a ten percent improvement in fuel efficiency, and much greater operating flexibility. Where other gas turbine generators' fuel efficiency drops off rapidly when the machine is operated at less than full load, the LMS100's efficiency suffers much less at lower output. Further, the machine is capable of ramping at high rates. The LMS100 can be operated at loads as low as ten percent (10 MW), then ramped up quickly. When running at half load (50 MW), the machine can reach full load of nearly 100 MW in less than a minute. In addition, the LMS100 can go from a cold start to full load in ten minutes. Such operating flexibility make this the most capable machine available for providing such ancillary services as peaking, load following, spinning and non-spinning reserve, and automatic generation control.

Alternatives to the LMS100

Alternative machines that can meet the project's objectives are the LM6000 SPRINT, the SGT-800 and the FT8 TwinPac, which are aeroderivative machines adapted from General Electric, Siemens Power Generation and Pratt & Whitney aircraft engines, respectively.

The General Electric LM6000PC SPRINT gas turbine generator in a simple cycle configuration is nominally rated at 50.1 MW and 40.5 percent efficiency LHV at ISO conditions (GTW 2006).

The Pratt & Whitney FT8 TwinPac gas turbine generator in a simple cycle configuration is nominally rated at 51.4 MW and 38.4 percent efficiency LHV at ISO conditions (GTW 2006).

The Siemens SGT-800 gas turbine generator in a simple cycle configuration is nominally rated at 45 MW and 37 percent efficiency LHV at ISO conditions (GTW 2006).

Machine	Generating Capacity (MW)	ISO Efficiency (LHV)
GE LMS100	**98.8**	**45.1 %**
GE LM6000PC SPRINT	50.1	40.5 %
P & W FT8 TwinPac	51.4	38.4 %
Siemens SGT-800	45	37.0 %

Source: GTW 2006; Morton 2005

While the LMS100 enjoys a significant advantage in fuel efficiency over these alternative machines, its operating flexibility makes it even more attractive for peaking, load following and ancillary service than these efficiency numbers reflect. Staff agrees with the applicant that the GE LMS100 is the most appropriate choice of machine for the CPV Sentinel project.

Inlet Air Cooling

A further choice of alternatives involves the selection of gas turbine inlet air-cooling methods.[10] The two commonly used techniques are the evaporative cooler or fogger, and the chiller (mechanical or absorption); both techniques increase power output by

[10] A gas turbine's power output decreases as ambient air temperatures rise. Cooling the air as it enters the machine increases its power output.

cooling the gas turbine inlet air. In general terms, a mechanical chiller can offer greater power output than the evaporative cooler on hot, humid days, but consumes electric power to operate its refrigeration process, thus slightly reducing overall net power output and, thus, overall efficiency. An absorption chiller uses less electric power, but necessitates the use of a substantial inventory of ammonia. An evaporative cooler or a fogger boosts power output best on dry days; it uses less electric power than a mechanical chiller, possibly yielding slightly higher operating efficiency. The difference in efficiency among these techniques is relatively insignificant.

The applicant proposes to employ evaporative inlet air cooling and evaporative compressor interstage cooling (CPVS 2007a, AFC §§1.3, 2.1, 2.4.2.2, 2.9.5). Given the climate at the CPV Sentinel project site and the relative lack of superiority of one system over the other, staff agrees that the applicant’s approach would yield no significant adverse energy impacts.

In conclusion, the project configuration (simple cycle) and generating equipment chosen appear to represent the most efficient feasible combination to satisfy the project objectives. There are no alternatives that could significantly reduce energy consumption.

CUMULATIVE IMPACTS

One nearby project has been identified that could potentially combine with the CPV Sentinel project to create cumulative impacts on natural gas resources. That project is the IEF, an existing 135 MW (nominal output) natural gas-fired simple cycle power plant consisting of three GE LM6000 combustion turbines located less than two miles away from the CPV Sentinel project site. Natural gas would be delivered to the CPV Sentinel project site via a new natural gas pipeline that would be connected to an existing SoCalGas natural gas transmission pipeline that currently delivers gas to the IEF. The SoCalGas natural gas supply system draws from extensive supplies originating in the Rocky Mountains, in the southwest, and in Canada, and is capable of delivering the required amount of gas to both of these projects. Therefore, staff believes the SoCalGas system is adequate to supply the CPV Sentinel project without adversely impacting its other customers.

NOTEWORTHY PUBLIC BENEFITS

The applicant proposes to provide flexible peaking power and ancillary services, such as automatic generation control, during periods of high demand (typically hot summer days) (CPVS 2007a, AFC §2.1). By doing so in this most fuel-efficient manner, i.e., employing the most modern peaking gas turbine generators available, the CPV Sentinel project would provide a benefit to the electric consumers of California.

CONCLUSIONS

The project, if constructed and operated as proposed, would generate 779 MW (nominal output) of peaking electric power at an overall project fuel efficiency of 42 percent LHV at average annual ambient conditions. While it would consume substantial amounts of energy, it would do so in the most efficient manner practicable. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to 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.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

CPVS 2007a – CPV Sentinel, LLC / D. Shileikis (tn: 41166). CPV Sentinel Application for Certification – Volume 1, 2, & 3. Dated on 6/25/2007. Submitted to CEC/Docket Unit on 6/25/2007.

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POWER PLANT RELIABILITY

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

CPV Sentinel, LLC, the applicant, predicts an availability factor of over 95 percent, which staff believes is achievable. Based on a review of the proposal, staff concludes that the CPV Sentinel Energy Project would be built and would 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 CPV Sentinel Energy Project (CVP Sentinel) 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 availability factor of over 95 percent for the CPV Sentinel project (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), that purchase, dispatch, and sell electric power throughout the State. How the California ISO and other control area operators would ensure system reliability has been an ongoing process; protocols have been developed and put in place that allow sufficient reliability to be maintained under the competitive market system. “Must-run” power purchase agreements and “participating generator” agreements are two mechanisms that have been employed to ensure an adequate supply of reliable power.

In September 2005, AB 380 (Stats. 2003, Chapter 367, §1) became law. This bill modified the Public Utilities Code to require the California Public Utilities Commission to consult with the California ISO to establish resource adequacy requirements for all load-serving entities (public and privately-owned utility companies). These requirements include maintaining a minimum reserve margin (extra generating capacity to serve in times of equipment failure or unexpected demand) and maintaining sufficient local generating resources to satisfy the load-serving entity’s peak demand and operating reserve requirements.

In order to fulfill this mandate, the California ISO has begun to establish specific criteria for each load-serving entity under its jurisdiction. These criteria guide each load-serving entity in deciding how much generating capacity and ancillary services to build or purchase, after which the load-serving entity issues power purchase agreements to satisfy these needs. The applicant has secured a power purchase agreement with Southern California Edison for all of the project’s generating units.

The California ISO’s mechanisms to ensure adequate power plant reliability apparently were devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there has been valid cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill 1994). It is possible that, if significant numbers of power plants were to exhibit individual reliability sufficiently lower than this historical level, the assumptions used by California ISO to ensure system reliability would prove invalid, with potentially disappointing results. Accordingly, staff has recommended that power plant owners continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

As part of its plan to provide needed reliability, the applicant proposes to operate the 850 megawatt (MW) (nominal output) CPV Sentinel, a simple cycle peaking power plant with quick start capability[1], providing flexible peaking power and ancillary services to the Los Angeles area (CPVS 2007a, AFC §2.1).

The project is expected to achieve an availability factor of over 95 percent (CPVS 2007a, AFC §2.9.3). The project would be expected to operate at an annual capacity factor of no more than 35 percent (CPVS 2007a, AFC §2.9.3).

[1] The LMS100 machines to be employed in this project can achieve full load from a cold start in ten minutes (CPVS 2007a, AFC §2.7.1.3; GE 2008).

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(b)(2)]. 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. 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 would then conclude that CPV Sentinel would be as reliable as other power plants on the electric system and would not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability would 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 (CPVS 2007a, AFC §2.9.8) that is typical of the power industry. Equipment would be purchased from qualified suppliers based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs and quality history would be evaluated. The project owner would perform receipt inspections, test components, and administer independent testing contracts. Staff expects that implementation of this program would result in 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 peaking generating facility commonly offers adequate opportunity for maintenance work during its downtime. During periods of extended dispatch, however, as could occur if other major generating or transmission assets were disabled, the facility may be required to operate for extended periods. A typical approach for achieving reliability in such circumstances is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The applicant plans to provide an appropriate redundancy of function for the project (CPVS 2007a, AFC §2.9.4, Table 2.3-1). Because the project would consist of eight 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 (approximately 87 percent of full plant 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 would 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 would be adequately maintained to ensure an acceptable level of reliability.

FUEL AND WATER AVAILABILITY

The long-term availability of fuel and of water for cooling or process use is necessary to ensure the reliability of any 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

CPV Sentinel would burn natural gas which would be delivered through a new 2.6-mile long natural gas pipeline that would be connected to an existing Southern California Gas Company (SoCalGas) natural gas transmission pipeline at the existing Indigo Energy Facility (CPVS 2007a, AFC §§1.3, 1.8, 2.1, 2.9.6). The SoCalGas 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 would be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The project would use process cooling water from the onsite or nearby groundwater wells within the Mission Creek Sub-basin (CPVS 2007a, AFC §2.9.7; LW 2008a, AFC Supplement §§1.0, 5.14.2). Potable water would be supplied via a new 3,200-foot long water line extension that would be connected to an existing municipal water line located near Dillon Road. 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 (CPVS 2007a, AFC §7.15.1.5, Appendix C); see the "Faulting and Seismicity" portion of the **Geology and Paleontology** section of this document. The project would be designed and constructed to the latest appropriate LORS (CPVS 2007a, AFC Appendices B through F). Compliance with current seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been periodically and continually upgraded. Because it would be built to the latest seismic design LORS, this project would likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see the section of this document entitled **Facility Design**. In light of the general historical performance of California power plants and the electrical system in seismic events, staff has no special concerns with the power plant's functional reliability during seismic events.

Flooding

The project site elevation ranges from approximately 1,050 to 1,120 feet above mean sea level. This site is outside the 100- and 500-year floodplains (CPVS 2007a, AFC §§2.5.11, 2.5.13).

The plant site would be graded for proper drainage to prevent onsite flooding and minimize the potential for flooding to neighboring areas. Grading and project construction would be performed in accordance with the applicable grading standards and codes (see the section of this document entitled **Facility Design)**.

Staff believes there are no special concerns with power plant functional reliability due to flooding. For further discussion, see **Soil and Water Resources** and **Geology and Paleontology**.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as other related reliability data) are maintained by the North American Electric Reliability Corporation (NERC). NERC regularly polls North American utility companies on their project reliability through its Generating Availability Data System, and periodically summarizes and publishes those statistics on the Internet [http://www.nerc.com]. The NERC reported the following generating unit statistic for the years 2002 through 2006 (NERC 2007):

For gas turbine units (50 MW and larger):

Availability Factor = 93.95%

The gas turbines that would be employed in the project are new on the market. General Electric (GE), manufacturer of the LMS100 gas turbines, is pursuing a development program for these units that is nearly unprecedented[2] in the gas turbine industry. New turbines typically undergo only systems tests during development, leaving final testing and shakedown to the initial commercial units. After the costly debacle that attended the release of GE's Frame 7F machine in the mid-1990s, GE committed to build and own the initial LMS100 power plant itself. Only after the machine had been thoroughly tested and proven did GE sell this initial plant to its ultimate owner, and proceed to deliver LMS100 machines to additional customers. That first machine, destined for the Basin Electric Power Cooperative's Groton, SD station, was delivered in late 2005 and was turned over to its new owner in summer 2006 (GTW 2006; Morton 2004).

The applicant's prediction of an availability factor of over 95 percent (CPVS 2007a, AFC §2.9.3) appears reasonable compared to the NERC figure for similar plants throughout North America (see above) and in light of the development program being undertaken. In fact, these new machines can well be expected to outperform the fleet of various (mostly older) gas turbines that make up the NERC statistics. Further, since the plant would consist of eight parallel gas turbine generating trains, maintenance can be scheduled during those times of year when the full plant output is not required to meet market demand, typical of industry standard maintenance procedures. The applicant's estimate of plant availability, therefore, appears realistic. The stated procedures for assuring design, procurement and construction of a reliable power plant appear to be in keeping with industry norms, and staff believes they are likely to yield 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, spinning and non-spinning reserve). The fact that the project consists of eight 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.

Although the gas turbines that would be employed in the project are new on the market, they can be expected to exhibit typically high availability due to the unique program GE is pursuing to ensure a reliable machine. The applicant's prediction of an availability factor of over 95 percent appears achievable. Staff believes this should provide an adequate level of reliability.

[2] GE has taken this same approach on the initial Frame 7H machines being installed at the Inland Empire Energy Center project.

CONCLUSION

The applicant predicts an availability factor of over 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

CPVS 2007a – CPV Sentinel, LLC / D. Shileikis (tn: 41166). CPV Sentinel Application for Certification – Volume 1, 2, & 3. Dated on 6/25/2007. Submitted to CEC/Docket Unit on 6/25/2007.

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TRANSMISSION SYSTEM ENGINEERING

Testimony of Ajoy Guha, P. E. and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed interconnecting facilities including the CPV Sentinel 230 kV[1] switchyard, the single circuit 230 kV tie line to the Devers substation and its termination are adequate in accordance with good utility practices and acceptable to staff according to engineering Laws Ordinances Regulations and Standards.

The current Southern California Edison (SCE) System Impact Study (SIS) and Facilities Study (FS) indicate that under certain contingency conditions the addition of the CPV Sentinel would overload the Devers-San Bernardino No.1 230 kV line. SCE has identified the upgrade of the Devers-San Bernardino lines by 2012 in their proposed 2008 annual transmission expansion plan. The interim mitigation for these overloads requires the installation of a Special Protection Scheme (SPS) that would trip the CPV Sentinel generation under specific conditions. The mitigation measures would eliminate the adverse impact and are acceptable to staff. Since the upgrade project is not a direct network requirement for interconnection of the project, it is beyond the scope of a general analysis according to the California Environmental Quality Act (CEQA).

The CPV Sentinel has a long term existing Power Purchase Agreement with SCE for selling power from the new generating units. The new CPV Sentinel 850 MW peaking units would essentially supplement the local wind generation in the Palm Springs area and the import of power to SCE system, and help to meet the increasing high load demands in the Riverside County and Coachella Valley. The new generation would also provide additional reactive power supply and improved voltage in the network, and enhance the reliability of the local electric grid.

The CPV Sentinel would, therefore, conform to the applicable Laws, Ordinances, Regulations and Standards (LORS) on satisfactory compliance of the recommended Conditions of Certifications.

INTRODUCTION

The Transmission System Engineering (TSE) analysis examines whether or not the facilities associated with the proposed interconnection conforms to all applicable LORS required for safe and reliable electric power transmission. Staff’s analysis evaluates the power plant switchyard, outlet line, termination and downstream facilities identified by the applicant. Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the “whole of the action,” which may include facilities not licensed by the Energy Commission (California Code of Regulations, title 14, §15378). Therefore, the Energy Commission must identify the

[1] The normal rating for the bus at the Devers Substation is 230 kV. The Southern California Edison and the California Independent System Operator documents are inconsistent, often referring to the same line and bus sometimes as 230 kV and others 220 kV. Staff has chosen to use the normal, 230 KV, rating for the equipment discussed in as either 230 kV or 220 kV in the applicant’s documents.

system impacts and necessary new or modified transmission facilities downstream of the proposed interconnection that are required for interconnection and represent the “whole of the action.” The downstream network upgrade mitigation measures that will be required to maintain system reliability for the addition of the power plant, are used to identify the requirement for any general CEQA analysis.

Energy Commission staff relies on the interconnecting authority for the analysis of impacts on the transmission grid as well as the identification and approval of required new or modified facilities downstream from the proposed interconnection that would be required as mitigation measures. The proposed CPV Sentinel would interconnect to the SCE transmission network and requires analysis by SCE and approval of the California Independent System Operator (California ISO).

SCE’S ROLE

SCE is responsible for ensuring electric system reliability in the SCE system for addition of the proposed generating plant. SCE has provided the analysis and reports in their System Impact and Facilities studies, and their approval for the facilities and changes required in the SCE system for addition of the proposed transmission modifications.

CALIFORNIA ISO’S ROLE

The California ISO is responsible for ensuring electric system reliability for all participating transmission owners and is also responsible for developing the standards necessary to achieve system reliability. The California ISO will review the studies of the SCE system to ensure adequacy of the proposed transmission interconnection. The California ISO will determine the reliability impacts of the proposed transmission modifications on the SCE transmission system in accordance with all applicable reliability criteria. According to the California ISO Tariffs, the California ISO will determine the “Need” for transmission additions or upgrades downstream from the interconnection point to insure reliability of the transmission grid. The California ISO has reviewed the System Impact Study (SIS) performed by SCE and has provided its approval for the proposed project to interconnect to the grid (CPVS 2007a, Appendix H).. On satisfactory completion of the SCE Facility study and in accordance with the Large Generator Interconnection Procedure (LGIP) as in the California ISO Tariff, the California ISO instead of issuing a final approval letter, would perform an Operational study examining the impacts of the project on the grid based on 2010 in-service date after the execution of the Large Generator Interconnection Agreement (LGIA) between the California ISO and the project owner. The California ISO may also provide written and verbal testimony on their findings at the Energy Commission hearings, if necessary.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), “Rules for Overhead Electric Line Construction,” formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance and operation or use of overhead electric lines and to the public in general.

- California Public Utilities Commission (CPUC) General Order 128 (GO-128), "Rules for Construction of Underground Electric Supply and Communications Systems," formulates uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety to persons engaged in the construction, maintenance and operation or use of underground electric lines and to the public in general.
- The National Electric Safety Code, 1999 provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
- NERC/WECC Planning Standards: The Western Electricity Coordinating Council (WECC) Planning Standards are merged with the North American Electric Reliability Council (NERC) Planning Standards and provide the system performance standards used in assessing the reliability of the interconnected system. These standards require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. Certain aspects of the NERC/WECC standards are either more stringent or more specific than the NERC standards alone. These standards provide planning for electric systems so as to withstand the more probable forced and maintenance outage system contingencies at projected customer demand and anticipated electricity transfer levels, while continuing to operate reliably within equipment and electric system thermal, voltage and stability limits. These standards include the reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of the standards, "NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table" and on Section I.D, "NERC and WECC Standards for Voltage Support and Reactive Power". These standards require that the results of power flow and stability simulations verify defined performance levels. Performance levels are defined by specifying the allowable variations in thermal loading, voltage and frequency, and loss of load that may occur on systems during various disturbances. Performance levels range from no significant adverse effects inside and outside a system area during a minor disturbance (loss of load or a single transmission element out of service) to a level that seeks to prevent system cascading and the subsequent blackout of islanded areas during a major disturbance (such as loss of multiple 500 kV lines along a common right of way, and/or multiple generators). While controlled loss of generation or load or system separation is permitted in certain circumstances, their uncontrolled loss is not permitted (WECC 2006).
- North American Reliability Council (NERC) Reliability Standards for the Bulk Electric Systems of North America provide national policies, standards, principles and guidelines to assure the adequacy and security of the electric transmission system. The NERC Reliability Standards provide for system performance levels under normal and contingency conditions. With regard to power flow and stability simulations, while these Reliability Standards are similar to NERC/WECC Standards, certain aspects of the NERC/WECC Standards are either more stringent or more specific than the NERC Standards for Transmission System Contingency Performance. The NERC Reliability Standards apply not only to interconnected system operation but also to individual service areas (NERC 2006).

- California ISO Planning Standards also provide standards, and guidelines to assure the adequacy, security and reliability in the planning of the California ISO transmission grid facilities. The California ISO Grid Planning Standards incorporate the NERC/WECC and NERC Reliability Planning Standards. With regard to power flow and stability simulations, these Planning Standards are similar to the NERC/WECC or NERC Reliability Planning Standards for Transmission System Contingency Performance. However, the California ISO Standards also provide some additional requirements that are not found in the WECC/NERC or NERC Standards. The California ISO Standards apply to all participating transmission owners interconnecting to the California ISO controlled grid. They also apply when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the California ISO (California ISO 2002a).
- California ISO/FERC Electric Tariff provides guidelines for construction of all transmission additions/upgrades (projects) within the California ISO controlled grid. The California ISO determines the “Need” for the proposed project where it will promote economic efficiency or maintain system reliability. The California ISO also determines the Cost Responsibility of the proposed project and provides an Operational Review of all facilities that are to be connected to the California ISO grid (California ISO 2007a).

EXISTING FACILITIES AND RELATED SYSTEMS

The applicant has proposed interconnection of the CPV Sentinel via a new 2,300-foot long single circuit 230 kV line at the Devers substation, which is about 700 feet west from the project site. In the SCE Los Angeles (LA) basin eastern system, the Devers substation is considered a large junction of electrical power with concentration of local wind and other generation, and high load demands in the Palm Springs and Mirage desert area during summer. In addition about 2,000 to 2,200 MW power is normally imported through the Devers-Palo Verde No. 1 (DVP1) 500 kV line from the Palo Verde nuclear power plant and the Southwest during peak hours. The substation is connected to Valley 500 kV substation which in turn is connected to a large 500 kV substation in Serrano valley. The new CPV sentinel 850 MW peaking units would supplement the local wind generation in the Palm Springs area and the import of power to the SCE system, and help to meet the increasing high load demands in the Riverside County and Coachella Valley. The new generation would also provide additional reactive power supply and improved voltage in the network, and enhance the reliability of the local electric grid.

PROJECT DESCRIPTION

The CPV Sentinel plant site would be located within a 37-acre site about 700 feet east of SCE Devers substation in the northern part of Palm Springs city and within incorporated Riverside County. The CPV Sentinel will consist of eight natural gas-fired combustion turbine generator (CTG) units (General Electric LMS100 model) operating in simple cycle mode with a total 850 MW nominal output. Each CTG unit rated 155 MVA, 13.8 kV would be connected through a 7,000-ampere segregated bus duct to the low voltage terminal of a dedicated generation station unit (GSU) 76/104/130 MVA, 13.8/230 kV step-up transformer with a specified impedance of 11.59 percent @76 MVA (CPVS 2007a, AFC Sections 2 & 4, Appendix H-6).

SWITCHYARD AND INTERCONNECTION FACILITIES

The new CPV Sentinel 230 kV switchyard is proposed for a 3,000-ampere single bus arrangement for with nine switch bays. Each bay would have a single SF6 gas-insulated (GIS) breaker. Eight of the breakers with a 1,200-ampere continuous rating would be connected by overhead conductors to the high voltage terminals of the respective GSU transformer. The remaining switch bay with a 3,000-ampere breaker would be used for the new 230 kV overhead interconnection line to the Devers 500/230/115 kV Substation. The applicant would build, own and operate the CPV Sentinel switchyard.

The new CPV Sentinel 230 kV switchyard would be interconnected to the SCE Devers Substation 230 kV bus by building a new 2,300-foot long 230 kV single circuit overhead transmission line with a bundled 1590 kcmil steel reinforced aluminum conductor (ACSR) on nine 85-foot to 115-foot high tubular steel poles. About 1,800 feet of the line would be outside of the CPV Sentinel plant or Devers substation boundaries and this portion of the line would follow the right of way of existing SCE 230 kV and 115 kV lines adjacent to Powerline Road.

To accommodate termination of the interconnecting line at the SCE Devers substation 230 kV bus, the existing Devers-Coachella 230 kV line and Devers-Vista #1 line outlets and their terminations would be relocated to adjacent switch bays with installation of five new 230 kV circuit breakers with 3,000-ampere continuous rating and 50 kA interrupting rating, and the new interconnection line from the CPV Sentinel switchyard would be terminated to the switch bay previously occupied by the Devers-Vista #1 230 kV line through a 3,000-ampere circuit breaker. SCE would build, own and operate the new 230 kV transmission tie line and interconnecting facilities between the CPV Sentinel switchyard and Devers substation (CPVS, AFC Sections 2 & 4).

The configuration of the CPV Sentinel switchyard, the generator tie line to the Devers substation and its termination is in accordance with good utility practices and is acceptable to staff.

TRANSMISSION SYSTEM IMPACT ANALYSIS

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility and the control area operator are responsible for ensuring grid reliability. For the CPV Sentinel, SCE and California ISO are responsible for ensuring grid reliability. In accordance with the FERC/California ISO/Utility Tariffs, System Impact and Facilities Studies are conducted to determine the preferred and alternate interconnection methods to the grid, the downstream transmission system impacts and the mitigation measures needed to ensure system conformance with performance levels required by the utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. Staff relies on the studies and any review conducted by the responsible agencies to determine the effect of the 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 (NERC2006, WECC 2006, California ISO 2002a and 2007a).

The System Impact and Facilities Studies analyze the grid 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 by which grid reliability is determined. The studies must analyze the impact of the project for the proposed first year of operation and thus are based on a forecast of loads, generation and transmission. Load forecasts are developed by the interconnected utility, which would be SCE in this case. Generation and transmission forecasts are established by an interconnection queue. The studies are focused on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads or cascading outages), and short circuit duties.

If the studies show that the interconnection of the project causes the grid to be out of compliance with reliability standards, the study will then identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. If the interconnecting utility determines that the only feasible mitigation includes transmission modifications or additions which require CEQA review as part of the "whole of the action," the Energy Commission must analyze those modifications or additions according to CEQA requirements.

SCOPE OF SYSTEM IMPACT STUDY (SIS) AND FACILITY STUDY (FS)

The April 6, 2005 SCE SIS was prepared to evaluate the impact of the new 850 MW generation output from the CPV Sentinel plant to the Devers substation 230 kV bus. Based on the estimated commercial operation date of May, 2008, the study was conducted with a 2008 heavy summer peak case and a 2008 spring case, derived from the annual California ISO 2005-2014 Transmission Expansion Plan. The full loop 2008 summer peak base case was prepared with and without the proposed CPV Sentinel 850 MW generation output with a 1-in-5 year extreme weather summer peak load, San Onofre units 2 & 3 on-line, maximum generation in SCE eastern area system, maximum East of the River (EOR)/West of the River (WOR) power flow and high power flow into the Devers area. The base cases also included planned California ISO approved transmission upgrades that would be operational by 2007/2008, and all queue generation higher than the CPV Sentinel. The full loop 2008 spring case was prepared with and without the proposed CPV Sentinel 850 MW generation output with 65 percent of the summer peak load and other assumptions remaining same as in the summer peak cases. Further assuming the largest unit of the San Onofre (unit 2 or 3) initially off-line, the study was also conducted with and without the CPV Sentinel generation output for single (N-1) contingencies. The study included a power flow analysis, a short circuit analysis and substation evaluations.

The January 9, 2006, SCE Facility Study (FS) determined the scope of work and provided cost estimates for the CPV sentinel generation tie line facilities and also necessary downstream reliability upgrades in the SCE system, assuming SCE would engineer, construct, own and maintain the interconnecting facilities (except the CPV

Sentinel switchyard) and engineer and construct the downstream upgrades (CPVS 2007a, AFC Section 4.5; Appendix H-1, SIS; Appendix H-2, FS and Appendix H-3).

POWER FLOW STUDY RESULTS AND MITIGATION

The SIS and FS demonstrate that the new 850 MW CPV Sentinel generation output would not cause any normal (N-0) overload or voltage criteria violations for both 2008 summer peak and spring system conditions with all transmission facilities in service. However, under certain contingency conditions the existing SCE transmission facilities are found inadequate to accommodate interconnection of the CPV Sentinel and would need network upgrades to maintain reliability.

- Under certain contingencies and during 2008 summer peak and spring system conditions, the SIS identified the following overloads on the Devers-San Bernardino No.1 230 kV line and corresponding mitigation measures: The Devers-San Bernardino No.1 230 kV line is limited by its conductor ground clearance and therefore, does not have any emergency capacity available during contingency conditions.
  - The line overloaded to 103 percent during the 2008 summer peak system conditions and to 115 percent during the 2008 spring system conditions due to the Category B (N-1) contingency outage of the Devers-Valley 500 kV line
  - The line overloaded to 108 percent during 2008 spring system conditions due to Category C (N-2) contingency outages of the Devers-Vista #1 & 2 230 kV lines.
  - The line overloaded to 114 percent during 2008 spring system conditions due to Category C (N-2) contingency outages of the Devers-Vista #1 and Devers-San Bernardino #2 230 kV lines.
  - The line overloaded to 114 percent during 2008 spring system conditions due to Category C (N-2) contingency outages of the Devers-Vista # 2 and Devers-San Bernardino #2 230 kV lines.
- **Mitigation**: A new Special protection scheme (SPS) to trip the CPV sentinel generation under the above mentioned outage conditions can be used to mitigate the above overload problem. As part of the West of Devers 230 kV Rebuild project identified in the SCE/ California ISO 2008 Transmission Plan, SCE has proposed to upgrade the Devers-San Bernardino no.1 230 kV line by 2012. Because this transmission upgrade is identified in the transmission plan as being needed to maintain system reliability and to reduce the cost of serving loads with or without the CPV Sentinel project, the need for the upgrade is not viewed by staff as a consequence of the CPV Sentinel project. The line upgrade may also eliminate the need for the SPS. Additional studies, taking into account the timing of both the transmission and generation projects and the final load flows after both projects are on-line, would be required to determine if the SPS would still be needed after the line upgrade. SCE in their facility study report recommends at this stage to proceed with a plan for installing a SPS to mitigate the overload on interim basis. Staff concurs with the mitigation plan.

SHORT CIRCUIT STUDY RESULTS and mitigation

The Short Circuit Study results identified that the addition of the CPV Sentinel generation would increase the three-phase to ground short circuit duty by 0.1 kA or more at three 500 kV substation buses, twenty-three 230 kV substation buses and three 115 kV substation buses in the SCE system, where the breaker duty is in excess of 60 percent of the breaker name plate interrupting rating. A summary of the short circuit duty results are provided in Table 3 of the SIS report (CPVS 2007a, AFC, Appendix H SIS, page 6).The Short Circuit Study data is used to determine if any equipment would be overstressed due to increase in fault current by the addition of the CPV Sentinel.

- **Mitigation**: SCE's Optional Study for Material Modification Determination of December 21, 2006 determined that the current plant configuration with eight CTG units having a net 850 MW generation output and corresponding GSU transformers each with a non-standard modified percentage impedance (11.59@ 76 MVA rating) would not have any material impact on the short circuit duty of the lower queued projects. Such impedance specification for the proposed eight GSU transformers, therefore, would eliminate any short circuit duty criteria violations observed in the study for the addition of the CPV Sentinel. Staff considers the mitigation acceptable.

SUBSTATION EVALUATION

According to the Substation Evaluation in the SCE FS report, several modifications would be made at the Devers Substation in order to reliably accommodate interconnection of the CPV Sentinel. The wave traps would be removed from the existing Devers-Coachella 230 kV line and Devers-Vista #1 230 kV line outlets, and the line terminations would be relocated to adjacent switch bays with five new 3,000-ampere circuit breakers. The interconnection 230 kV tie line from the CPV Sentinel switchyard would be terminated to the switch bay previously occupied by the Devers-Vista #1 230 kV line through a 3,000-ampere circuit breaker. The study also identified the need to install new relays and telecommunication equipment for the new tie line and the need to replace relays for the existing 230 kV lines. Remote control equipment would be required for the new generating units. Staff concurs with the evaluation (CPVS 2007a, AFC, Appendix H-2 FS).

TRANSIENT STABILITY STUDY RESULTS

SCE performed transient stability studies in 2000 and 2004 with the alternative generating unit configurations for CPV Sentinel plant. SCE performed the latest study with the current generating unit configuration in 2006 and identified no transient stability concerns in the SCE system due to the addition of the CPV Sentinel project.

CALIFORNIA ISO REVIEW

The California ISO letter of August 8, 2007 addressed the April 6, 2005 SIS and the January 6, 2006 FS reports for interconnection of the project with 2008 summer peak and spring system conditions based on May, 2008 on-line date, which is inconsistent with the May, 2010 on-line date as stated in the Application For Certification (AFC). In their letter the California ISO stated that they would shortly complete a Large Generator Interconnection Agreement (LGIA) with the CPV Sentinel. And pursuant to Section 12.2.4 of the Large Generator Interconnection Procedures (LGIP) in the California ISO Tariff, after the execution of the LGIA the California ISO would perform an Operational study examining the impacts of the proposed project on the grid base on the 2010 in-service date. The applicant in their November 5, 2007 data response indicated they would provide the required information (LW 2007c; CPVS 2007b).

The California ISO also reviewed SCE's two Optional Studies for Material Modification determination of December 11 and 21, 2006 for the CPV sentinel alternative generating unit configurations and concluded in their January 12, 2007 letter that the current plant configuration with eight CTG units having a net 850 MW generation output and corresponding GSU transformers each with a non-standard modified percentage impedance (11.59@ 76 MVA rating) would retain its present queue position. Such configuration would not have any material impact on the short circuit duty of the lower queued projects and the applicant may proceed through the LGIP in order to finalize the LGIA for the project. The applicant had since finalized and signed the LGIA effective June 6, 2008 with the California ISO (CPVS 2007a, AFC, Appendices H-4 and H-5, CPVS 2007c).

Performance of the Operational study based on 2010 commercial operation date and execution of the LGIA ensure system reliability in the California ISO grid and compliance with WECC/NERC and California ISO Planning standards (WECC 2006, NERC 2006, California ISO 2002a and 2007a).

DOWNSTREAM FACILITIES

Besides the interconnection facilities which include the new CPV Sentinel switchyard and the proposed new single circuit 230 kV line between the CPV Sentinel 230 kV switchyard and the Devers 500/230/115 kV substation, accommodating the interconnection of the CPV Sentinel at the Devers substation 230 kV bus would require installation of five new 3,000-ampere 230 kV breakers and relocation of two existing 230 kV transmission line outlets and their terminations to adjacent switch bays. The construction would be done by SCE within the existing fence line of the Devers substation.

CUMULATIVE IMPACTS

In view of the concentration of electrical generation and loads in the SCE Devers area including about 2200 MW import of power through the existing Devers-Palo Verde No.1 (DPV1) 500 kV line from the Southwest, staff believes that the CPV Sentinel generation would create some cumulative effects in the area network especially on the west of Devers 230 kV and 115 kV lines. SCE has proposed reconductoring the west of Devers 230 kV lines as part of their proposed annual grid expansion process.

The cumulative marginal impacts due to the CPV Sentinel, as identified in the SIS, would be mitigated. Staff also believes that there would be some positive impacts because the CPV Sentinel would supplement local wind generation and import of power to the SCE system, meet the increasing load demand in the Riverside County and Coachella Valley, provide additional reactive power and voltage support in the local network, and may reduce system losses in the SCE system.

ALTERNATIVE TRANSMISSION ROUTES

The new CPV Sentinel 230 kV switchyard would be interconnected to the SCE Devers Substation 230 kV bus by building a new 2,300-foot long 230 kV single circuit overhead transmission line. About 500 feet of the line would be inside the fence lines of the CPV Sentinel plant or Devers substation and the remaining 1,800 feet of the line would follow the shortest and economic route through the right of way of the existing SCE 230 kV and 115 kV lines. As such no alternate route or line was considered by the applicant and this is permissible under the provisions of CEQA (CPVS 2007a, AFC, Section 2 & 4).

CONFORMANCE WITH LORS AND CEQA REVIEW

The SIS demonstrates that there would be an adverse impact in the SCE system for the addition of the CPV Sentinel to the Devers substation. However the identified impact would be mitigated by installing a SPS and a network upgrade that SCE has identified as needed with or without the CPV Sentinel project. The applicant's submission of a California ISO Operational Study report would ensure system reliability in the California ISO grid and conformance with the reliability LORS.

The proposed new interconnecting facilities, the CPV Sentinel 230 kV switchyard, and the single circuit 230 kV line and its termination to the Devers substation, would be built according to the NESC standards and GO-95 Rules. The new facilities would be in accordance with good utility practices, would conform to engineering LORS and are acceptable to staff.

The SCE plan for building the new interconnection 230 kV tie line through the existing right of way and for facilities within the existing fence line of the Devers substation would have no significant or unmitigated environmental impact. The follow-up reconductoring of the Devers-San Bernardino 230 kV line is planned by SCE as a part of their 2008 Transmission Plan. Since the reconductoring project is not a direct network upgrade requirement for interconnection of the CPV Sentinel, it is beyond the scope of this CEQA review.

The CPV Sentinel project would, therefore, meet the requirements and standards of all applicable LORS upon satisfactory compliance of the Conditions of Certifications (CPVS 2007a, AFC Sections 2 and 4, Appendices H-1 and H-2).

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments related to the TSE discipline have been received.

CONCLUSIONS AND RECOMMENDATIONS

1. The proposed interconnecting facilities including the CPV Sentinel 230 kV switchyard, the single circuit 230 kV line to the Devers substation and its termination are adequate in accordance with good utility practices and acceptable to staff according to engineering LORS.

2. The current April 6, 2005 SIS and January 9, 2006 FS were performed by SCE to evaluate the system impact of the 850 MW CPV Sentinel generation output with 2008 system conditions based on May, 2008 estimated commercial operation date (COD) of the project, which is inconsistent with the May, 2010 COD as stated in the AFC. The California ISO in their August 8 letter stated that they would shortly complete a Large Generator Interconnection Agreement (LGIA) with the CPV Sentinel. And pursuant to Section 12.2.4 of the LGIP in the California ISO Tariff, after the execution of the LGIA the California ISO, would perform an Operational study examining the impacts of the proposed project on the grid based on the 2010 in-service date. The applicant indicated in their November 5, 2007 data response that they would provide the required information.

3. The California ISO also reviewed two SCE Optional Studies for Material Modification determination of December 11 and 21, 2006 for the CPV Sentinel alternative generating unit configurations and concluded in their January 12, 2007 letter that the current plant configuration with eight CTG units having a net 850 MW generation output and corresponding GSU step-up transformers each with a non-standard modified percentage impedance (11.59@ 76 MVA rating) would have no material impact including the short circuit duty of the SCE substations and the applicant may proceed to finalize the LGIA for the project. The applicant had since finalized and signed the LGIA effective June 6, 2008 with the California ISO.

4. The current SCE SIS and FS demonstrate that the addition of the CPV Sentinel would have an adverse overload impact on the Devers-San Bernardino No.1 230 kV line under certain single and double contingencies. The interim mitigation for installing a SPS to trip the CPV sentinel generation may be replaced by follow-up reconductoring of the affected line as a part of the proposed SCE 2008 Transmission Expansion Plan. The mitigation measures would eliminate the adverse impact and are acceptable to staff. The applicant’s submission of a California ISO Operational Study report as stated in item 2 above would ensure compliance with the reliability LORS.

5. SCE plans to build the new interconnection 230 kV tie line through an existing right of way. The follow-up reconductoring of the Devers-San Bernardino No.1 230 kV line is planned by SCE as a part of their 2008 Transmission Expansion Plan. Since the reconductoring project is not a direct network upgrade requirement for interconnection of the CPV Sentinel, it is beyond the scope of this general CEQA analysis.

6. The CPV Sentinel would, therefore, conform to the applicable LORS upon satisfactory compliance of the recommended Conditions of Certifications.

7. The CPV Sentinel has an existing long term Power Purchase Agreement with SCE for the five new generating units. The new CPV sentinel 850 MW peaking units would supplement the local wind generation in the Palm Springs area and import of power to the SCE system, and would help to meet the increasing high load demands

in the Riverside County and Coachella Valley. The new generation would also provide additional reactive power supply, improved voltage in the network and would enhance reliability in the electric grid.

RECOMMENDATIONS

If the Energy Commission approves the project, staff recommends the following Conditions of Certification to ensure system reliability and conformance with LORS.

CONDITIONS OF CERTIFICATIONS FOR TSE

TSE-1 The project owner shall furnish to the CPM and to the CBO a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Verification: At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

Table 1: Major Equipment List
Breakers
Step-up Transformer
Switchyard
Busses
Surge Arrestors
Disconnects and Wave-traps
Take off facilities
Electrical Control Building
Switchyard Control Building
Transmission Pole/Tower
Insulators and Conductors
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 with 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 (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action. (1998 CBC, 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 to obtain 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:

a) receipt or delay of major electrical equipment;

b) testing or energization of major electrical equipment; and

c) the number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, 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 to the CBO as determined by the CBO.

a) The power plant switchyard and outlet line shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders", California ISO standards, National Electric Code (NEC) and related industry standards.

b) Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to accommodate full output from the project and to comply with a short-circuit analysis.

c) Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.

d) The project conductors shall be sized to accommodate the full output from the project.

e) Termination facilities shall comply with applicable PG&E interconnection standards.

f) The project owner shall provide to the CPM:

   i) A line route drawing after selecting one of the alternate route options for the generator interconnection 230 kV tie line.

   ii) The Special Protection System (SPS) sequencing and timing if applicable,

   iii) A letter stating that the mitigation measures or projects selected by the transmission owners for each criteria violation are acceptable,

   iv) The Operational study report based on 2010 or current Commercial Operation Date (COD) system conditions (including operational mitigation measures) from the California ISO and/or SCE.

Verification: At least 60 days prior to the start of construction of transmission facilities (or a lesser number of days mutually agree to by the project owner and CBO), the project owner shall submit to the CBO for approval:

a) Design drawings, specifications and calculations conforming with CPUC General Order 95 or NESC, Title 8, 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.

b) For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst case conditions"[2] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of them, "High Voltage Electric Safety Orders", NEC, applicable interconnection standards, and related industry standards.

c) 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** a) through f) above.

[2] Worst case conditions for the foundations would include for instance, a dead-end or angle pole.

d) A line route drawing after selecting one of the alternate route options for the generator interconnection 230 kV tie line.

e) The Special Protection Scheme (SPS) sequencing and timing if applicable shall be provided concurrently to the CPM.

f) A letter stating that the mitigation measures or projects selected by the transmission owners for each criteria violation are acceptable.

g) The Operational study report based on 2010 or current COD system conditions (including operational mitigation measures) from the California ISO and/or PG&E.

TSE-6 The project owner shall inform the CPM and CBO of any impending changes that may not conform to requirements **TSE-5** a) through f), 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.

Verification: 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 that` 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 (Cal-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 Cal-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 ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the Cal-ISO letter to the CPM when it is sent to the Cal-ISO one week prior to initial synchronization with the grid. The project owner shall contact the Cal-ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the Cal-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 them, “High Voltage Electric Safety Orders”, applicable interconnection standards, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

a) "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.

b) An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the "Compliance Monitoring Plan".

c) 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. California ISO Tariff Scheduling Protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

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CPVS (CPV Sentinel, LLC/D. Shileikis) 2007a. Application For Certification for the CPV Sentinel Energy Project (07-AFC-3). Appendix H for System Impact study & Facility study reports, Copy of Letter dated 1-12-07 from the California ISO RE: Reviewing SCE Optional studies. Submitted to the Energy Commission on June 25, 2007.

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CPVS (CPV Sentinel, LLC/D. Shileikis) 2007c. Response to data request 24 dated July, 2007. Submitted to CEC on July 10, 2007.

CEC (California Energy Commission) 2007d. CEC Data Requests 1-61, dated 10-4-2007 to CPNV Sentinel. Docketed on October 4, 2007.

CEC (California Energy Commission) 2008a. CEC Data Requests 66-97 dated 3-25-2008. Docketed on March 25, 2008.

LW (Latham & Watkins LLP/P.Kihm) 2007C. Copy of letter dated 8-14-2007 from California ISO to CEC Re: Data Adequacy determination. Submitted to CEC on August 14, 2007.

URS(URS / D. Shileikis) 2007f. Responses to Data Requests dated 11-5-07. Submitted to CEC on November 5, 2007.

NERC (North American Electric Reliability Council) 2006. Reliability Standards for the Bulk Electric Systems of North America, May 2 2006.

WECC (Western Electricity Coordinating Council) 2006. NERC/WECC Planning Standards, August 2006.

DEFINITION OF TERMS

ACSR
Aluminum cable steel reinforced.

AAC
All Aluminum conductor.

Ampacity
Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.

Ampere
The unit of current flowing in a conductor.

Kiloampere
(kA) 1,000 Amperes

Bundled
Two wires, 18 inches apart.

Bus
Conductors that serve as a common connection for two or more circuits.

Conductor
The part of the transmission line (the wire) that carries the current.

Congestion Management

Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports) would not violate criteria.

Emergency Overload
: See Single Contingency. This is also called an L-1.

Hertz
: The unit for System Frequency.

Kcmil or KCM
: Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained.

Kilovolt (kV)
: A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground. 1,000 Volts.

Loop
: An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac.

MVAR or Megavars
: Megavolt Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.

Megavolt ampere (MVA)
: A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000.

Megawatt (MW)
: A unit of power equivalent to 1,341 horsepower.

Normal Operation/ Normal Overload
: When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.

N-1 Condition
: See Single Contingency.

Outlet
: Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

Power Flow Analysis

A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels.

Reactive Power

Reactive power is generally associated with the reactive nature of inductive loads like motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.

Remedial Action Scheme (RAS)

A remedial action scheme is an automatic control provision, which, for instance, would trip a selected generating unit upon a circuit overload.

SSAC

Steel Supported Aluminum Conductor.

SF6

Sulfur hexafluoride is an insulating medium.

Single Contingency

Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

Solid dielectric cable

Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.

SVC

Static VAR Compensator: An equipment made of Capacitors and Reactors with electronic controls for producing and controlling Reactive Power in the Power System.

Switchyard

A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.

Thermal rating

See ampacity.

TSE

Transmission System Engineering.

TRV

Transient Recovery Voltage

Tap

A transmission configuration creating an interconnection through a sort single circuit to a small or medium sized load or a generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.

Undercrossing
A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

Underbuild
A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

VAR
Voltage Ampere Reactive, a measure for Reactive power in the power system.

ALTERNATIVES

Testimony of Suzanne Phinney, D.Env.

SUMMARY OF CONCLUSIONS

In the analysis of the CPV Sentinel Energy Project (CPV Sentinel), staff examined five alternative project sites, as well as several alternative energy producing technologies which do not burn fossil fuels. The alternative sites would not reduce or avoid significant impacts to Air Quality. Some of the alternative technologies would not generate air pollutants, but would not fulfill the project objective of quick-start peaking capacity.

Staff analyzed five undeveloped sites in the vicinity of the proposed project as potential alternatives. Four of the sites (areas respectively to the south, directly east, to the west, and 3,400 feet to the east of Devers Substation) were not available. They have already been approved for wind development or are owned by Southern California Edison (SCE) for future substation expansion. The fifth site, an area to the north of Devers Substation, would require longer transmission, gas, and water connections and a longer access road than the proposed site. Air quality impacts would be the same as at the proposed site.

Renewable technologies were examined as possible alternatives to the project. Solar PV, solar thermal, and wind technologies would consume little on-site water and would not generate air pollutants that would require offsets. They would, however, require extensive acreage for comparable generation to the proposed project. In addition, a solar or wind facility would not fulfill a basic objective of this project: to provide quick-start capability to respond to unexpected changes in regional demands. Geothermal and hydroelectric alternatives were determined to not be viable options, as there are no adequate geothermal or hydrological resources located in the Coachella Valley. Biomass would not be feasible due to small generation capacity and the need to transport biomass fuels from outside the area. Consequently, staff does not believe that solar, wind, geothermal, biomass, or hydroelectric technologies present feasible alternatives to the proposed project.

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 for CPV Sentinel.

INTRODUCTION

This section considers potential alternatives to the construction and operation of the proposed CPV Sentinel project. The purpose of this alternatives analysis is to comply with state environmental laws by providing an analysis of a reasonable range of feasible alternative sites which could substantially reduce or avoid any potentially significant adverse impacts of the proposed project (Cal. Code Regs., tit. 14, §15126.6; Cal. Code

Regs., tit. 20, §1765). This section discusses potentially significant impacts of the proposed project that were identified in various technical sections of this FSA and analyzes different technologies and alternative sites that may reduce or avoid those significant impacts. The section also analyzes the impacts that may be created by locating the project at alternative sites.

The Energy Commission does not have the authority to approve an alternative or require CPV Sentinel to move the proposed project to another location, even if it identifies an alternative site that meets the project objectives and avoids or substantially lessens one or more of any significant effects of the project. CPV Sentinel, LLC has executed a contract with SCE that requires the delivery of capacity, energy, and ancillary services from five of eight proposed units to the Devers Substation by August 1, 2010. In March 2008, SCE signed an additional long-term power purchase agreement for the remaining three CPV Sentinel units for an on-line date of May 1, 2012.

CALIFORNIA ENVIRONMENTAL QUALITY ACT CRITERIA

Title 14, California Code of Regulations, section 15126.6(a), provides direction by requiring an evaluation of the comparative merits of “a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project.” In addition, the analysis must address the “No Project” alternative (Cal. Code Regs., tit. 14, §15126.6(e)).

The range of alternatives is governed by the “rule of reason” which requires consideration only of those alternatives necessary to permit informed decision making and public participation. CEQA states that an environmental document does not have to consider an alternative where the effect cannot be reasonably ascertained and whose implementation is remote and speculative (Cal. Code Regs., tit. 14, §15126.6(f)(3)).

PROJECT DESCRIPTION AND SETTING

CPV Sentinel is designed as an 850-MW natural gas-fired, simple cycle generating, quick-start peaking facility which has been proposed to provide reliability for the Southern California region and meet growing local demand in the Coachella Valley and Riverside County. As described in Section 1.2 of the AFC, CPV Sentinel was selected by SCE through its New Gen Request for Offers (RFO) for 1,500 MW of new generation capacity in the Los Angeles Basin Local Capacity Requirements (LCR) area. The project will meet the need for additional electric generation capacity, energy, and ancillary services in Southern California and, in particular, quick-start peaking capacity needs identified by SCE, the Energy Commission, the California Public Utilities Commission (CPUC), and the California Independent System Operator (California ISO) for the Los Angeles Basin LCR area.

The proposed CPV Sentinel site is a 37-acre parcel in Riverside County, in an area zoned for Controlled Development and designated Public Facilities. The site is surrounded by existing wind farms to the south, southeast, and east. It is located 1.3 miles east of State Route 62, 1.7 miles north of Interstate 10, 1.3 miles west of Indian

Avenue, and 4.5 miles west of the center of the city of Desert Hot Springs. CPV Sentinel would be connected to SCE's electrical system at the utility's existing Devers Substation, which is located approximately 700 feet west of the proposed CPV Sentinel site. The 2,300-foot-long connection to the substation would require a new overhead single-circuit 220-kV line. Natural gas would be supplied to the proposed CPV Sentinel project via a 2.6-mile-long, 24-inch-diameter pipeline connection to the existing Indigo Energy Facility, which is 1.8 miles southeast of the site.

CPV Sentinel's process water demands are estimated to be a maximum of 1,100 acre-feet per year, with a long-term average of 550 acre-feet per year. This water would be pumped from groundwater wells. Potable water for human use would be obtained through a 3,200-foot-long extension to a Mission Springs Water District municipal line along Dillon Road. Sanitary wastewater would be collected in portable, self-contained toilets and tanks for service by an outside contractor during construction, and would discharge to an onsite septic system during operations.

The closest noise receptors are four residences respectively located 340 feet to the south and 330, 1,000, and 1,300 feet to the east of the facility. (The residence 340 feet to the south would be vacated prior to construction, and CPV Sentinel has the option to acquire the property 330 feet to the east.) The nearest residential community is 2,600 feet to the southwest. No other sensitive receptors were identified within a 2-mile radius of the proposed site (CPVS 2007a).

DETERMINING THE SCOPE OF THE ALTERNATIVES ANALYSIS

The purpose of staff's alternatives analysis is to determine the potential significant impacts of the CPV Sentinel project and then focus on alternatives that are capable of reducing or avoiding these impacts.

To prepare this alternative analysis, the staff used the methodology summarized below.

- Describe the basic objectives of the project.
- Identify any potential significant environmental impacts of the project.
- Identify and evaluate alternative locations or sites to determine whether the environmental impacts of the alternatives are the same, better, or worse than the proposed project.
- Identify and evaluate technology alternatives to the project which would mitigate impacts.
- Evaluate the impacts of not constructing the project to determine whether the "no project" alternative is superior to the project as proposed.

In considering site alternatives, staff determined a reasonable geographical area. Since alternatives must consider the underlying objectives of the proposed project, staff confined the geographic area for site alternatives to the vicinity of SCE's Devers Substation. These location alternatives are generally consistent with CPV Sentinel's project objectives and siting criteria: proximity to the substation; location in an area appropriate for industrial development and compatible with Riverside County general plans and zoning ordinances; proximity to water, transmission, and land gas infrastructure; and ability to have no significant impact on the environment with implementation of reasonable mitigation measures.

Alternative generation technologies, as discussed in this analysis, include both methods to reduce the demand for electricity and also alternative methods to generate electricity. Water supply and cooling alternatives have been addressed in the **Soil and Water Resources** section of the **FSA**.

BASIC OBJECTIVES OF THE PROJECT

After studying CPV Sentinel's AFC (CPVS 2007a), Energy Commission staff has determined CPV Sentinel's objectives are to:

- safely construct and operate a nominal 850-MW, natural-gas-fired, simple cycle generating facility;
- provide quick-start peaking capacity, energy, and ancillary services;
- meet electrical demand in the Southern California region, particularly Riverside County and the Coachella Valley;
- deliver electricity to the SCE Devers Substation at 220 kV;
- have proximity to the substation and to gas and water infrastructure; and
- begin commercial operation by August 2010.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS OF THE PROJECT

Since the PSA was published, staff has identified a water recharge schedule that would ensure an adequate amount of water is recharged into the Mission Creek spreading grounds sufficiently in advance of project groundwater pumping to prevent groundwater drawdown, thereby avoiding impacts to mesquite hummocks. Please see the **Biological and Water Resources** sections of the FSA.

However, staff cannot conclude at this time that significant impacts to Air Quality would be mitigated by the proposed project. The CPV Sentinel project applicant has not secured or identified sufficient emission reduction credits, RECLAIM Trading Credits or other offsets allowed under South Coast Air Quality Management District Rules and Regulations to comply with New Source Review offset requirements or mitigate the potential air quality impacts from the project emissions of nitrogen oxides, sulfur dioxides, volatile organic compounds, and particulate matter. Unmitigated, these pollutants have the potential to contribute to existing violations of the ambient air quality standards.

SITE ALTERNATIVES TO THE PROJECT

This section evaluates the alternative sites identified by CPV Sentinel and other site possibilities identified by staff or the public.

Staff considered the following criteria in identifying potential alternative sites:

1. Avoid or substantially lessen one or more of the potential significant effects of the project;

2. Satisfy the following criteria:

   A. Site suitability. Approximately 37 acres are required for the site. The shape of the site also affects its usability.

   B. Availability of infrastructure. The site should be within a reasonable distance of natural gas and water supplies. Longer infrastructure lengths would increase the potential for environmental impacts.

   C. Location near SCE's Devers Substation.

   D. Compliance with general plan designation and zoning district.

   E. Availability of the site.

Staff first identified an initial study region. The region consisted of the geographic area near the SCE Devers Substation. Staff then reviewed the alternative sites identified by the applicant, as well as alternative sites identified in the environmental impact report (EIR) prepared for a nearby wind farm, Dillon Wind Farm. The nearest boundaries of the wind farm sites are all located within one mile of the proposed CPV Sentinel site. Staff visited the alternative sites to investigate their suitability and also to ascertain their availability. Much of the land in the study area either consists of multiple small parcels or has been developed or is in the process of being developed for wind energy. Staff examined the four alternative sites proposed in the CPV Sentinel AFC: areas north, west, south, and directly east of the Devers Substation. Staff reviewed the EIR prepared for the Dillon Wind Farm and identified one additional site 3,400 feet east of the Devers Substation. (The Wind Farm also identified a site that corresponds to CPV Sentinel's alternative to the west of the substation).

Sites Not Meeting Screening Criteria

Four of the five alternative site locations referred to above were rejected for a variety of reasons. These sites and the reasons for rejection are as follows:

Area to the south of Devers Substation: This site was the location for the Ocotillo Power Plant proposed in 2001; the project was subsequently terminated. Zoning of this site would not allow for the proposed project, and wind turbines are currently being developed. This site is not a feasible alternative for the CPV Sentinel project and has been eliminated from further consideration.

Area directly east of Devers Substation: This site is owned by SCE for possible future expansion. Thus this site is not available to CPV Sentinel.

Area to the west of Devers Substation: This area has been approved by the Riverside County Planning Commission for development by the Dillon Wind Farm. Therefore, this site is not a feasible alternative to the CVP Sentinel project and will not undergo further consideration.

Area 3,400 feet to the east of Devers Substation: This area has also been approved for development by the Dillon Wind Farm and is likewise not a feasible alternative.

Site Meeting Screening Criteria

A discussion of the one site (area to the north of Devers Substation) which generally meets the screening criteria is provided below. This site is one of the four sites identified in the CPV Sentinel AFC. As noted above, areas to the south, west, directly east, and 3,400 feet to the east were eliminated from further analysis. The alternative site is identified in **Alternatives Figure 1**.

Area to the North of Devers Substation

The area just to the north of the substation consists of multiple 5- to 10-acre lots owned by multiple private land owners. The sites would have to be aggregated, requiring procurement from multiple landowners. As compared to the proposed site, the natural gas pipeline, potable water line, and access road corridor would have to be extended farther north by over 3,000 feet—potentially resulting in greater land use impacts. Other environmental impacts, including air quality impacts, from this site would be similar to the proposed site.

Alternatives Table 1 compares the approximate lengths of linears (transmission line, gas pipeline, water and sewer lines) required for the proposed and alternative sites. The table also shows distance to sensitive receptors.

Alternatives Table 2 shows whether impacts of the alternative site are less than, similar to, or greater than for the CPV Sentinel project site.

Alternatives Table 1
Comparison of Approximate Length of Linears/Distance to Receptors (feet)

	CPV Sentinel Site	Area to the north of substation
Transmission Line Length	3,250 feet	~6,250 feet
Gas Pipeline Length	2.6 miles	~3.2 miles
Potable Water/Sewer Connections	3,200 feet	~6,200 feet
Distance to Nearest Residence	330 feet	Longer
Distance to Nearest Residential Area	2,600 feet	Longer

Source**:** CPVS2007a and Staff Analysis

Alternatives Table 2
Comparison of Impacts of the Alternative Site to the Proposed CVP Sentinel Project

Issue Area	Area to the north of substation
Environmental Assessment	
Air Quality	Similar to proposed site
Biological Resources	Similar to proposed site
Cultural Resources	Similar to proposed site
Hazardous Materials	Similar to proposed site
Land Use	Similar to proposed site
Noise and Vibration	Similar to proposed site
Public Health	Similar to proposed site
Socioeconomic Resources	Similar to proposed site
Soil and Water Resources	Similar to proposed site
Traffic and Transportation	Similar to proposed site
Visual Resources	Similar to proposed site
Waste Management	Similar to proposed site
Worker Safety	Similar to proposed site
Engineering Assessment	
Geology, Mineral Resources, and Paleontology	Similar to proposed site
Transmission System Engineering	Similar to proposed site

Source**:** Staff Analysis

GENERATION TECHNOLOGY ALTERNATIVES

CONSERVATION AND DEMAND SIDE MANAGEMENT

One alternative to meeting California's electricity demand with new generation is to reduce the demand for electricity. Such *demand side*[1] measures include programs that increase energy efficiency, reduce electricity use, or shift electricity use away from *peak*[2] hours of demand.

In California there is a considerable array of demand side programs. At the federal level, the Department of Energy adopted national standards for appliance efficiency and building standards to reduce the use of energy in federal buildings and at military bases. At the state level, the Energy Commission adopted comprehensive energy efficiency standards for most buildings, appliance standards for specific items not subject to

[1] Planning, implementation, and evaluation of utility-sponsored programs to influence the amount or timing of customers' energy use

[2] Time of day when demand for electricity is at its highest

federal appliance standards, and is in the process of adopting load management standards. The Energy Commission also provides grants for energy efficiency development through the Public Interest Energy Research (PIER) program.

The CPUC, along with the Energy Commission, oversees investor-owned utility demand side management programs financed by the utilities and their ratepayers. At the local level, many municipal utilities administer demand side management and energy conservation programs. These include subsidies for the replacement of older appliances through rebates, building weatherization programs, and peak load management programs. In addition, several local governments have adopted building standards which exceed the state standards for building efficiency, or have by ordinance set retrofit energy efficiency requirements for older buildings. New buildings may combine the need for heat and power through a single fuel source or a common source may supply heating and/or heating and cooling to a number of adjacent buildings, increasing overall efficiency.

Even with this great variety of federal, state, and local demand side management programs, the state's electricity use is still increasing as a result of population growth and business expansion. Current demand side programs are not sufficient to satisfy future electricity needs, nor is it likely that even more aggressive demand side programs could accomplish this, given the economic and population growth rates of the last 10 years.

Therefore, although it is likely that federal, state, and local demand side programs will receive even greater emphasis in the future, both new generation and new transmission facilities will be needed in the immediate future and beyond in order to maintain adequate supplies.

RENEWABLE RESOURCES

As noted previously, CPV Sentinel was selected by SCE through its New Gen RFO for 1,500 MW of new generation capacity in the Los Angeles Basin LCR area. A separate solicitation process is conducted for SCE's procurement of renewable resources. SCE currently obtains approximately 17 percent of its electricity from solar, wind, geothermal, biomass, and small hydropower sources. SCE announced that in the past year the company has signed over a dozen agreements for renewable energy development, including 1,500 MW of wind in the Tehachapi area (SCE 2008).

Staff considered various alternative technologies, but did not retain them due to infeasibility or lack of environmental benefit. Although viable, solar and wind technologies would require significantly greater land use and would not provide peaking capacity. Geothermal, biomass, and hydroelectric would not be feasible in the Coachella Valley.

Solar Photovoltaic

The California Solar Initiative has set a goal to create 3,000 MW of new solar-produced electricity by 2017. As part of this initiative, the Energy Commission is managing a 10-year, $400 million program to encourage solar in new home construction through its New Solar Homes Partnership. Photovoltaic (PV) arrays mounted on buildings generally require about 4 acres per MW. Rooftop solar systems would not meet the basic objectives of the project and therefore would not constitute a project alternative under CEQA.

Utility-scale PV systems (as opposed to distributed solar generation noted directly above) can require from 4 acres/MW (crystalline silicon) to 10 acres/MW (thin film and tracking) (NRDC and Sierra Club 2008); an 850 MW plant would require approximately 3,400 to 8,500 acres. Although water is not required for electricity generation, 2 to 10 acre feet per year (AFY) per 100 MW may be needed to wash panels (NRDC and Sierra Club 2008).

Solar Thermal

Solar thermal technologies and their land use requirements are described as follows:

- **Parabolic Trough**. Collectors have linear parabolic-shaped reflectors that focus the sun's direct beam radiation on linear heat collection elements at the foci. This technology requires approximately 4 to 5 acres per MW, or 3,400 to 4,250 acres for 850 MW.
- **Distributed Power Tower.** A large field of mirrors (the heliostat) surrounds and focuses light on an elevated tower- 300 to 440 feet tall in the case of three towers proposed for the Ivanpah Solar Electric Generating System. If the 400 MW Ivanpah project requires 3,680 acres (Solar Partners 2007), an 850 MW plant could require 7,800 acres.
- **Stiring Dish.** A paraboloid dish of mirrors (38 by 40 feet for the proposed SES Solar 2) focuses sunlight on the receiver end of a Stirling engine. A Stirling engine field requires 7 to 9 acres per MW; generation of 850 MW could thus require 5,950 to 7,650 acres.

Wind

Wind carries kinetic energy that can be utilized to spin the blades of a wind turbine rotor and an electrical generator, which then feeds alternating current (AC) into the utility grid. Wind turbines currently being manufactured have power ratings ranging from 250 watts to 1.8 MW (AWEA 2004). Land use requirements average 5.4 acres/MW (CEC 2008), which corresponds to 4,600 acres for an 850 MW plant. (The adjacent Dillon Wind Farm will generate 45 MW on 200 acres). The turbine footprints, however, only take 5 percent of the area (AWEA 2004). Environmental impacts include bird and bat collisions and visual pollution. Wind energy is highly utilized in the area, and along with the aforementioned solar technologies, can be credited with an absence or reduction in air pollutant emissions and visible plumes.

Geothermal

Steam or high-temperature water from geothermal reservoirs is harnessed to drive steam turbine/generators. Geothermal plants range in size from under 1 MW to 110 MW, and require 0.2 to 0.5 acre/MW. Geothermal plants provide highly reliable base-load power, with capacity factors from 90 to 98 percent. Plants, however, must be built near geothermal reservoir sites, as steam and hot water cannot be transported long distances without significant thermal energy loss. The Salton Sea (40 miles southeast) is known for its geothermal resources, but is outside the range of the project area. Furthermore, all 16 Imperial Valley geothermal plants combined currently generate 475 MW (Sass and Priest 2002), which is equivalent to just over half of the capacity that would be available through CPV Sentinel.

Biomass

Electricity is generated by burning organic fuels in a boiler to produce steam, which then turns a turbine. Biomass can also be converted into a fuel gas such as methane and burned. Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing wastes, and construction and urban wood wastes. Air emissions can be substantially greater. Biomass facilities do not require an extensive amount of land for the actual facility, although fuel production could require extensive acreage if specifically farmed. Biomass facilities are generally small-scale, in the range of 3 to 10 MW. This is significantly less than the capacity of the CPV Sentinel project. Furthermore, there is no large fuel source in the Coachella Valley, and ongoing truck deliveries would be required to supply the plant with biomass fuel.

Hydroelectric

As a power source, hydroelectric can cause significant environmental impacts primarily due to the inundation of many acres of potentially valuable habitat and the interference with fish movements during their life cycle. It is unlikely that new hydropower facilities that could generate 850 MW could be developed and permitted in California within the next several years.

THE “NO PROJECT” ALTERNATIVE

The “No Project” alternative under CEQA assumes that the project is not constructed. In the CEQA analysis, the “No Project” alternative is compared to the proposed project and determined to be superior, equivalent, or inferior to it. The CEQA Guidelines state that “the purpose of describing and analyzing a No Project Alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project” (Cal. Code Regs., tit. 14 §15126.6(i)). Toward that end, the “No Project” analysis considers “existing conditions” and “what would be reasonably expected to occur in the foreseeable future if the project were not approved…” (§15126.6(e)(2)). CEQA Guidelines and Energy Commission regulations require consideration of the “No Project” alternative. The no-action alternative is compared to the effects of constructing the proposed project. In short, the site-specific and direct impacts associated with the power plant would not occur at this site if the project does not go forward.

Selection of the “No Project” alternative would render all concerns about potential project impacts moot. The “No Project” alternative would preclude any construction or operation and, thus, grading of the site or installation of new foundations, piping, or utility connections..

If the project were not built, the region would not benefit from the local and efficient source of 850 MW of new generation that this facility would provide. A primary benefit of the CPV Sentinel project is that it would serve load demands of the cities that include

Desert Hot Springs, Palm Springs, Cathedral City, and Palm Desert in the Coachella Valley. As noted above, the CPV Sentinel project would also have ability to compensate for the intermittency of solar and wind plants.

In the absence of the CPV Sentinel project, however, other power plants could likely be constructed in the project area or in California to serve the demand that could have been met with the CPV Sentinel project. If those plants were to use dry cooling, the use of fresh water would be significantly reduced. New plants constructed in the area would likely have similar air quality effects as those of the proposed CPV Sentinel. If no new natural gas plants were constructed, SCE may have to rely on older power plants. These plants could consume more fuel and emit more air pollutants per kilowatt-hour generated than the CPV Sentinel project. In the near term, the more likely result is that existing plants, many of which produce higher level of pollutants, could operate more than they do now. It is thus difficult to conclude that “No Project” would or would not have serious, long-term consequences on air quality and water supply.

CONCLUSIONS AND RECOMMENDATION

As determined by Energy Commission staff in the FSA, staff cannot conclude that the mitigation proposed for the project is adequate to lessen any potentially significant air quality impacts to a less than significantl level. The alternative site evaluated in this section is also located in the same area as the CPV Sentinel project, and as such, would face similar air emission offset requirements. In addition, the alternative site would require longer transmission infrastructure and acquirement of parcels from multiple landowners and is therefore not preferable to the proposed site.
Staff does not believe that alternative technologies such as solar, wind, geothermal, biomass, and hydroelectric, present feasible alternatives to the proposed project under CEQA.

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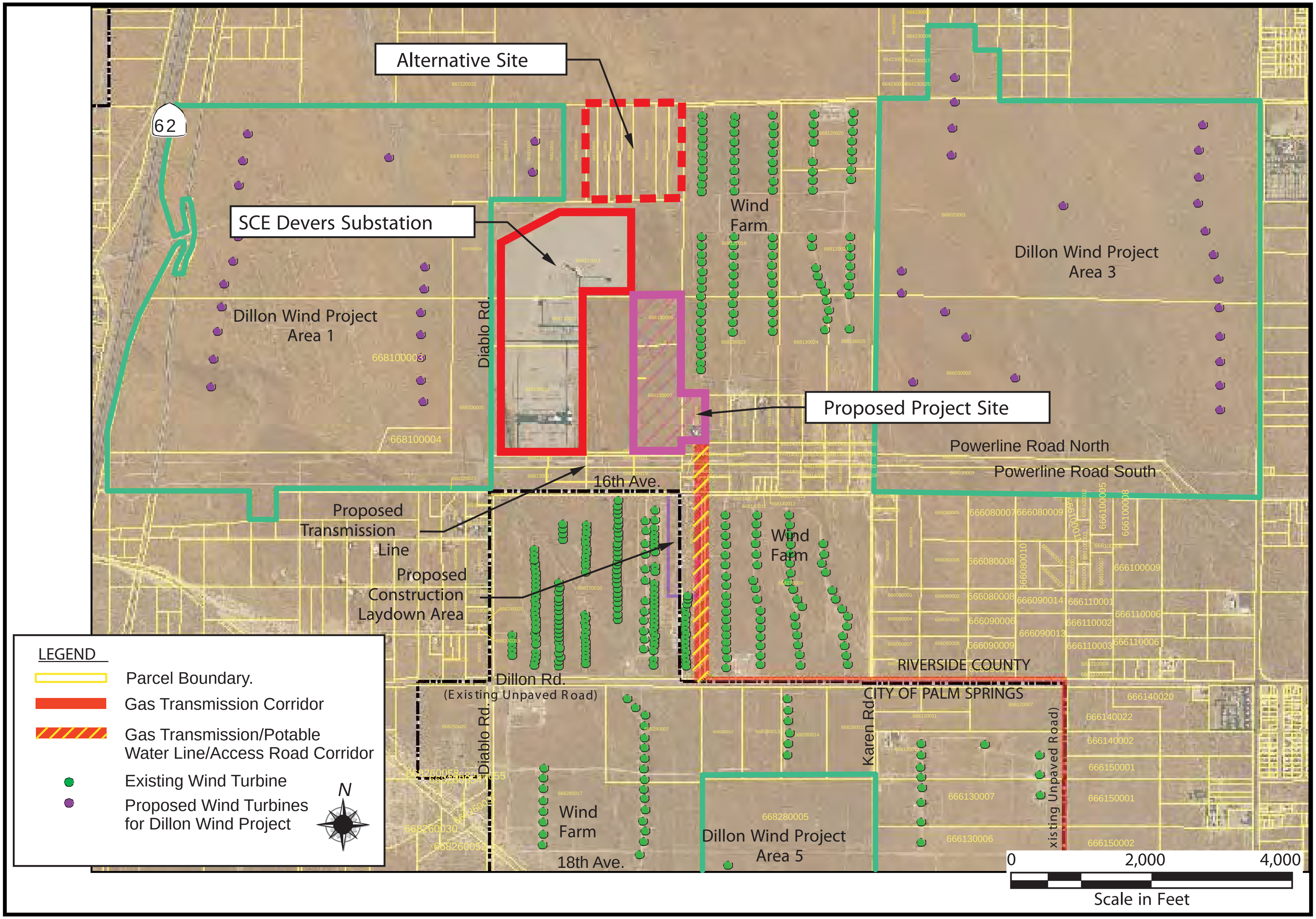
ALTERNATIVES - FIGURE 1

CPV Sentinel Energy Project - Project Location



CALIFORNIA ENERGY COMMISSION - ENERGY FACILITIES SITING DIVISION, OCTOBER 2008

SOURCE: URS, 2007

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Ron Yasny

INTRODUCTION

The project's General Compliance Conditions of Certification, including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of elements that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions of certification;
- establish requirements for facility closure plans; and
- specify conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure below a level of significance. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

DEFINITIONS

The following terms and definitions are used to establish when Conditions of Certification are implemented.

PRE-CONSTRUCTION SITE MOBILIZATION

Pre-construction site mobilization consists of limited activities at the site to allow for the installation of fencing, construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities is considered part of pre-construction site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and light vehicles is allowable during pre-construction site mobilization.

CONSTRUCTION

Onsite work to install permanent equipment or structures for any facility. This includes the following:

> Ground disturbance: Ground disturbance refers to activities that result in the removal of top soil or vegetation at the site beyond site mobilization needs, and for access roads and linear facilities.
>
> Grading, boring, and trenching: 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.

Not withstanding the definitions of ground disturbance, and grading, boring, and trenching above, construction does **not** include the following:

1. the installation of environmental monitoring equipment;
2. a soil or geological investigation;
3. a topographical survey;
4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and
5. any work to provide access to the site for any of the purposes specified in "Construction" 1, 2, 3, or 4 above.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, "commercial operation" begins after the completion of start-up and commissioning, when the power plant has reached reliable steady-state production of electricity at the rated capacity. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The Compliance Project Manager (CPM) shall oversee the compliance monitoring and is responsible for:

1. Ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision
2. Resolving complaints
3. Processing post-certification changes to the conditions of certification, project description (petition to amend), and ownership or operational control (petition for change of ownership) (See instructions for filing petitions)
4. Documenting and tracking compliance filings

5. Ensuring that compliance files are maintained and accessible

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies, Energy Commission, and staff when handling disputes, complaints, and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management. All submittals must include searchable electronic versions (pdf or word files).

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

The CPM usually schedules pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings is to assemble both the Energy Commission's and project owner's technical staff to review the status of all pre-construction or pre-operation requirements, contained in the Energy Commission's conditions of certification. This is to confirm that all applicable conditions of certification have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

ENERGY COMMISSION RECORD

The Energy Commission shall maintain the following documents and information as a public record, in either the Compliance file or Dockets file, for the life of the project (or other period as required):

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

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 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 delegated agencies or consultants shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on-site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

Compliance Record (COMPLIANCE-2)

The project owner shall maintain project files on-site or at an alternative site approved by the CPM for the life of the project, unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all "as-built" drawings, documents submitted as verification for conditions, and other project-related documents.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files maintained pursuant to this condition.

Compliance Verification Submittals (COMPLIANCE-3)

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission's procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by the CPM.

Verification of compliance with the conditions of certification can be accomplished by the following:

1. Monthly and/or annual compliance reports, filed by the project owner or authorized agent, reporting on work done and providing pertinent documentation, as required by the specific conditions of certification;

2. Appropriate letters from delegate agencies verifying compliance;

3. Energy Commission staff audits of project records; and/or

4. Energy Commission staff inspections of work, or other evidence that the requirements are satisfied.

Verification lead times associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter subject line shall identify the project by AFC number, the appropriate condition(s) of certification by condition number(s), and a brief description of the subject of the submittal**. The project owner shall also identify those submittals **not** required by a condition of certification with a statement such as: "This submittal is for information only and is not required by a specific condition of certification." When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal and CEC submittal number.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All hardcopy submittals shall be addressed as follows:

Compliance Project Manager
(07-AFC-2C)
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

Those submittals shall be accompanied by a searchable electronic copy, on a CD or by e-mail, as agreed upon by the CPM.

If the project owner desires Energy Commission staff action by a specific date, that request shall be made in the submittal cover letter and shall include a detailed explanation of the effects on the project if that date is not met.

Pre-Construction Matrix and Tasks Prior to Start of Construction (COMPLIANCE-4)

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner's first compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be submitted in the same format as the compliance matrix described below.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

If the project owner anticipates commencing project construction as soon as the project is certified, it may be necessary for the project owner to file compliance submittals prior to project certification. Compliance submittals should be completed in advance where the necessary lead time for a required compliance event extends beyond the date anticipated for start of construction. The project owner must understand that the submittal of compliance documents prior to project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change, based upon the Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the Energy Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

Compliance Matrix (COMPLIANCE-5)

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all conditions of certification in a spreadsheet format. The compliance matrix must identify:

1. the technical area;
2. the condition number;
3. a brief description of the verification action or submittal required by the condition;
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. the expected or actual submittal date;
6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable; and
7. the compliance status of each condition, e.g., "not started," "in progress" or "completed" (include the date).
8. if the condition was amended, the date of the amendment.

Satisfied conditions shall be placed at the end of the matrix.

Monthly Compliance Report (COMPLIANCE-6)

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date upon which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include the

AFC number and an initial list of dates for each of the events identified on the **Key Events List. The Key Events List Form is found at the end of this section.**

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and an electronic searchable version of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. A summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;

2. Documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, as well as the conditions they satisfy and submitted as attachments to the Monthly Compliance Report;

3. An initial, and thereafter updated, compliance matrix showing the status of all conditions of certification (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.

All sections, exhibits, or addendums shall be separated by tabbed dividers or as acceptable by the CPM.

Annual Compliance Report (COMPLIANCE-7)

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by the CPM. Each Annual Compliance Report shall include the AFC number, identify the reporting period and shall contain the following:

1. An updated compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

2. A summary of the current project operating status and an explanation of any significant changes to facility operations during the year;

3. Documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter, with the condition it satisfies, and submitted as attachments to the Annual Compliance Report;

4. A cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;

5. An explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;

6. A listing of filings submitted to, or permits issued by, other governmental agencies during the year;

7. A projection of project compliance activities scheduled during the next year;

8. A listing of the year's additions to the on-site compliance file;

9. An evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date [see Compliance Conditions for Facility Closure addressed later in this section]; and

10. A listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved matters, and the status of any unresolved matters.

Confidential Information (COMPLIANCE-8)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's 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, including noise and lighting complaints, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A).

FACILITY CLOSURE

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

There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure and unplanned permanent closure.

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner implements the on-site contingency plan. It can also include unplanned closure where the project owner fails to implement the contingency plan, and the project is essentially abandoned.

COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

Planned Closure (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM) prior to commencement of closure activities. The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;

2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;

3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and

4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

Prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

In the event that there are significant issues associated with the proposed facility closure plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, the CPM 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 than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

Unplanned Permanent Closure/On-Site Contingency Plan (COMPLIANCE-13)

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

Post Certification Changes to the Energy Commission Decision: Amendments, Ownership Changes, 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. Both shall be filed as a "Petition to Amend." Staff will determine if the change is significant or insignificant. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the CPM, who will file it with the Energy Commission's Dockets Unit in accordance with Title 20, California Code of Regulations, section 1209.

The criteria that determine which type of approval and the process that applies are explained below. They reflect the provisions of Section 1769 at the time this condition was drafted. If the Commission's rules regarding amendments are amended, the rules in effect at the time an amendment is requested shall apply.

Amendment

The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769(a), when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed modification results in deletion or change of a condition of certification, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations or standards, the petition will be processed as a formal amendment to the final decision, which requires public notice and review of the Energy Commission staff analysis, and approval by the full Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(a). Upon request, the CPM will provide you with a sample petition to use as a template.

Change of Ownership

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769 (b). This process requires public notice and approval by the full Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(b). Upon request, the CPM will provide you with a sample petition to use as a template.

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 requires minimal time 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. These requests must also be submitted in the form of a "petition to amend" as described above.

Verification Change

A verification may be modified by the CPM without requesting an amendment to the decision if the change does not conflict with the conditions of certification and provides an effective alternate means of verification.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

Energy Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental protection when conducting project monitoring.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1237, but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by future law or regulations.

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 Process

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate an informal dispute resolution process. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This process may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1237, but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The process encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be brought before the full Energy Commission for consideration via the complaint and investigation procedure.

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter. Within seven working days of the CPM's request, provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to also provide an initial verbal report, within 48 hours.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures proposed or undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;

2. secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;

3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner;

4. After the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum that fairly and accurately identifies the positions of all parties and any understandings reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

Any person may file a complaint with the Energy Commission's Dockets Unit alleging noncompliance with a Commission decision adopted pursuant to Public Resources Code section 25500. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1237.

KEY EVENTS LIST

PROJECT: ______________________________

DOCKET #: ______________________________

COMPLIANCE PROJECT MANAGER: ______________________________

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Unrestricted Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-2	Compliance Record	The project owner shall maintain project files on-site. Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COMPLIANCE-3	Compliance Verification Submittals	The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed or the project owner or his agent.
COMPLIANCE-4	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until the all of the following activities/submittals have been completed: ▪ property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, ▪ a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, ▪ all pre-construction conditions have been complied with, ▪ the CPM has issued a letter to the project owner authorizing construction.
COMPLIANCE-5	Compliance Matrix	The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification.
COMPLIANCE-6	Monthly Compliance Report including a Key Events List	During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Energy Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.
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.

CONDITION NUMBER	SUBJECT	DESCRIPTION
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

CPV SENTINEL ENERGY UPGRADE PROJECT
PREPARATION TEAM

Executive Summary .... John Kessler

Introduction ....John Kessler

Project Description ....John Kessler

Air Quality...Joseph M. Loyer

Biological Resources .... Heather Blair

Cultural Resources...Michael K. Lerch

Hazardous Materials Management.....................Rick Tyler and Alvin J. Greenberg, Ph.D

Land Use..Negar Vahidi

Noise and Vibration ....Steve Baker

Public Health .... Obed Odoemelam, Ph.D.

Socioeconomic Resources .... Hedy Born

Soils and Water Resources...Christopher Dennis, P.G., John Fio and John Kessler, P.E.

Traffic and Transportation ....Mark R. Hamblin

Transmission Line Safety and Nuisance .... Obed Odoemelam, Ph.D.

Visual Resources ....Martha A. Goodavish

Waste Management ....Christopher Dennis P. G.

Worker Safety and Fire Protection ....Rick Tyler and Alvin J. Greenberg, Ph.D

Facility Design..Erin Bright

Geology and Paleontology .... Michael S. Lindholm, P.G.

Power Plant Efficiency.. Shahab Khoshmashrab

Power Plant Reliability.. Shahab Khoshmashrab

Transmission System Engineering.............................Ajoy Guha, P. E. and Mark Hesters

Alternatives ....Suzanne Phinney, D. Env.

General Conditions including Compliance Monitoring & Closure Plan ....Ron Yasny

Project Secretary... .Maria Sergoyan

DECLARATION OF
John S. Kessler

I, John S. Kessler, declare as follows:

1. I am presently a consultant to the California Energy Commission for the Siting Office of the Energy Facilities Siting Division as a Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Project Description and Soil and Water Resources** for the CPV Sentinel Energy Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 19, 2008 Signed: John S Kessler

At: Sacramento, California

JOHN S. KESSLER
Kessler and Associates, LLC
2801 Shady Lane, Pollock Pines, CA 95726
Ofc: (530) 644-2010, Fax: (530) 644-2051
Email: zephyr@innercite.com

PROFESSIONAL EXPERIENCE:

Mr. Kessler is a licensed Civil Engineer in California with over 28 years experience in water supply and power generation, which includes planning and managing projects with responsibilities in operations, maintenance, environmental assessment, licensing, regulatory compliance , permitting and project management.

May 2000 - Present: Principal - Kessler and Associates

Established Kessler and Associates to provide engineering, regulatory and operating services related to energy and associated water supply projects;

California Energy Commission (CEC) – Application for Certification (AFC) Licensing Process
Project Management and Soil & Water Resource Assessments of Proposed Gas-Fired Generating Facilities (Serving as Project Manager or Technical Lead to assess all potential soil and water resource impacts and/or evaluate water supply/cooling alternatives for the following projects:)

- Humboldt Bay Repowering Project, 06-AFC-7, Serving as the Project Manager of the AFC licensing process before the CEC for the Humboldt Bay Repowering Project (HBRP); The HBRP is a proposed 163-MW facility to replace aging generating units of Humboldt Bay Power Plant.

- Victorville 2 Hybrid Power Project, 07-AFC-1, Serving as the Project Manager of the AFC licensing process before the CEC for the Victorville 2 Hybrid Power Project (Victorville 2); which is a proposed 563 MW facility integrating combined cycle and solar-thermal technology.

- Walnut Creek Energy Park, 05-AFC-2; Co-authored Staff Assessment;

- Vernon Power Plant, 06-AFC-1; Co-authored Staff Assessment;

- Los Esteros Critical Energy Facility, 01-AFC-12; Authored Staff Assessment and coordinated the resolution of storm water discharge issues into Coyote Creek with responsible agencies including City of San Jose, Santa Clara Valley Water District, San Francisco RWQCB, and the U.S. Army Corps of Engineers;

- San Francisco Electric Reliability Project, 04-AFC-01; Authored initial Staff Assessment;

- Blythe Energy Project Transmission Line Modifications, 99-AFC-8, Co-authored Staff Assessment/Environmental Assessment;

- Blythe II Energy Project, 02-AFC-01; Prepared a Water Supply & Cooling Alternatives Analysis;

- San Joaquin Valley Energy Center, 01-AFC-22; Co-authored Staff Assessment;

- Palomar Power Plant, 01-AFC-24; Supported soil and storm water testimony;

- Tesla Power Plant, 01-AFC-21; Prepared Water Supply Alternatives Analysis, and coordinated closely with local agencies to demonstrate the feasibility of using recycled water; The final Commission decision adopted our recommendation to require use of recycled water;
- Inland Empire Energy Center, 01-AFC-17; Co-authored Staff Assessment;
- Russell City Energy Center, 01-AFC-7; Co-authored Staff Assessment;
- East Altamont Energy Center, 01-AFC-6; Prepared a Water Supply Alternatives Analysis, and coordinated with agency representatives to demonstrate the feasibility of using recycled water; The final Commission decision adopted our recommendation to require use of recycled water;
- Valero Cogeneration Project, 01-AFC-05, Co-authored Staff Assessment;
- Avenal Power Plant, 01-AFC-20; Co-authored Staff Assessment before project was suspended;
- Baldwin Hills – Supported Evidentiary Hearings before being withdrawn by the applicant;

CEC – Assessment of Alternative Generation Technologies
Served as the author of the Hydropower Chapter discussing the status of development, potential for new development, costs, and deployment constraints including environmental effects, in comparison to development of gas-fired generation technologies;

CEC - Water Discharge Assessment of Coastal Power Plants – Executive Order 22-01
Served as Project Manager of Water Resources to assess the generation curtailments resulting from regulatory-required cooling water discharge limitations at various coastal thermal power plants;

CEC - Environmental Performance Report of California's Electric Generation Facilities
Co-authored the 2001, 2003 and 2005 Water and Biological Resources Sections, providing research and analysis of trends in power plant water resource utilization affected by technological changes, improved environmental safeguards, regulatory influences in market development, and diminishing supplies of fresh water;

CEC – California/Mexico Border Energy Issues – 2005 EPR White Paper
Authored the Water Chapter evaluating water quality and supply issues associated with existing and planned energy infrastructure along the U.S-Mexico border, finding that power plant water demands threaten to compromise our most fundamental needs, securing enough water to sustain life and food production;

CPUC – EIR for PG&E's Application for Authorization to Divest its Hydroelectric Generating Facilities and Related Assets - Served as Hazards Section Leader and Team Member of the Public Services and Utilities Section in preparing the EIR for considering PG&E's divestiture of its entire hydroelectric system; The environmental assessment included evaluating the safety and potential risks of PG&E's dams throughout its hydroelectric system in Northern California.

DWR – Oroville Relicensing
Prepared a description of operations for the Oroville Complex, in support of the FERC Relicensing process to understand project constraints and opportunities for modified operations to enhance natural resource protection, water supply and power generation.

Utica Power Authority – Dam Safety and Project Management Services
Serving as UPA's dam safety engineer and project manager of environmental compliance and special construction projects; The projects include managing natural resources, and planning maintenance and construction improvements to water conveyance and storage facilities.

El Dorado Irrigation District – Engineering, Regulatory Permitting and Compliance Services
Assessed condition of the 23-mile El Dorado Canal water conveyance system, proposing a range of maintenance and capital improvements including cost estimates; Am currently preparing Standard Operating Procedures and facilitating employee training for project O&M, and preparing license compliance plans for protection of natural resources;

September 1995 – April 2000: Hydroelectric Director - El Dorado Irrigation District
Overall responsibilities included managing operation, maintenance, construction and regulatory activities and the acquisition of the El Dorado Hydroelectric Project from PG&E to EID; Construction activities included managing improvements to the penstock and powerhouse, replacing and relining sections of the penstock, and replacing turbine nozzle bodies, jet deflectors, governors, hydraulic oil systems and associated plant controls. Planning and feasibility studies included evaluating alternatives for replacing canal sections and a diversion dam which incurred flood damage and resulted in approximately $30 million in capital replacement.

Aug. 1993 – Sept. 1995: Project Engineer - Northern California Power Agency
Managed planning of various enhancements and aquatic resource studies associated with the North Fork Stanislaus River Hydroelectric Project and relicensing studies associated with the Angels and Utica Projects; Coordinated initial development phases of new biomass energy from the Gridley Rice Straw Project for prototype development testing in the production of ethanol;

July 1984 – August 1993: Hydro Supervisor – Pacific Gas & Electric Company
Managed the operations, maintenance, capital improvements and regulatory compliance activites for the El Dorado and Chili Bar Hydroelectric Projects; Responsibilities included planning, estimating and managing numerous water conveyance and dam maintenance/capital projects;

Aug. 1979 – July 1984 - Hydraulic Engineer and Hydrographer/Hydrologist - PG&E
Managed various capital projects within PG&E's and its water district/agency partner's hydroelectric systems, including the low level outlet repair of New Bullards Bar Dam, that required several weeks of underwater construction. Also forecasted snowpack runoff and planned water storage and conveyance schedules for optimizing hydro generation production as integrated with PG&E's other generation and power import sources;

EDUCATION AND PROFESSIONAL CERTIFICATES:
- State Of California Professional Civil Engineer, License No. C034897;
- B.S. Civil Engineering, University Of California, Davis, June 1979;
- A.A. Diablo Valley College, Pleasant Hill, June 1976;

HONORS AND AWARDS:
- 2001 Outstanding Performance Award from the State of California - Energy Commission;
- 1999 Outstanding Achievement Award for Transfer of the El Dorado Hydroelectric Project from PG&E to the El Dorado Irrigation District;

PROFESSIONAL ASSOCIATIONS:
- American Society of Civil Engineers

DECLARATION OF
Joseph M. Loyer

I, Joseph M. Loyer declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting, Transmission and Environmental Protection Division as an Associate Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Air Quality, for the CPV Sentinel Energy Project based on my independent analysis of the Application for Certification and supplement hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/19/08 Signed:

At: Sacramento, California

QUALIFICATIONS

Joseph M. Loyer

EDUCATION:

Bachelor of Science in Mechanical Engineering
California State University, Sacramento. May 27, 1989

WORK EXPERIENCE:

June, 1993 to Present

I am currently employed in the Systems Assessment and Facilities Siting Division of the California Energy Commission as an Associate Mechanical Engineer. My responsibilities include air quality analysis in siting, compliance and policy work. I have worked on many siting cases and assisted in several modeling efforts. I have extensive experience with various compliance issues and have authored several policy papers for publication.

DECLARATION OF
Heather Blair

I, **Heather Blair**, declare as follows:

1. I am presently employed as a **consultant** to the California Energy Commission in the **Environmental Protection Office** of the **Energy Facilities Siting Division**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepared the staff testimony on **Biological Resources** for the **CPV Sentinel Energy Project** based on my independent analysis of the application and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/22/08 Signed:

At: Sacramento, California

Aspen
Environmental Group

HEATHER BLAIR
Environmental Scientist

ACADEMIC BACKGROUND

M.S., Conservation Biology, Sacramento State University, In Progress
B.S., Ecology, San Diego State University, 2004

PROFESSIONAL EXPERIENCE

Heather Blair is an Environmental Scientist experienced in a range of natural resource investigations and environmental impact analysis including botanical and wildlife research, inventory, and survey techniques; technical writing; and data analysis. She has experience preparing environmental documents pursuant to the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA), and the Endangered Species Act (ESA), as well as other federal and state regulations.

Aspen Environmental Group — 2004 to present

Selected project experience at Aspen includes the following:

- **North Area ROW Maintenance Project**. Under contract to Western Area Power Administration (Western), Ms. Blair is currently providing project support to prepare an Environmental Assessment and Operation and Maintenance Program associated with the operation and maintenance procedures along Western's transmission line ROWs between Sacramento (Sutter/Yuba County line) and the Oregon border. This project also includes a detailed survey of the biological and cultural resources along 434 miles of North Area ROW, 342 miles of COTP ROW, and several hundred miles of access and maintenance roads. Ms. Blair is working closely with project management and resource specialists to coordinate and execute over 800 miles of surveys. She conducted wildlife inventory and surveyed portions of ROW for sensitive species and recorded habitat types, jurisdictional waters and infrastructure using a Trimble GeoXT GPS unit. Additionally, Ms. Blair was integrally involved in the management and development of the North Area O&M GIS database.
- **Categorical Exclusions for Routine Operation and Maintenance.** Under contract to Western, Aspen has prepared multiple CXs for routine maintenance activities along Western's CVP, PACI, and COTP transmission line ROWs and access roads. Aspen has developed a streamlined and highly efficient system to use the results and analysis for the North Area ROW Maintenance project to complete these documents.
- **Sacramento Area Voltage Support Project.** Under contract to Western, Aspen is preparing a SEIS and EIR for a double-circuit 230 kV circuit between Western's O'Banion/Sutter Power Plant and Elverta Substation/Natomas Substation. Ms. Blair assisted in the preparation of the land use section, which includes an analysis of potential impacts to recreation and agricultural resources. In addition she assisted in the development of the project description and alternatives and performed biological resource surveys of each alternative.
- **Sunrise Powerlink Transmission Line Project.** Under contract to the California Public Utilities Commission (CPUC), Aspen is preparing an EIR/EIS for a 150-mile proposed transmission line from Imperial Valley Substation, near El Centro, California, to Peñasquitos Substation in northwestern San Diego County. The Proposed Project would potentially deliver renewable resources from the Imperial Valley via a 500 kV transmission line to a new 500/230 kV substation, and from the new substation to

western San Diego via 230 kV overhead and underground transmission lines. Ms. Blair is analyzing the impacts to wilderness, recreation and agriculture. Additionally, she is writing the project description and coordinating the biological resources analysis.

- **Rare Plant Surveys for the East Branch Extension Pipeline Project.** Ms. Blair conducted rare plant surveys of the endangered Santa Ana River wooly star (*Eriastrum densifolium* ssp. *sanctorum*) and the state and federally endangered slender horned spine flower (*Dodecahema leptoceras*) in response to the proposed construction of a water pipeline through San Bernardino and Riverside Counties.

- **Least Tern Monitoring for the Montezuma Slough Tidal Wetlands Restoration Project**. Under contract to EcoBridges Environmental, Ms. Blair is monitoring the nesting success of three nesting colonies of the federally and State endangered least tern. This effort involves counting and mapping the nest sites and tern chicks once a week.

- **Hazardous Fuels and Vegetation Management for Angeles National Forest.** Under contract to the U.S. Forest Service, Ms. Blair conducted botanical and wildlife surveys at approximately 100 sites ranging from one to 2500 acres throughout the Angeles National Forest. Surveys included identification and mapping of potential habitat for listed species, and submittal of listed species occurrence information to the California Natural Diversity Database. She is currently writing 75 Biological Evaluations/Biological Assessments that assess the impacts of proposed fuel management practices throughout the forest.

- **Atlantic–Del Mar Reinforcement Project Mitigated Negative Declaration**. Ms. Blair served as an assistant environmental monitor during the construction of 4 miles of overhead transmission towers and lines and approximately 1.3 miles of underground lines. The project involved trenching, horizontal drilling and blasting and requires avoidance of several wetlands, seasonal pools and T and E species.

- **Diablo Canyon Power Plant Steam Generator Replacement Project.** Ms. Blair supported the management team in preparing the project description, alternatives and supporting sections of the Draft and Final EIR.

- **Miguel-Mission 230 kV #2 Project EIR Addendum**. Ms. Blair helped to prepare a detailed addendum associated with engineering design changes for the Miguel-Mission 230 kV #2 Project.

- **California Energy Commission.** Aspen has a multi-year contract to provide support to the Energy Facility Planning and Licensing Programs. Under this contract Ms. Blair has participated in the following projects:

  - **Biological Resources Assessment for the Panoche Energy Center.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 1600 MW PEC. Required coordination with USFWS and CDFG regarding impacts to the State and federally listed San Joaquin kit fox.

  - **Biological Resources Assessment for the Starwood-Midway Power Plant.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 120 MW Starwood Project. Required coordination with USFWS and CDFG regarding impacts to the State and federally listed San Joaquin kit fox.

  - **Biological Resources Assessment for the Chevron Richmond Power Plant Replacement Project.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 60 MW Chevron Richmond PPRP.

  - **LNG Interagency Working Group Fact Sheets.** Ms. Blair researched information on operational and safety issues associated with new LNG facilities. These fact sheets, intended for public distribution, include Biological Resource Impacts of LNG, air and water quality impacts of LNG and others.

- **Natural Gas Supply and Demand Report.** Ms. Blair researched recent natural gas supply and demand developments throughout the United States for incorporation into an Energy Commission report on the potential need for expanded natural gas supplies in California.

PREVIOUS EXPERIENCE

Soil Ecology and Restoration Group — January to May 2004

- **Research Assistant.** Ms. Blair assisted in managing the greenhouse where native seeds were germinated and raised. In this role, she collected seeds from native plants and analyzed the composition of the soil present in their native habitat to ensure seedling viability. The plants were subsequently used in the restoration of degraded habitat as contracted by the U.S. Army Corps of Engineers and others.

DECLARATION OF
Testimony of Michael K. Lerch

I, **Michael K. Lerch,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as a **Cultural Resources Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Cultural Resources for the **CPV Sentinel Energy Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 25, 2008 Signed: Mich K Lerch

At: Woodland, California

Michael K. Lerch
Statistical Research, Inc.
211Court Street
Woodland, CA 95695
(530) 661-1400 email: mlerch@sricrm.com

Education

School	Field	Degree	Year
University of California, Riverside	Anthropology	B.A.	1981
University of California, Riverside	Anthropology	M.A.	1992

Experience

Statistical Research, Inc. (SRI), Woodland, California *2006 to present*
Office Director, Principal Investigator
As office director, Mr. Lerch is responsible for personnel, administrative tasks, proposals, budgets, and project management. As principal investigator (PI), he supervises as many as 20 staff members in four offices on multiple concurrent projects throughout California and Nevada. He is currently Principal Professional on six proposed power plants as a consultant, through Aspen Environmental Group, for the California Energy Commission (CEC). As such, he directs, reviews, and edits the work of several staff members in the preparation of Preliminary and Final Staff Assessments for CEC power plant siting projects. This involves all tasks related to the production of the cultural resources sections of CEQA (California Environmental Quality Act)-equivalent documents for the environmental review of proposed power plants in California, including review of data provided by applicants, preparation of background information and historic contexts, evaluation of historical and cultural significance of cultural resources subject to impacts from proposed projects, and participation in public workshops and hearings. It also includes assisting CEC staff with development of mitigation measures to reduce potential impacts to cultural resources eligible for listing in the California Register of Historical Resources to less-than-significant levels. Mr. Lerch is PI for a cultural resources study for The Villages of Lakeview, a 3,000-acre specific plan in Riverside County, and a member of the Riverside County Cultural Resources Working Group. He also is currently preparing cultural affiliation studies pursuant to the Native American Graves Protection and Repatriation Act (NAGPRA) for the U.S. Army Corps of Engineers, Sacramento and San Francisco Districts, on 14 project areas in northern and central California.

Statistical Research, Inc., Redlands, California *1999 to 2005*
Principal Investigator
During his tenure in the SRI Redlands office, Mr. Lerch conducted a number of large survey, testing, and data recovery investigations on prehistoric and historical-period archaeological resources and cultural landscapes in the San Bernardino and San Jacinto Mountains for the U.S. Forest Service; surveys of extensive pipeline and transmission line corridors in the Mojave Desert, Owens Valley, and inland southern California valleys; and studies of ethnobotany and traditional cultural properties in compliance with the National Historic Preservation Act and CEQA. As PI, he prepared proposals, budgets, and research designs, supervised fieldwork and report preparation, consulted with Native American tribes, and coordinated project implementation with clients and agency officials.

Michael K. Lerch & Associates, Riverside, California *1984 to 1999*
Owner and Principal Investigator
For more than 15 years, Mr. Lerch ran a successful consulting business, providing high-quality cultural resource studies to local, state, and federal agencies, as well as private clients, throughout southern California. During this time, he surveyed thousands of acres of land for cultural resources, recorded and evaluated hundreds of prehistoric and historical-period archaeological resources, and prepared more than

350 technical reports of findings in compliance with the NHPA and CEQA. Among the major projects he conducted were the Rail-Cycle Bolo Station Landfill project in the Mojave Desert, the Calico Ghost Town inventory and management plan, the Mojave River Pipeline project, and the San Bernardino Santa Fe Yards project.

County of San Bernardino, Office of Planning *1986 to 1989*
Senior Planner, Environmental Analysis Team and General Plan Team
As senior planner in charge of environmental analysis, Mr. Lerch supervised a staff of seven to prepare all CEQA initial studies for County projects, and selected and managed consultants who prepared environmental impact reports for both County projects and private developments. He prepared and delivered staff reports to the County Planning Commission and Board of Supervisors, and presided over public information meetings on controversial projects. He also served as a member of the General Plan Team for the 1989 General Plan update, for which he supervised preparation of the natural resources element and wrote the cultural resources element.

Archaeological Research Unit (ARU), University of California, Riverside *1984 to 1987*
Museum Scientist (Archaeologist), part-time
During his years as a graduate student, Mr. Lerch worked part-time for the ARU as a project director, during which time he conducted numerous archaeological surveys and test excavations in western Riverside County, the Coachella Valley, the San Bernardino Mountains, and the Mojave Desert. Among these were geomorphic and archaeological testing of the Elsinore site, ultimately determined to be more than 8,500 years old, and extensive studies in the Clark Mountains in the eastern Mojave Desert, where he documented a succession of use by Virgin Branch Anasazi, Colorado River Patayan, and Southern Paiute cultures.

San Bernardino County Museum Association, Redlands, California *1981 to 1984*
Archaeologist-Curator and Coordinator, San Bernardino County Archaeological Information Center
As archaeologist-curator, Mr. Lerch conducted prefield research, field surveys, test excavations, and collections research for private and public agency clients to a non-profit corporation; prepared site records, cultural resource management reports, and research reports. As information center coordinator, he maintained all the maps, site records, and report files for San Bernardino County, assigned trinomial designations to newly recorded sites, prepared records searches for private consultants as well as local, state, and federal agencies. He also conducted research on museum collections, assisted with exhibit design and interpretation, led tour groups, and spoke with local schools and avocational groups.

San Bernardino National Forest, San Bernardino, California *1980 to 1981*
Seasonal Archaeologist, GS-5
Conducted archaeological surveys in the San Bernardino Mountains in the Heart Bar dispersed recreation area, Delamar timber sale area, Holcomb Valley area, and several segments of the Pacific Crest Trail; prepared site records and Archaeological Reconnaissance Reports for each survey.

Professional Societies
Register of Professional Archaeologists, #154587
Society for California Archeology
Society for American Archaeology
Society for Historical Archaeology
Association of Environmental Professionals

DECLARATION OF
Rick Tyler

I, Rick Tyler declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Energy Facilities Siting and Environmental Protection Division as a Senior Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I supervised the preparation of testimony on the Hazardous Material Management and Worker Safety and Fire protection sections, for the CPV Sentinel Energy Project based on my independent analysis of the Application for Certification, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

6. I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Septerber 26, 2008 Signed: ______________________

At: Sacramento, California

RICK TYLER

Associate Mechanical Engineer

CALIFORNIA ENERGY COMMISSION

EDUCATION B.S., Mechanical Engineering, California State University, Sacramento. Extra course work in Statistics, Instrumentation, Technical Writing, Management; Toxicology, Risk Assessment, Environmental Chemistry, Hazardous Materials Management, Noise Measurement, and regulations regarding control of toxic substances.

Near completion of course work necessary to obtain a certificate in hazardous materials management from University of California, Davis.

EXPERIENCE

Jan. 1998- Present

California Energy Commission - Senior Mechanical Engineer
Energy Facility Siting and Environmental Protection Division

Responsible for review of Applications for Certification (applications for permitting) for large power plants including the review of handling practices associated with the use of hazardous and acutely hazardous materials, loss prevention, safety management practices, design of engineered equipment and safety systems associated with equipment involving hazardous materials use, evaluation of the potential for impacts associated with accidental releases and preparation and presentation of expert witness testimony and conditions of certification. Review of compliance submittals regarding conditions of certifications for hazardous materials handling, including Risk Management Plans Process Safety Management.

April 1985- Jan. 1998

California Energy Commission - Health and Safety
Program Specialist; Energy Facility Siting and Environmental Protection Division.

Responsible for review of Public Health Risk Assessments, air quality, noise, industrial safety, and hazardous materials handling of Environmental Impact Reports on large power generating and waste to energy facilities, evaluation of health effects data related to toxic substances, development of recommendations regarding safe levels of exposure, effectiveness of measures to control criteria and non-criteria pollutants, emission factors, multimedia exposure models. Preparation of testimony providing Staff's position regarding public health, noise, industrial safety, hazardous materials handling, and air quality issues associated with proposed power plants. Advise Commissioners, Management, other Staff and the public regarding issues related to health risk assessment of hazardous materials handling.

Nov. 1977- April 1985	California Air Resources Board - Engineer (last 4 years Associate level) Responsible for testing to determine pollution emission levels at major industrial facilities; including planning, supervision of field personnel, report preparation and case development for litigation; evaluate, select and acceptance-test instruments prior to purchase; design of instrumentation systems and oversight of their repair and maintenance; conduct inspections of industrial facilities to determine compliance with applicable pollution control regulations; improved quality assurance measures; selected and programmed a computer system to automate data collection and reduction; developed regulatory procedures and the instrument system necessary to certify and audit independent testing companies; prepared regulatory proposals and other presentations to classes at professional symposia and directly to the Air Resources Board at public hearings. As state representative, coordinated efforts with federal, local, and industrial representatives.
PROFESSIONAL AFFILIATIONS/ LICENSES	Past President, Professional Engineers in California Government Fort Sutter Section; Past Chairman, Legislative Committee for Professional Association of Air Quality Specialists. Have passed the Engineer in Training exam.
PUBLICATIONS, PROFESSIONAL PRESINTATIONS AND ACCOMPLISHMENTS	Authored staff reports published by the California Air Resources Board and presented papers regarding continuous emission monitoring at symposiums. Authored a paper entitled "A Comprehensive Approach to Health Risk Assessment", presented at the New York Conference on Solid Waste Management and Materials Policy. Authored a paper entitled "Risk Assessment A Tool For Decision Makers" at the Association of Environmental Professionals AEP Conference on Public Policy and Environmental Challenges. Conducted a seminar at University of California, Los Angeles for the Doctoral programs in Environmental Science and Public Health on the subject of "Health Risk Assessment". Authored a paper entitled "Uncertainty Analysis -An Essential Component of Health Risk Assessment and Risk Management" presented at the EPA/ORNL expert workshop on Risk Assessment for Municipal Waste Combustion: Deposition, Uncertainty, and Research Needs. Presented a talk on off-site consequence analysis for extremely hazardous materials releases. Presented at the workshop for administering agencies conducted by the City of Los Angeles Fire Department. Evaluated, provided analysis and testimony regarding public health and hazardous materials management issues associated with the permitting of more than 20 major power plants throughout California.

Developed Departmental policy, prepared policy documents, regulations, staff instruction, and other guidance documents and reference materials for use in evaluation of public health and hazardous materials management aspects of proposed power plants.

Project Manager on contracts totaling more than $500,000.

RES.RT

DECLARATION OF
Alvin J. Greenberg, Ph.D.

I, **Alvin J. Greenberg, Ph.D.** declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on the **Hazardous Materials Management, and Worker Safety/Fire Protection** sections for the **Sentinel Energy Project** based on my independent analysis of the amendment petition, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/29/08 Signed: [signature]

At: Sacramento, California

Risk Science Associates
121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
415-479-7560 fax 415-479-7563
e-mail agreenberg@risksci.com

Name & Title: **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP**
Principal Toxicologist

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader in the preparation of human and ecological risk assessments, air quality assessments, hazardous materials handling and risk management/prevention, infrastructure vulnerability assessments, occupational safety and health, hazardous waste site characterization, interaction with regulatory agencies in obtaining permits, and conducting lead surveys and studies. He has particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, the intrusion of subsurface contaminants into indoor air, and the preparation and review of public health/public safety sections of EIRs/EISs. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission and has assisted the CEC in the assessment of safety and security issues for proposed LNG terminals. In addition to providing security expertise to the State of California, Dr. Greenberg was the Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 26

Education:

B.S. 1969 Chemistry, University of Illinois Urbana

Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California, San Francisco

Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of California, San Francisco

Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002
Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)

September 2000 – February 2001
Member, State Water Resources Control Board Noncompliant Underground Tanks Advisory Group

January 1999 – June 2001
Member, California Air Resources Board Advisory Committee on Diesel Emissions

January 1994 - September 1999
Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee

September 1998
Member, US EPA Workgroup on Cumulative Risk Assessment

April 1997 - September 1997
Member, Cal/EPA Private Site Manager Advisory Committee

January 1986 - July 1996
Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)

January 1988 - June 1995
Member: California Department of Toxic Substance Control Site Mitigation Program Advisory Group

January 1989 - February 1995
Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992

Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991

Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988

ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987

California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987

Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987

Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986

Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985

Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983

Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

Present Position

January 1983- present

Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, review and evaluation of EIRs/EISs, preparation of public health and safety sections of EIRs/EISs, and litigation support for toxic substance exposure cases.

Previous Positions

Jan. 2, 1983 - June 12, 1984

Member, State of California Occupational Safety and Health Standards Board (Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983

Assistant Deputy Chief for Health, California Occupational Safety and Health Administration

Feb. 1, 1979 - Aug. 1, 1979

Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979

Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975

Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

Experience

General

Dr. Greenberg has been a consultant in Hazardous Materials Management and Security, Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Waste Site Characterization, and Toxic Substances Control Policy for over 26 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants, refineries, and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He is presently assisting the California Energy Commission in assessing the risks to workers and the public of proposed power plants and LNG terminals in the state. His experience in hazard identification, exposure assessment, risk assessment, occupational safety and health, emergency response, and Critical Infrastructure Protection has made him a valuable part of the CEC team addressing this issue. He has reviewed and commented on the DEIS/DEIR for the proposed SES LNG Port of Long Beach terminal, focusing on security issues for the CEC and on safety matters for the City of Long Beach. He has presented technical information and analysis to the State of California Interagency LNG Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has been a member of the Squaw Valley Technical Review Committee since 1986 establishing chemical application management plans at golf courses to protect surface and groundwater quality. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead contaminated soils. Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

Liquefied Natural Gas (LNG)

Dr. Greenberg assisted the CEC in the preparation of the "background" report on the risks and hazards of siting LNG terminals in California ("LNG in California: History, Risks, and Siting" July 2003) and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. He has also conducted an evaluation and prepared comments on the risks, hazards, and safety analysis of the DEIS/DEIR for the City of Long Beach on a proposed LNG terminal at the Port of Long Beach (POLB) and conducted an analysis on vulnerability and critical infrastructure security for the CEC on this same proposed LNG terminal. He currently advises the CEC on the POLB LNG proposal on risks, hazards, human thresholds of thermal exposure, vulnerability, security, and represented the CEC at a U.S. Coast Guard briefing on the Waterway Suitability Assessment that included the sharing of SSI (Sensitive Security Information). He has presented technical information and analysis to the State of California LNG Interagency Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

Infrastructure Security

Since 2002, Dr. Greenberg has been trained by and is working with the Israeli company SB Security, LTD, the most experienced and tested security planning and service company in the world. Since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments and power plant security programs for the California Energy Commission (CEC). In taking the lead for this state agency, Dr. Greenberg has interfaced with the California Terrorism Information Center (CATIC) and provided analysis, recommendations, and testimony at CEC evidentiary hearings regarding the security of power plants within the state. These analyses include the assessment of Critical Infrastructure Protection, threat assessments, criticality assessments, and the preparation of vulnerability assessments and off-site consequence analyses addressing the use, storage, and transportation of hazardous materials, recommendations for security to reduce the threat from foreign and domestic terrorist activities, perimeter security, site access by personnel and vendors, personnel background checks, management responsibilities for facility security, and employee training in security methods. Dr. Greenberg is the lead person in developing a model power plant security plan, vulnerability assessment matrix, and a security training manual for the CEC. The model security plan is used by power plants in California as guidance in developing and implementing security measures to reduce the vulnerability of California's energy infrastructure to terrorist attack. He has testified at several evidentiary hearings for the CEC on power plant security issues. He also leads an audit team conducting safety and security audits at power plants throughout California that are under the jurisdiction of the CEC. In addition to providing security expertise to the State of California, in August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

Air Pathway Analysis

Dr. Greenberg has prepared numerous Air Pathway Analyses and human health risk assessments, evaluating exposure at numerous locations in California, Hawai'i, Oregon, Minnesota, Michigan, and New York. He is experienced in working with Region IX EPA, the State of California DTSC, and the Hawai'i Department of Health Clean Air Branch in the application of both site-specific and non site-specific health risk assessment criteria.

Examples

Human Health Risk Assessment for the Open Burn/Open Detonation Operation at McCormick Selph, Inc., Hollister, Ca. (June 2003)

Air Quality and Human Health Risk Assessment for the Royal Oaks Industrial Complex, Monrovia, Ca. (January 2003)

Human Health Risk Assessment and Indoor Vapor Intrusion Assessment for the former Pt. St. George Fisheries Site, Santa Rosa, Ca. (October 2002)

Human Health Risk Assessment for the former Sargent Industries Site, Huntington Park, Ca. (July 2001)

Ballard Canyon Air Pathway Analysis and Human Health Risk Assessment, Santa Barbara County, Ca. (September 2000)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca.
(March, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawai'i (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (March 1993)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Cancer Risk Assessment for the H-Power Generating Station, Campbell Industrial Park, Oahu, Hawai'i (1988)

Hazardous Materials Assessments, Waste Management Assessments, Worker Safety and Fire Protection Assessments, and Public Health Impacts Assessments

Dr. Greenberg also has significant experience as a consultant and expert witness for the California Energy Commission providing analysis, recommendations, and testimony in the areas of hazardous materials management, process safety management, waste management, worker safety and fire protection, and public health impacts for proposed power plant/cogeneration facilities. These analyses include the evaluation and/or preparation of the following:

- Off-site consequence analyses of the handling, use, storage, and transportation of hazardous materials,
- Risk Management Plans (required by the Cal-ARP) and Business Plans (required by H&S Code section 25503.5),
- Safety Management Plans (required by 8 CCR section 5189),
- Natural gas pipeline safety,
- Solid and hazardous waste management plans,
- Phase I and II Environmental Site Assessments,
- Construction and Operations Worker Safety and Health Programs,
- Fire Prevention Programs,
- Human health risk assessment from stack emissions and from diesel engines, and
- Mitigation measures to address PM exposure, including diesel particulates

Examples

- San Francisco Energy Reliability Project, San Francisco, Ca. 2004-present. Hazardous materials management, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Malburg Generating Station Project, City of Vernon, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Blythe II, Blythe, Ca. 2002-3. hazardous materials, worker safety/fire protection,
- Palomar Energy Center, Escondido, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Project, Rancho Seco, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Project, Tesla, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- San Joaquin Valley Energy Center, San Joaquin, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management
- Morro Bay Power Plant, Morro Bay, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Potrero Power Plant Unit 7, San Francisco, Ca., 2001-2: hazardous materials, worker safety/fire protection
- El Segundo Power Redevelopment Project, El Segundo, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Rio Linda Power Project, Rio Linda, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Pastoria II Energy Facility Expansion, Grapevine, Ca., 2001: hazardous materials, worker safety/fire protection
- East Altamont Energy Center, Byron, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Magnolia Power Project, Burbank, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Russell City Energy Center, Hayward, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Woodbridge Power Plant, Modesto, Ca., 2001: hazardous materials, worker safety/fire protection, waste management
- Colusa Power Plant Project, Colusa County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Valero Refinery Cogeneration Project, Benicia, Ca., 2001: hazardous materials, worker safety/fire protection
- Ocotillo Energy Project, Palm Springs, Ca., 2001: hazardous materials, worker safety/fire protection
- Gilroy Energy Center Phase II Project, Gilroy, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Los Esteros Critical Energy Facility, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Roseville Energy Facility, Roseville, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health

- Spartan Power, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- South Star Cogeneration Project, Taft, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Plant, Eastern Alameda County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tracy Peaker Project, Tracy, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Henrietta Peaker Project, Kings County, Ca., 2001: hazardous materials, worker safety/fire protection, waste management, public health
- Central Valley Energy Center, San Joaquin, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Plant, Rancho Seco, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Los Banos Voltage Support Facility, Western Merced County, Ca., 2001-2: waste management, public health
- Palomar Energy Project, Escondido, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Metcalf Energy Center, San Jose, Ca., 2000-1: hazardous materials
- Blythe Power Plant, Blythe, Ca., 2000-1: hazardous materials
- San Francisco Energy Co. Cogeneration Project, San Francisco, Ca., 1994-5: hazardous materials
- Campbell Soup Cogeneration Project, Sacramento, Ca., 1994: hazardous materials
- Proctor and Gamble Cogeneration Project, Sacramento, Ca., 1993-4: hazardous materials
- San Diego Gas and Electric South Bay Project, Chula Vista, Ca., 1993: hazardous materials
- SEPCO Project, Rio Linda, Ca., 1993: hazardous materials
- Shell Martinez Manufacturing Complex Cogeneration Project, Martinez, Ca., 1993: hazardous materials and review and evaluation of EIR
- SFERP Project, San Francisco, Ca. 2004 – 2006. hazardous materials, worker safety/fire protection, waste management, public health

<u>Occupational Safety and Health/Health and Safety Plans/Indoor Air Quality</u>

Dr. Greenberg has significant experience in occupational safety and health, having directed the development, adoption, and implementation of over 50 different Cal/OSHA regulations, including airborne contaminants (>450 substances), lead, asbestos, confined spaces, and worker-right-to-know (MSDSs). He has conducted numerous occupational health surveys and has extensive experience in the sampling and analysis of indoor air quality at residences, workplaces, and school classrooms. He is currently the team leader conducting safety and security audits at power plants throughout California for the California Energy Commission. Safety issues audited include compliance with regulations addressing several safety matters, including but not limited to, confined spaces, lockout/tagout, hazardous materials, and fire prevention/suppression equipment.

Examples

Review and Evaluation of Public and Worker Safety Issues at the proposed SES LNG Facility, Port of Long Beach. prepared for the City of Long Beach. (November 2005)

Confidential safety and security audit reports for 18 power plants in California. prepared for the California Energy Commission. (January 2005 through March 2006)

Report on the Accidental release and Worker Exposure to Anhydrous Ammonia at the BEP I Power Plant, Blythe, Ca. prepared for the California Energy Commission. (October 2004)

Investigation of a Worker Death in a Confined Space, La Paloma Power plant. prepared for the California Energy Commission. (July 2004)

Preliminary Report on Indoor Air Quality in Elementary School Portable Classrooms, Marin County, Ca. (December 1999)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Air Pathway Analysis for the Ballard Canyon Landfill. Submitted to the County of Santa Barbara, (March 1999)

Review and Evaluation of the Health Risk Assessment for Outdoor and Indoor Exposures at the Former Golden Eagle Refinery Site, Carson, Ca. (May 1998)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Determination of Occupational Lead Exposure at a Tire Shop in Placerville, Ca. (April 1993)

Development of an Environmental Code of Regulations for Hazardous Waste Treatment Facilities on La Posta Indian Tribal lands, San Diego County, Ca. (August 1992)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Sites with RWQCB and/or DTSC Oversight

Dr. Greenberg has specific experience in assessing human health and ecological risks at contaminated sites at the land/water interface, including petroleum contaminants, metals, mercury, and VOCs at several locations in California including Oxnard, Richmond, Avila Beach, Mare Island Naval Shipyard, San Diego, Hollister, San Francisco, Hayward, Richmond, the Port of San Francisco, and numerous other locations. He has used Cal/EPA methods, US EPA methods, and ASTM Risk Based Corrective Action (RBCA) and Cal/Tox methodologies. He is extremely knowledgeable about SWRCB and SF Bay RWQCB regulations on underground storage tank sites and with ecological issues presented by contaminated sediments including sediment analysis, toxicity testing, tissue analysis, and sediment quality objectives. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Dr. Greenberg experience on many of these contaminated sites has been as a consultant to local governments, state agencies, and citizen groups. He assisted the City and County of San Francisco in developing local ordinance requiring soil testing (Article 20, Maher ordinance) and hazardous materials use reporting (Article 21, Walker ordinance). He served as the City of San Rafael's consultant to provide independent review and evaluation of the site characterization and remedial action plan prepared for a former coal gasification site. He was a consultant to a citizen group in northern California regarding exposure and risks due to accidental releases from a petroleum refinery and assisted in the assessment of risks due to crude petroleum contamination of a southern California beach. He has prepared a number of risk assessments addressing crude petroleum, diesel and gasoline contamination, including coordinating site investigations, environmental monitoring, and health risk assessment for the County of San Luis Obispo regarding Avila Beach subsurface petroleum contamination. That high-profile project lasted for over one year and Dr. Greenberg managed a team of experts with a budget of $750,000. Another high-profile project included the preparation of an extensive comprehensive human and ecological risk assessment for the Hawaii Office of Space Industry on rocket launch impacts and transportation/storage of rocket fuels at the southern end of the Big Island of Hawaii. Dr. Greenberg's risk assessments were part of the EIS for the project. Dr. Greenberg also worked on another high-profile project conducting Air Pathway Analysis of off-site and on-site impacts from landfill gas constituents, including indoor and outdoor air measurements, air dispersion modeling, flux chamber investigations, and health risk assessment for the County of Santa Barbara. Dr. Greenberg has conducted RI/FS work, prepared health risk assessments, evaluated hazardous waste sites and hazardous materials use at numerous locations in California, Hawaii, Oregon, Minnesota, Michigan, and New York. He has considerable experience in the development of clean-up standards and the development of quantitative risk assessments for site RI/FS work at CERCLA sites, as well as site closures, involving toxic substances and petroleum hydrocarbon wastes. He is experienced in working with both Region IX EPA and the State of California DTSC in negotiating clean-up standards based on the application of both site-specific and non site-specific health and ecological based clean-up criteria. He has significant experience in the development of site chemicals of concern list, quantitative data quality levels, site remedial design, the site closure process, the design and execution of data quality programs and verification of data quality prior to its use in the decision making process on large NPL sites.

Examples

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)
The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment, Ecological Screening Evaluation, and Development of Proposed Remediation Goals for the Flair Custom Cleaners Site, Chico, California (January 1996)

Human Health Risk Assessment for the X-3 Extrudate Project at Criterion Catalyst, Pittsburg, Ca. (November 1994)

Screening Health Risk Assessment and Development of Proposed Soil Remediation Levels at Hercules Plant #3, Culver City, Ca. (July 1993)

Ecological Screening Evaluation for the Altamont Landfill, Alameda County, Ca. (June, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawaii (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (March 1993)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca.
(March, 1993)

Screening Health Risk Assessment for the Proposed Expansion of the West Marin Sanitary Landfill, Point Reyes Station, Ca.
(March, 1993)

Health Risk Assessment for the Proposed Expansion of the Forward, Inc. Landfill, Stockton, Ca.
(September 14, 1992)

Health Risk Assessment for the Rincon Point Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Health Risk Assessment for the South Beach Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Screening Health Risk Assessment and Development of Proposed Soil and Groundwater Remediation Levels, Kaiser Sand and Gravel, Mountain View, Ca. Prepared for Baseline Environmental Consulting (January 30, 1992)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Preliminary Health Risk Assessment for the City of Pittsburg Redevelopment Agency, Pittsburg, California (May 29, 1991)

Military Bases

Dr. Greenberg has experience in conducting assessments at DOD facilities, including RI/FS work, preparation of health risk assessments, evaluation of hazardous waste sites and hazardous materials use at the following Navy sites in California: San Diego Naval Base; Marine Corps Air-Ground Combat Center, 29 Palms; Mare Island Naval Shipyard, Vallejo; Treasure Island Naval Station, San Francisco, Hunters Point Naval Shipyard, San Francisco, and the Marine Corps Logistics Base, Barstow. He worked with the U.S. Navy and the U.S. EPA in the implementation of Data Quality Objectives (DQO's) at MCLB, Barstow.

Examples

Review and Evaluation of the Remedial Investigation Report and Human Health Risk Assessment for the U. S. Naval Station at Treasure Island, Ca. (June 1999)

Screening Health Risk Assessment for the Proposed San Francisco Police Department's Helicopter Landing Pad at Hunters Point Shipyard, San Francisco, Ca. (September 1997)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Health Risk Assessment for the Chrome Plating Facility, Mare Island Naval Shipyard, Vallejo, California (October 24, 1988)

Background Levels and Health Risk Assessment of Trace Metals present at the Naval Petroleum Reserve No.1, 27R Waste Disposal Trench Area, Lost Hills, California (August 12, 1988)

RCRA Facility Investigation (RFI) Work Plan of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 14, 1989)

Hazardous Waste and Solid Waste Audit and Management Plan, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (July 3, 1989)

Water Quality Solid Waste Assessment Test (SWAT) Proposal RCRA Landfill, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (October 31, 1988)

Waste Disposal Facilities, Waste Haulers, Waste Recycling Facilities Report, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 22, 1988)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Air Quality Solid Waste Assessment Test (SWAT) Proposal, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 25, 1988)

Mercury Contamination

Dr. Greenberg has prepared and/or reviewed several human health and ecological risk assessments regarding mercury contamination in soils, sediments, and indoor surfaces. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Examples

Review and evaluation of a human health risk assessment of ingestion of sport fish caught from San Diego Bay and which contain tissue levels of mercury and PCBs (November 2004 – present)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

DECLARATION OF
Testimony of Negar Vahidi

I, **Negar Vahidi**, declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as a **Senior Project Manager/Senior Land Use Technical Specialist** .

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Land Use** for the **CPV Sentinel Energy Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 22, 2008 Signed: ____________

At: Agoura Hills, California

Aspen
Environmental Group

NEGAR VAHIDI
Senior Associate
Land Use Planning and Socioeconomics

ACADEMIC BACKGROUND
Master of Public Administration, University of Southern California, 1993
B.A. (with Highest Honors), Political Science, University of California, Irvine, 1991

PROFESSIONAL EXPERIENCE

Ms. Vahidi is an environmental planner with over 14 years of experience managing and preparing a variety of federal and State of California environmental, planning, and analytical documents for large-scale infrastructure and development projects. Ms. Vahidi brings the experience of being both a public and private sector planner, specializing in the integration and completion of NEPA and CEQA documentation, joint documentation, land use, socioeconomic, and public policy analysis, environmental justice analysis, and public and community involvement programs. Her diversity and experience in preparing NEPA, CEQA, and NEPA/CEQA joint documentation can be shown through a sample of her projects.

Aspen Environmental Group — 1992 to 1998 and 2001 to present

Ms. Vahidi has participated in CEQA and NEPA analyses of major utility development projects, providing public policy and land use expertise as well as managing Public Participation Programs. She has conducted land use analyses for major environmental assessments, including identification of ownership and land use types and identification of sensitive land uses and sensitive receptors. She has also gathered and analyzed information on State, federal and local laws, policies and regulations relevant to land uses and public policy. Her specific projects are described below.

California Energy Commission (CEC)

In response to California's power shortage, Aspen has assisted the CEC in evaluating the environmental and engineering aspects of new power plant applications throughout the State under three separate contracts. Ms. Vahidi has served as Technical Senior for land use (since 2001), and a specialist for socioeconomics and environmental justice, and alternatives analyses and special studies. Her specific projects are listed below.

- **Technical Assistance in Application for Certification Review (Contract # 700-99-014; 3/6/2000 through 12/31/2003)**
  - **Woodland Generation Station No. 2, Modesto, CA**. As the land use Technical Specialist, prepared the Land Use and Recreation, and Agricultural Resources Staff Assessments of this 80-megawatt nominal, natural gas-fired power generating facility and associated linear facilities (i.e., gas and water pipeline and transmission line. The Staff Assessment evaluated potential impacts on nearby residential, recreational, and agricultural land uses, including important farmlands being traversed by linear faculties.
  - **Valero Cogeneration Project, Benicia, CA**. Prepared the Socioeconomics Staff Assessment for a proposed cogeneration facility at the Valero Refinery in Benicia. Issues addressed included impacts on public services and other project-related population impacts such as school impact fees.
  - **Rio Linda/Elverta Power Project, Sacramento, CA**. Prepared the Socioeconomics Staff Assessment for a 560-megawatt natural gas power plant in the northern Sacramento County. Issues of importance included environmental justice and impacts on property values.

- **Magnolia Power Project, Burbank, CA.** As the Socioeconomics technical specialist, prepared the Staff Assessment for this nominal 250-megawatt natural gas combined-cycle fired electrical generating facility to be located at the site of the existing City of Burbank power plant. Environmental justice issues and potential impacts on local economy and employment were evaluated
- **Potrero Power Plant Project, San Francisco, CA.** Prepared the land use portion of the Alternatives Staff Assessment for this proposed nominal 540 MW natural gas-fired, combined cycle power generating facility. Analysis included review of several alternative sites for development of the power plant and the comparative merits of those alternatives with the proposed site located on the San Francisco Bay.
- **Los Esteros Critical Energy Facility, San Jose, CA.** Technical Senior for the Land Use Staff Assessment of this 180-megawatt natural-gas-fired simple cycle peaking facility. Issues included potential impacts resulting from loss of agricultural land, and impacts associated with the project's non-compliance with local General Plan land use and zoning designations.
- **East Altamont Energy Center, Alameda County, CA.** Technical Specialist for the Land Use Assessment for a 1,100-megawatt nominal, natural gas-fired power plant and associated linear facilities. Provided expert witness testimony on Land Use Staff Assessment. Major issues addressed in the Staff Assessment included loss of Prime Farmlands, recommendation of land preservation mitigation, and the project's non-compliance with local General Plan land use and zoning designations.
- **Tracy Peaker Project, Tracy, CA.** Technical Senior for the Land Use Staff Assessment of this 169-megawatt simple-cycle peaking facility in an unincorporated area of San Joaquin County. Provided expert witness testimony on Land Use Staff Assessment. Issues included potential impacts resulting from loss of agricultural land under Williamson Act Contract, and evaluation of cumulative development in the fast-growing surrounding area.
- **Avenal Energy Project, Kings County, CA.** Socioeconomics Technical Specialist for this 600-megawatt combined cycle electrical generating facility, and associated linear facilities.
- **Tesla Power Project, Alameda County, CA.** Land Use Technical Senior and Alternatives Technical Specialist in charge of preparation of two Staff Assessments for this project. The project will be a nominal 1,120-MW electrical generating power plant with commercial operation planned for third quarter of 2004. The Tesla Power Project will consist of a natural gas-fired combined cycle power generator, with 0.8 miles of double-circuit 230-kilovolt transmission line connected to the Tesla PG&E substation, 24-inch 2.8-mile natural gas pipeline, and 1.7-mile water line constructed along Midway Road.
- **Sacramento Municipal Utility District Consumes Power Plant Project, Sacramento, CA.** Socioeconomics and Alternatives Technical Specialist in charge of preparation of two Staff Assessments for this nominal 1,000-megawatt (MW) combined-cycle natural gas facility. Provided expert witness testimony on Socioeconomics Staff Assessment. The project would include the construction and operation of a natural gas power plant at the Rancho Seco Nuclear Plant, 25 miles southeast of the City of Sacramento, in Sacramento County. The project would be located on a 30-acre portion of an overall 2,480-acre site owned by SMUD.
- **Inland Empire Energy Center, Riverside County, CA.** Technical Specialist for the Land Use Assessment for a 670-megawatt natural gas-fired, combined-cycle electric generating facility and associated linear facilities including, a new 18-inch, 4.7-mile pipeline for the disposal of non-reclaimable wastewater, and a new 20-inch natural gas pipeline. Provided expert witness testimony on Land Use Staff Assessment. The project would be located on approximately 46-acres near Romoland, within Riverside County. Major issues addressed in the Staff Assessment included potential loss of agricultural lands, impacts to planned school uses, and the project's potential non-compliance with local General Plan land use and zoning designations.

- **Engineering & Environmental Technical Assistance to Support the Energy Facility Planning and Licensing Program Contract (Contract # 700-02-004; 6/30/03 through 3/30/06)**
  - **Environmental Performance Report (EPR).** Ms. Vahidi managed the preparation of the Socioeconomics Chapter of the EPR for the California Energy Commission, which eventually became part of the State of California's Integrated Energy Policy Report (IEPR). The Socioeconomics Chapter addressed: the

importance of reliable and affordable electricity supply power plant construction and operation impacts, including labor force, taxation, etc.; and trends in the energy section, including renewable power sources such as wind and solar. She also conducted the analysis of a new portion of the Land Resources Chapter, which addressed the siting and land use issues associated with renewable power. This new portion of the land use analysis compared the land use and siting constraints associated with renewable power infrastructure such as wind and solar versus other forms of power infrastructure, such as gas pipelines, transmission lines, LNG facilities, and power plants.

- **Coastal Plant Study.** Ms. Vahidi served as the Social Sciences Task Manager for this special study being conducted as part of Aspen's contract with the California Energy Commission. The study included identification and evaluation of potential issues associated with the possible modernization, re-tooling, or expansion of California's 25 coastal power plants including: northern California power plants such as Humboldt, Potrero, Hunter's Point, Pittsburg, and Oakland; central coast power plants such as Contra Costa, Diablo Canyon Nuclear, Morro Bay, Moss Landing, Elwood, Mandalay, and Ormond Power Plants; and southern California power plants such as the Alamitos, Long Beach, Los Angeles Harbor, Haynes, Redondo Beach, Scattergood, El Segundo, Huntington Beach, Encina, Silver Gate, South Bay, and San Onofre Nuclear. As Task Manager her responsibilities included, identification of potential political, social, community, and physical land use impacts that may arise from the potential increased output of energy from plants in highly sensitive coastal communities. The intent of the study is to identify red flag items for the Energy Commission in order to streamline future licensing processes. Her task as the Social Science Task Manager also included a thorough review of applicable Local Coastal Plans, and Coastal Commission regulations associated with Coastal Development Permits and Consistency Determinations.
- **Natural Gas Market Outlook Report (NGMOR).** Ms. Vahidi assisted the CEC's Natural Gas Unit as a technical editor in their preparation and publication of the NGMOR. She managed Aspen's efforts, including format and graphics, to edit technical sections prepared by Natural Gas Unit Staff under a condensed time frame. The Preliminary NGMOR was released for public review in June 2003.

- **Peak Workload Support for the Energy Facility Siting Program and the Energy Planning Program (Contract #700-05-002; 4/11/06 through 3/30/09)**
  - **Chula Vista Energy Upgrade Project, Chula Vista, CA.** Technical Specialist for the Land Use Staff Assessment for MMC Energy, Inc.'s Application for Certification (AFC) to construct and operate replacements and upgrades of equipment at the Chula Vista Power Plant, located on a 3.8-acre parcel in the City of Chula Vista's Main Street Industrial Corridor and within the City's Light Industrial zoning district. Issues of concern include the impacts of the power plant on adjacent residential and open space land uses, and compliance with applicable local LORS.
  - **Ivanpah Solar Electric Generating System Project, San Bernardino County, CA.** Technical Specialist for the Socioeconomics Staff Assessments for a 400-megawatt solar thermal electric power generating system. The project's technology would include heliostat mirror fields focusing solar energy on power tower receivers producing steam for running turbine generators. Related facilities would include administrative buildings, transmission lines, a substation, gas lines, water lines, steam lines, and well water pumps. The proposed project would be developed entirely in the Mojave Desert region of San Bernardino County, California.
  - **Sentinel Energy Project, Riverside County, CA.** Technical Specialist for the Land Use Staff Assessment for CPV Sentinel's Application for Certification (AFC) to construct and operate an 850-megawatt (MW) peaking electrical generating facility near SCE's Devers Substation. The proposed project site consists of 37 acres of land situated approximately eight miles northwest of the center of the City of Palm Springs with portions of the construction laydown area and natural gas pipeline within the Palm Springs city limits. Land use issues of concern include the project's compliance with local LORS.
  - **Carrizo Energy Solar Farm, San Luis Obispo County, CA.** Technical Specialist for the Land Use Staff Assessment for Carrizo Energy, LLC's Application for Certification (AFC) to build the Carrizo Energy Solar Farm (CESF), which will consist of approximately 195 Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air-cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The CESF is located in an unincorporated area of eastern San Luis Obispo County, west of Simmler and northwest of

California Valley, California. The CESF includes the solar farm site, a minimal offsite transmission system connection, and construction laydown area. The CESF site will encompass approximately 640 acres of fenced area in an area zoned for agricultural uses as specified in the San Luis Obispo County General Land Use Plan. Issues of concern include the impacts of the power plant on adjacent land uses and compliance with applicable local LORS.

- **Carlsbad Energy Center Project, Carlsbad, CA.** Technical Specialist for the Land Use Staff Assessment for Carlsbad Energy Center, LLC's Application for Certification (AFC) to build the Carlsbad Energy Center Project (CECP), which will consist of a 558 MW gross combined-cycle generating facility configured using two units with one natural-gas-fired combustion turbine and one steam turbine per or unit. Issues of concern include major incompatibilities with local LORS, and cumulative impacts from widening of I-5.
- **Marsh Landing Generating Station, Contra Costa County, CA.** Technical Specialist for the Land Use Staff Assessment for the Mirant Marsh Landing, LLC AFC for a 930 MW natural gas-fired power plant, which would be would be sited adjacent to the existing Contra Costa Power Plant in unincorporated Contra Costa County, near the City of Antioch.
- **Canyon Power Plant, Anaheim, CA.** Senior Technical Specialist for the Socioeconomics Staff Assessments for a nominal 200 megawatt (MW) simple-cycle plant, using four natural gas-fired combustion turbines and associated infrastructure proposed by Southern California Public Power Authority (SCPPA). This project is a peaking power plant project located within the City of Anaheim, California.
- **Willow Pass Generating Station, Pittsburg, CA.** Technical Specialist for the Land Use Staff Assessment for a new, approximately 550-megawatt (MW) dry-cooled, natural gas-fired electric power facility proposed by Mirant. Development of Willow Pass would entail the construction of two generating units and ancillary systems including, adjacent electric and gas transmission lines, and water and wastewater pipelines.
- **Stirling Energy Systems Solar Two, Imperial County, CA.** Technical Specialist for the Land Use Staff Assessment for a nominal 750-megawatt (MW) Stirling engine project, with construction planned to begin either late 2009 or early 2010. The primary equipment for the generating facility would include the approximately 30,000, 25-kilowatt solar dish Stirling systems (referred to as SunCatchers), their associated equipment and systems, and their support infrastructure.
- **City of Palmdale Hybrid Power Plant Project, Palmdale, CA.** Technical Specialist for the Land Use Staff Assessment for the Palmdale Hybrid Power Project (PHPP) proposed by the City of Palmdale. The PHPP consists of a hybrid of natural gas-fired combined-cycle generating equipment integrated with solar thermal generating equipment to be developed on an approximately 377-acre site in the northern portions of the City of Palmdale (City).

- **Littlerock Reservoir Sediment Removal Project EIS/EIR, Palmdale, CA.** Ms. Vahidi is the Project Manager for this joint EIS/EIR evaluating the impacts of sediment removal alternatives for the Littlerock Reservoir and Dam on USFS Angeles National Forest (NEPA Lead Agency) lands in Los Angeles County. The Palmdale Water District (District) [CEQA Lead Agency] proposes to remove approximately 540,000 cubic yards of sediment from the reservoir (behind the dam) and haul it to off-site commercial gravel pits located 6 miles north of the dam site in the community of Littlerock. The project involves impacts to the arroyo toad, extensive coordination with USFWS for a Section 7 consultation, incorporation of new Forest Service Plan updates and requirements into the analysis, preparation of the Forest Service required BE/BA, and analysis of compliance with federal air quality conformity requirements. Under Ms. Vahidi's direction, Aspen developed six different project alternatives for sediment removal, involving detailed hydraulics analysis and preparation of a hydraulics technical report. The most feasible of these alternatives (grade control structure) was chosen by the PWD as their proposed project to be evaluated in the EIS/EIR. In addition, the PWD is currently considering an additional alternative (use of a slurry line for sediment removal) presented by Aspen. Aspen is currently working on the Administrative Draft EIR/EIS and assisting the PWD with portions of their Proposition 50 grant application to the DWR.

- **El Casco System Project, Riverside, CA.** Ms. Vahidi is serving as the Project Manager for this EIR being prepared for the CPUC to evaluate SCE's application for a Permit to Construct (PTC) the El Casco System Project. The Proposed Project would be located in a rapidly growing area of northern Riverside County, which includes the Cities of Beaumont, Banning, and Calimesa. A 115-kV subtransmission line begins at Banning Substation and extends westward toward the proposed El Casco Substation site within the existing Banning to Maraschino 115-kV subtransmission line and Maraschino-El Casco 115-kV subtransmission line ROWs. Major issues of concern include impacts to existing and residential land uses, which have led to the development of a partial underground alternative and a route alternative different than the project route proposed by SCE (the Applicant). The 1,200-page Draft EIR was released for a 45-day public review and comment on December 12, 2007, and evaluates project alternatives at the same level of detail as the Proposed Project analysis.

- **Sacramento Area Voltage Support Supplemental Environmental Impact Statement (SEIS), Western Area Power Administration.** Ms. Vahidi served as the task leader for several social science sections for the SEIS for a double-circuit 230 kV circuit between Western's O'Banion/Sutter Power Plant and Elverta Substation/Natomas Substation. New transmission lines and transmission upgrades are needed to mitigate transmission line overload, reduce the frequency of automatic generation and load curtailment during the summer peak load periods, and help maintain reliability of the interconnected system operation. Ms. Vahidi directed the preparation of the land use, aesthetics, socioeconomics, and environmental justice sections of the SEIS.

- **Sunset Substation and Transmission and Distribution Project CEQA Documentation, Banning, CA.** The City of Banning proposes to construct the Sunset Substation and supporting 33-kilovolt (kV) transmission line that would interconnect with the City's existing distribution system. The purpose of this new substation and transmission is to relieve the existing overloads that are occurring within the City's electric system and to accommodate projected growth in the City. Ms. Vahidi served as the Environmental Project Manager for the initial stages of CEQA documentation prepared for the City's Utility Department.

- **San Onofre Nuclear Generating Station (SONGS) Steam Generator Replacement Project, San Clemente, CA.** Ms. Vahidi served as the Technical Senior in charge of developing the methodology and guiding the analysis for the Land Use and Recreation Section of this EIR. This project EIR addressed the environmental effects of SCE's proposed replacement of Steam Generator Units 2 & 3 at the SONGS Nuclear Power Plant located entirely within the boundaries of the US Marine Corps Base Camp (MCBCP) Pendleton. Issues of concern included potential conflicts resulting from the transport of the large units through sensitive recreation areas such as beaches, and the San Onofre State Park.

- **Diablo Canyon Power Plant (DCPP) Steam Generator Replacement Project, San Luis Obispo County, CA.** Ms. Vahidi served as the Technical Senior in charge of developing the methodology and guiding the analysis for the Land Use and Recreation Section of this EIR. The EIR addressed impacts associated with the replacement of the eight original steam generators (OSGs) at DCPP Units 1 and 2 due to degradation from stress and corrosion cracking, and other maintenance difficulties. The Proposed Project would be located at the DCPP facility, which occupies 760 acres within PG&E's 12,000-acre owner-controlled land on the California coast in central San Luis Obispo County. Land use issues of concern include impacts to agricultural lands, recreational resources, and potential Coastal Act inconsistencies.

- **Cabrillo Port Liquefied Natural Gas (LNG) Deepwater Port, Ventura County, CA.** Under contract to the City of Oxnard, Aspen was tasked to review the Draft EIS/EIR for this the proposed construction and operation of an offshore floating storage and regasification unit (FSRU) that would be moored in Federal waters offshore of Ventura County. As proposed, liquefied natural gas (LNG) from the Pacific basin would be delivered by an LNG Carrier to and offloaded onto, the FSRU; regasified; and delivered onshore via two new 21.1-mile (33.8-kilometer), 24-inch (0.6-meter) diameter natural gas pipelines laid on the ocean floor. These pipelines would come onshore at Ormond Beach near Oxnard, California to connect through proposed new onshore pipelines to the existing Southern California Gas Company intrastate pipeline system to distribute natural gas throughout the Southern California region. Ms. Vahidi reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Aesthetics, Land Use, Recreation, Socioeconomics, and Environmental Justice.

- **Long Beach LNG Import Project, Long Beach, CA.** Under contract to the City of Long Beach, Aspen was tasked to review the Draft EIS/EIR for the proposed construction and operation of this onshore LNG facility to be located at the Port of Long Beach. Ms. Vahidi reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Aesthetics, Land Use, Recreation, Socioeconomics, Environmental Justice, and Port Master Plan Amendment.

- **Post-Suspension Activities of the Nine Federal Undeveloped Units and Lease OCS-P 0409, Offshore Southern California**. Aspen assisted the US Department of the Interior, Minerals Management Service (MMS) to prepare an Environmental Information Document (EID) evaluating the potential environmental effects associated with six separate suspensions for undeveloped oil and gas leases Pacific Outer Continental Shelf (OCS) located offshore Southern California. These undeveloped leases lie between 3 and 12 miles offshore Santa Barbara, Ventura and southern San Luis Obispo Counties and are grouped into nine units, with one individual lease that is not unitized. As the Senior Aspen social scientist, Ms. Vahidi guided the analysis of community characteristics and tourism resources, recreation, visual resources, social and economic environment, and military operations.

- **Otay River Watershed Management Plan (ORWMP) and Special Area Management Plan (SAMP) in San Diego County, CA.** Ms. Vahidi served as a Technical Senior for social science and land use issues. The ORWMP focused on developing strategies to protect and enhance beneficial uses within this watershed and thereby comply with the San Diego Region's NPDES permit, and the SAMP intended to achieve a balance between reasonable economic development and aquatic resource preservation, enhancement, and restoration in this 145-mi2 (93,000 acres) area through the issuance of Corps and CDFG programmatic permits.

- **Santa Ana Valley Pipeline Repairs Project, San Bernardino and Riverside Counties, CA.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation and permitting efforts related to the repair of 12 sites along the pipeline portion of the East Branch of the California Aqueduct. The repair of the 12 sites was crucial because, eight of the Priority 1 sites included areas of the pipeline that were under high stress and subject to rupture. Issues of concern included, potential impacts to special status species, sensitive receptors, and traffic. As the DWR's CEQA consultant, Ms. Vahidi determined that the proposed SAPL Repairs Project would qualify for a CEQA Categorical Exemption, and recommended the preparation of a Technical Memorandum to justify this exemption. The Technical Memorandum and supporting documentation, including a Biological Constraints Report, and analyses of proposed project potential construction-related air quality, noise, and traffic impacts, were prepared and presented to DWR as one packet to support both a Class 1 and Class 2 CEQA Exemption. Subsequent to preparation of this packet, DWR filed a Notice of Exemption on June 13, 2003 for their repair activities.

- **Piru Creek Erosion Repairs and Bridge Seismic Retrofit Project, Northern Los Angeles County, CA.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation for this project. An IS/MND was prepared to evaluate the impacts of the project, which proposed to maintain four access routes to DWR's facilities along the West Branch of the California Aqueduct downstream of the Pyramid Dam. Repair and improvement activities would occur on Osito Canyon (an intermittent tributary to Piru Creek) at Osito Adit, adjacent to Old Highway 99 at North Adit (or access tunnel), alongside an eroded section of Old Highway 99 along Piru Creek, and at Pyramid Dam Bridge. Repair activities would serve to improve conditions of access routes, as well as strengthening and reinforcing them against seismic or flood events. Project-related construction could result in potentially significant impacts to biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, and transportation and traffic.

- **Pyramid Lake Repairs and Improvements Project, northern Los Angeles County.** Under Aspen's on-going environmental services contract with the DWR, Ms. Vahidi served as the project manager for CEQA documentation, ADA (Americans with Disabilities Act) compliance, and permitting efforts for this project. DWR and the Department of Boating and Waterways (DBW) are planning repairs and improvements at various recreational sites at Pyramid Lake, which is located on the border between Los Padres National Forest and Angeles National Forest; recreation is managed by Angeles National Forest. The lake is also part of Federal Energy Regulatory Commission Project 2426. Aspen worked with DWR and DBW to determine ADA compliance components at each site. CEQA documentation in support of a Class 1 and 2 Categorical Exemption was prepared to evaluate the potential impacts of the repairs and improvements, and provide CEQA clearance for filing of required permit applications, including but not necessarily limited to 404, 401, and 1602 permits. In addition to the CEQA documentation and preparation of permit applications, Aspen coordinated DWR and DBW's efforts with the USFS, and the permitting agencies (i.e., CDFG, RWQCB, and USACE). Through coordination with the USAC, Aspen prepared the NEPA EA for Corps 404 permit process, and reviewed and coordinated revisions to the 1602 with CDFG.

- **Mulholland Pumping Station and Lower Hollywood Reservoir Outlet Chlorination Station Project, Los Angeles, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Project Manager for preparation of CEQA documentation for this project. LADWP proposed to replace the existing historic pumping/chlorination station building as well as the existing lavatory and unoccupied Water Quality Laboratory buildings with a new single structure pumping/chlorination station within the LADWP's Hollywood Reservoir Complex located in the Hollywood Hills section of the City Los Angeles. These improvements were required due to the age and deterioration of the facility and the potential risk of seismic damage to existing structures. An Initial Study was prepared in support of a City of Los Angeles General Exemption.

- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles and Burbank, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Task Leader for land use issues and is in charge of development and analysis of project alternatives for the CEQA document for this project. The RSC is a major transmission pipeline in the LADWP water distribution system. The existing RSC pipeline's purpose is to transport large amounts of water from the Los Angeles Reservoir Complex and local ground water wells to reservoirs and distribution facilities located in the central areas within of the City of Los Angeles. The LADWP proposed a new larger RSC pipeline to replace and realign the Upper and Lower Reaches of the existing RSC pipeline, which would involve the construction of approximately 69,600 linear feet (about 13.2 miles) of 42-, 48-, 60-, 66-, 72-, 84-, and 96-inch diameter welded steel underground pipeline.

- **Valley Generating Station Site Survey & Documentation Report, Los Angeles, CA.** Ms. Vahidi managed the preparation of a comprehensive report (over 150 pages) documenting all of the structures and facilities located at the Valley Generating Station (VGS). The report includes exhibits that illustrate locations of each structure at the VGS, a detailed appendix of color photos of each structure, and a written description of each structure. The report also provides a general discussion of the history and background of the VGS and its development to provide a context for the structures on site.

- **Taylor Yard Water Recycling Project (TYWRP), Los Angeles and Glendale, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Ms. Vahidi served as the Project Manager for preparation of CEQA documentation for this project. LADWP proposed to construct the TYWRP in order to provide recycled water produced by the Los Angeles–Glendale Water Reclamation Plant (LAGWRP) to the Taylor Yard. An important part of the City of Los Angeles' expanding emphasis on water conservation is the concept that water is a resource that can be used more than once. Because all uses of water do not require the same quality of supply, the City has been developing programs to use recycled water for suitable landscaping and industrial uses. The project is located in the southernmost part of the City of Glendale and northeastern part of the City of Los Angeles. The IS/MND was adopted in the Summer of 2007.

- **Devers-Palo Verde 500 kV Transmission Line Project EIS/EIR, southern California/western Arizona.** For this EIR/EIS prepared by US Bureau of Land Management and CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator for SCE's proposed 250-mile long transmission line project from the Palo Verde Nuclear power plant in Arizona to the northern Palm Springs area in California. Major issues of concern include EMF and visual impacts on property values, impacts on the area's vast recreational resources and tribal lands, and the development and evaluation of several route alternatives, including the Devers-Valley No. 2 Route Alternative, which eventually was approved by the CPUC.

- **Antelope-Pardee 500 kV Transmission Line Project EIS/EIR, Los Angeles County, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Ms. Vahidi is served as the Deputy Project Manager and Social Sciences Issue Area Coordinator for SCE's proposed 25-mile long transmission line project from the Antelope Substation in the City of Lancaster, through the ANF, and terminating at SCE's Pardee Substation in Santa Clarita. Major issues of concern included impacts to biological, recreational, and cultural resources within Forest lands, EMF and visual impacts on property values, impacts on residences in the urbanized southern regions of the route, and the development and evaluation of several route alternatives.

- **Antelope Transmission Project, Segments 2 & 3 EIR, Los Angeles and Kern Counties, CA.** For this EIR being prepared by the CPUC, Ms. Vahidi served as the Deputy Project Manager and Social Sciences Issue Area Coordinator. The proposed Project includes both Segment 2 and Segment 3 of the Antelope Transmission Project, and involves construction of new transmission line infrastructure from the Tehachapi Wind Resource Area in southern Kern County, California, to SCE's existing Vincent Substation in Los Angeles County, California. The Tehachapi Wind Resource Area is one of the State's greatest potential sources for the generation of wind energy. A variety of wind energy projects are currently in development for this region. Major issues of concern include EMF and visual impacts on property values, impacts on residences and agricultural resources, and the development and evaluation of several substation and route alternatives.

- **Tehachapi Renewable Transmission Project (TRTP) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Ms. Vahidi is serving as the Deputy Project Manager for SCE's proposal to construct, use, and maintain a series of new and upgraded high-voltage electric transmission lines and substations to deliver electricity generated from new wind energy projects in eastern Kern County. Approximately 46 miles of the project would be located in a 200- to 400-foot right-of-way on National Forest System land (managed by the Angeles National Forest) and approximately three miles would require expanded right-of-way within the Angeles National Forest. The proposed transmission system upgrades of TRTP are separated into eight distinct segments: Segments 4 through 11. Segments 1 (Antelope-Pardee) and Segments 2 and 3 (Antelope Transmission Project) were evaluated in separated CEQA and NEPA documents as described above.

- **Jefferson-Martin 230 kV Transmission Line Project EIR, San Francisco Bay Area, CA.** Ms. Vahidi served as the Issue Area Coordinator for the Social Science issues of the EIR, and was responsible for preparation of the socioeconomics, recreation, and public utilities sections of the EIR prepared on behalf of the California Public Utilities Commission (CPUC) to evaluate a proposed 27-mile transmission line in San Mateo County. Major issues of concern included EMF and visual impacts on property values, impacts on the area's vas recreational resources, and evaluation of several route alternatives.

- **Miguel-Mission 230 kV #2 Project EIR, San Diego, CA.** Ms. Vahidi conducted the land use, recreation, socioeconomics, and environmental justice analyses for this EIR for a proposed 230 kV circuit within an existing transmission line ROW between Miguel and Mission substations in San Diego County. The proposed project included installing a new 230 kV circuit on existing towers along the 35-mile ROW, as well as relocate 69 kV and 138 kV circuits on approximately 80 steel pole structures. In addition, the Miguel Substation and Mission Substation would be modified to accommodate the new 230 kV transmission circuit.

- **Viejo System Project, Orange County, CA.** Ms. Vahidi served as the Deputy Project Manager for the project's CEQA documentation, including and Initial Study, prepared on behalf of the CPUC to evaluate Southern California Edison's (SCE) Application for a Permit to Construct the Viejo System Project, which was in SCE's forecasted demand of electricity and goal of providing reliable electric service in southern Orange County. The Viejo System Project would serve Lake Forest, Mission Viejo, and the surrounding areas. Components of the project included, construction of the new 220/66/12 kilovolt (kV) Viejo Substation, installation of a new 66 kV subtransmission line within an existing SCE right-of-way, replacement of 19 double-circuit tubular steel poles with 13 H-frames structures, and minor modification to other transmission lines. Major issues of concern include visual impacts of transmission towers, EMF effects, and project impacts on property values.

- **MARS EIR/EIS, Monterey, CA.** Ms. Vahidi served as the technical specialist in charge of preparing the Environmental Justice analysis for this EIR/EIS, which would evaluate the effects associated with the installation and operation of the proposed Monterey Accelerated Research System (MARS) Cabled Observatory Project (Project) proposed by Monterey Bay Aquarium Research Institute (MBARI)[NEPA Lead Agency]. The goal of the Project was to install and operate, in State and Federal waters, an advanced cabled observatory in Monterey Bay that would provide a continuous monitoring presence in the Monterey Bay National Marine Sanctuary (MBNMS) as well as serve as the test bed for a state-of-the-art regional ocean observatory, currently one component of the National Science Foundation (NSF) Ocean Observatories Initiative (OOI). The Project would provide real-time communication and continuous power to suites of scientific instruments enabling monitoring of biologically sensitive benthic sites and allowing scientific experiments to be performed. The environmental justice analysis evaluated the potential for any disproportionate project impacts to both land-based populations and fisheries workers. The CEQA Lead Agency was CSLC.

- **Kinder Morgan Concord-Sacramento Pipeline EIR.** Ms. Vahidi prepared the environmental justice and utilities and service systems sections of an EIR evaluating a proposed 70-mile petroleum products pipeline for the California State Lands Commission. Analysis included consideration of potential impacts of pipeline accidents in Contra Costa, Solano, and Yolo Counties.

- **Shore Marine Terminal Lease Consideration Project EIR, Contra Costa County, CA.** Served as Aspen's Project Manager (under contract to Chambers Group, Inc.) in charge of conducting the preparation of the Land Use, Recreation, Air Quality, and Noise sections of this EIR evaluating Shore

Terminal, LLC's application to the California State Lands Commission (CLSC) to exercise the first of two 10-year lease renewal options, with no change in current operations. Shore Terminals operations comprise the marine terminal and on-land storage facilities in an industrial part of the city of Martinez. The marine terminal is on public land leased from the CSLC with the upland storage facilities located on private land.

- **Looking Glass Networks Fiber Optic Cable Project IS/MND, northern and southern California.** As part of Aspen's ongoing contract with the CPUC for review of Telecommunications projects, this document encompassed the evaluation of project impacts and network upgrades in the San Francisco Bay Area and the Los Angeles Basin Area. Ms. Vahidi served as the Deputy Project Manager and Study Area Manager for the Los Angeles Basin for this comprehensive CEQA document reviewing the potential impacts of hundreds of miles of newly proposed fiber optic lines throughout northern and southern California, including Los Angeles and Orange Counties. Issues of concern focused on potential construction impacts of linear alignments in highly urbanized rights-of-way, and resultant land use, traffic and utilities conflicts.

- **US Army Corps of Engineers, Los Angeles District.** Ms. Vahidi is responsible for managing Delivery Orders and conducting the analyses of the social science issue areas for 16 projects throughout southern California and Arizona as part of two environmental services contracts. Delivery orders have included:

  - **Northeast Phoenix Drainage Area Alternatives Analysis Report, Phoenix and Scottsdale, AZ.** As the project manager guided the preparation of an alternatives analysis report that evaluated the potential environmental impacts associated with channel and detention basin alternatives to control flooding problems resulting from fast rate of development in the northeast Phoenix area.

  - **Imperial Beach Shore Protection EIS/EIR, Imperial Beach, CA.** Responsible for preparing the affected environment and environmental consequences sections for the land use, recreation, aesthetics, and socioeconomics issue areas. This EIS will analyze the impacts of shore protection measures along a 4.7-mile stretch of beach in southwest San Diego County.

  - **US Food and Drug Administration Laboratory EIS/EIR, Irvine, CA.** Prepared the land use and recreation; socioeconomics, public services, and utilities; and visual resources/aesthetics analyses for this proposed "mega-laboratory" on the University of California Irvine Campus. Also developed the cumulative projects scenario for analyses of cumulative impacts. As the Public Participation Coordinator for the EIS/EIR review process, prepared the NOP, set up the scoping meeting and public hearing, prepared meeting handouts, and developed the project mailing list.

  - **San Antonio Dam EIS, Los Angeles and San Bernardino Counties, CA.** Responsible for preparing the cultural resources, land use and recreation, and aesthetics sections for the analysis of impacts resulting from the re-operation of San Antonio Dam to increase flood protection.

  - **Rio Salado Environmental Restoration EIS, Phoenix and Tempe, AZ.** Conducted the land use and recreation, and aesthetics analyses for this environmental restoration project in the Salt River and Indian Bend Wash located in the Cities of Phoenix and Tempe. Incidental to the primary objective of the Proposed Action (environmental restoration) is the creation of passive recreational opportunities associated with the restored habitat areas, such as trails for walking and biking, and areas for observing wildlife and learning about the natural history of the river.

  - **Airspace Restrictions EA, Ft. Irwin, CA.** Conducted the land use, recreation, aesthetics, and socioeconomics analyses of impacts for the conversion of unrestricted airspace to restricted airspace above Ft. Irwin in the Mojave Desert.

  - **National Guard Armory Building EA, Los Angeles, CA.** Conducted the land use, aesthetics, and socioeconomics analyses and prepared the cumulative impacts and policy consistency sections.

  - **Supplemental EA for the Seven Oaks Dam Woolly Star Land Exchange, San Bernardino County, CA.** Prepared the land use and recreation analyses and policy consistency section.

- **Lower Santa Ana River Operations and Maintenance EA, Orange County, CA.** Responsible for conducting the land use, recreation, aesthetics, socioeconomics, and cultural resources analyses.
- **EA for Area Lighting, Fencing, and Roadways at the International Border, San Diego, CA.** Conducted the land use, aesthetics, and socioeconomics analyses and prepared the policy consistency section.
- **Border Patrol Checkpoint Station EA, San Clemente, CA.** Analyzed the aesthetic impacts of the installation of a concrete center divider and a Pre-inspected Automated Lane adjacent to and parallel to Interstate 5.
- **Upper Newport Bay Environmental Restoration Project, Newport Beach, CA.** Prepared physical setting, socioeconomics, land and water uses, and cultural resources sections for the Baseline Conditions Report and the Environmental Planning Report.
- **Whitewater/Thousand Palms Flood Control Project, Thousand Palms, CA.** Prepared the land use and recreation, aesthetics, and socioeconomics affected environment sections for the project's Baseline Conditions Report that was incorporated into the project EIS.
- **San Antonio Creek Bridges Project, Vandenberg Air Force Base, CA.** Prepared the physical setting, land use, socioeconomics, utilities, and aesthetics sections for analyses of bridge alternative impacts for missile transport on Vandenberg Air Force Base.
- **Ft. Irwin Expansion Mitigation Plan, Mojave Desert, CA.** Responsible for developing Ft. Irwin's Public Access Policy based on mitigation measures from the Army's Land Acquisition EIS for the National Training Center. Policy includes provisions for access by research and scientific uses.

- **Los Angeles Unified School District (LAUSD), Los Angeles County, CA.** Ms. Vahidi is Program Manager for Aspen's Environmental Master Services Agreement with the LAUSD (nation's second largest school district) to prepare CEQA documents (EIRs, IS/MNDs, Categorical Exemptions) in review of the LAUSD's four-phased new school construction program intended to meet existing and projected overcrowded conditions (200,000 seat shortfall) within the LAUSD (i.e., City of Los Angeles and all or parts of 28 surrounding jurisdictions cover 700 square miles of land). As the Program Manager, she is responsible for client interface and providing CEQA expertise to the LAUSD on day-to-day basis, QA/QC activities for all Aspen documents submitted, budget tracking and allocation, staff assignments, and the general day-to-day management of this contract. Thus far, Aspen has been awarded 48 CEQA document assignments for new school projects, school expansions and additions. In addition to her duties as the contract manager, Ms. Vahidi has managed the preparation of several CEQA documents under this contract, including:
  - **East Valley Middle School No. 2 EIR.** This middle school was proposed to be located at the previous Van Nuys Drive-In site. The EIR focused on impacts associated with air quality, hazards and hazardous materials, noise, land use and planning, and traffic and transportation. Major issues of concern included traffic and noise generated by school operation activities. The EIR included LAUSD design standards and measures employed to minimize environmental impacts.
  - **Canoga Park New Elementary School IS/MND.** This elementary school would be developed on a parcel of land owned by the non-profit organization, New Economics For Women (NEW). This "Turn-Key" project consisted of a Charter Elementary School to be developed by NEW and sold to the LAUSD for operation. It was later decided that NEW would lease the school back and run it as a charter school. Issues of concern included, pedestrian safety, traffic, air quality, noise, and land use.
  - **Mt. Washington Elementary School Multi-Purpose Room Addition Project IS/MND.** This project proposed the development of a multi-purpose room facility, including a library, auditorium, and theater, to the existing Mt. Washington Elementary School campus located in Los Angeles. The surrounding residential community had concerns regarding the proposed project's impacts on aesthetics, traffic, air quality, and noise. Of particular concern, were impacts generated due to the after-hours use of the multi-purpose room facility by civic and community groups.
  - **New School Construction Program EIR.** Serves as a Study Area Manager (Valley Districts), and Issue Area Coordinator (IAC) (i.e., technical lead and reviewer) for social science issues, including land use,

socioeconomics, public services, population and housing, and utilities and service systems. As the IAC, she has formulated the scope of work and methodology for analysis of issues and mitigation options. In addition to her managerial duties, Ms. Vahidi is preparing the Land Use section of the EIR, and directing the preparation of the Project's Scoping Report.

- **Belmont Senior High School 20-Classroom Modular Building Addition Project.** Under Aspen's ongoing master services agreement with the LAUSD, served as the project manager for CEQA documentation and permitting efforts related to the addition of modular classrooms to the existing Belmont Senior High School campus. Issues of concern included, potential impacts to sensitive receptors adjacent to the school from construction-related air quality, noise, and traffic, and operation-related noise generated by the new classrooms. As the LAUSD's CEQA consultant, Ms. Vahidi directed the preparation of technical documentation in support of a Class 32 In-Fill CEQA Categorical Exemption. This technical documentation included analyses of potential project-related air quality, noise, and traffic impacts, which were then submitted to LAUSD as one packet. Subsequent to preparation of this packet, LAUSD filed a CEQA Notice of Exemption for the classroom addition project.
- **Narbonne High School Stadium Lighting Project MND Addendum.** Served as the project manager for this project proposed to add a new stadium, lighting, and associated sport facilities needed to address existing needs at Narbonne High School. Issues of concern include lighting impacts to the surrounding neighborhood, and available parking stock.

- **SCE Calnev Power Line and Substation Project IS/MND.** Aspen was contracted to thoroughly review and analyze Southern California Edison Company's Application for a Permit to Construct and Proponent's Environmental Assessment (PEA) for the Calnev Power Line and Substation Project in the City of Colton. Ms. Vahidi served as the Deputy Project Manager for preparation of the IS/MND. Tasks include: a site visit, and evaluation of the project's compliance with the Commission's General Order 131D, Rule 17.1, and associated information submittal requirements; and preparation of a letter report identifying data deficiencies of the Application and PEA. Upon formal CPUC acceptance of the Application and PEA, Aspen prepared a CEQA Initial Study Checklist by identifying baseline data, project characteristics, and determining impact significance for each issue area. Each issue area's impact determination was supported by a paragraph or more of analysis describing the rationale for the impact identified, or for the lack of a significant impact. Upon completion of the Initial Study, the Mandatory Findings of Significance were prepared and Aspen determine that a Mitigated Negative Declaration should be prepared per CEQA Guidelines.

- **SCE Six Flags Substation and Power Line Project IS/MND.** Ms. Vahidi served as Deputy Project Manager for preparation of the IS/MND. Reviewed and provided comments on the permit application by SCE to construct a substation and power line to provide electrical service to Six Flags Amusement Park in Valencia, CA. Subsequent to the application completeness review, she prepared the project's Initial Study Checklist and Mitigated Negative Declaration for the California Public Utilities Commission (CPUC). Identified possible deficiencies and provided recommendations.

- **Industrywide Survey for the South Coast Air Quality Management District.** Ms. Vahidi coordinated Aspen's work for an Air Toxics Survey of harmful emissions by auto body and paint shops, performed in compliance with AB2588. She was responsible for development of an industrywide emission inventory for these facilities; she also performed information management, facility verifications, survey mail-outs, emissions calculations, analysis of calculated results, and preparation of the final report.

- **Technical Support to NEPA Lawsuit, Angeles National Forest, CA.** Ms. Vahidi prepared a detailed project chronology and a list of all applicable federal, State, and local laws and regulations in support of the USDA Office of General Counsel and National Forest's response to the City of Los Angeles' 1996 lawsuit on the adequacy of the Pacific Pipeline EIS.

- **Yellowstone Pipeline EIS, Lolo National Forest, Montana.** Environmental Justice and Public Services Issue Area Specialist. Responsible for conducting the analysis of project impacts on minority and low-income populations to comply with Presidential Executive Order 12898 on Environmental Justice using Census data to determine population density, minority population percentages and unemployment rates to determine the potential for disproportionate project impacts on affected communities. Also responsible for conducting analysis of project impacts such as population inmigration and pipeline accidents on public services in western Montana. During the EIS scoping process, she served as the project public participation coordinator and was responsible for preparation of the project newsletter, setup of the first round of scoping meetings, and determination of project information centers.

- **Santa Fe Pacific Pipeline Project EIR.** Ms. Vahidi was responsible for development and screening of alternatives for a 13-mile petroleum products pipeline from Carson to Norwalk, CA. Prepared analyses of project impacts on socioeconomics, public services, utilities, and aesthetics.

- **Pacific Pipeline Project Mitigation Monitoring, Compliance, and Reporting Program (MMCRP).** Ms. Vahidi served as the expert technical reviewer for the socioeconomics and environmental justice issues. As the MMCRP Agency Liaison, was responsible for developing protocol for efficient interagency communication procedures in coordination of mitigation activities with the CPUC, USFS, Responsible Agencies, and the project proponent. Also responsible for the development and management of the MMCRP Community Outreach and Public Access Program.

- **Pacific Pipeline Project EIR.** For the California Public Utilities Commission's (CPUC) EIR on the originally proposed route of this proposed pipeline (from Santa Barbara County to Los Angeles), Ms. Vahidi developed and coordinated a public participation program to comply with CEQA's mandate for information disclosure and public involvement in decision-making. The Final EIR was certified in September 1993.

- **Pacific Pipeline Project EIS and Subsequent EIR.** Ms. Vahidi prepared the socioeconomics and public services analysis, the Environmental Justice analysis in compliance with Presidential Executive Order 12898, as well as portions of the Land Use and Public Recreation analyses, including a comprehensive comparative analysis of project alternatives on this EIS/Subsequent EIR for the US Forest Service (Angeles National Forest) and the CPUC. Ms. Vahidi managed the subsequent GIS mapping of socioeconomic data relative to pipeline corridor alternatives and other industrial facilities. She also prepared the cumulative projects list (covering a five county area for the Proposed Project and its alternatives) used for the cumulative scenario analyses of the various issue areas in the EIS/SEIR. As the Public Participation Program Coordinator for the project, she developed, implemented, and managed the public involvement efforts for the NEPA and CEQA environmental review processes. This included: setup and logistics for 20 separate scoping meetings, informational workshops, and public hearings along the project route; preparation of all meeting handouts; preparation of project newsletters and public notices; placement of project documents on Internet; and maintenance of the a project telephone information hotline. She also reviewed over 2,000 public comments (written and verbal) received on the Draft EIS/SEIR, for subsequent distribution to the project team.

- **Alturas Transmission Line Project EIR/S.** Ms. Vahidi conducted the analysis of potential impacts on minority populations and low-income populations in compliance with Presidential Executive Order 12898 on Environmental Justice using Census data to determine population density, minority population percentages and unemployment rates, and the potential impacts of the transmission line on affected communities. She also prepared the cumulative projects list and map used for analyses of cumulative impacts. She managed development of meeting handouts; scheduling and logistics for four scoping meetings; developed and maintained project mailing list; reviewed public scoping comments and prepared the Scoping Report; coordinated four sets of informational workshops and public hearings for the Draft EIR/S; supervised the distribution of comments on the Draft EIR/S to the project team; and coordinated the distribution of the Draft and Final EIR/S to affected public agencies, organizations, and citizens.

EIP Associates **1998 to 2001**

- **Program EIR for the Divestiture of PG&E's Hydroelectric Generation Assets.** For the CPUC's EIR evaluating the Pacific Gas & Electric Company's (PG&E) proposal to divest their hydroelectric facilities in California, served as the land use technical analyst for two watershed areas, and the Task Manager for the Socioeconomics and Transportation sections of the EIR covering five watershed areas. PG&E owns and operates the largest private hydroelectric power system in the nation. Situated in the Sierra Nevada, Southern Cascade, and Coastal mountain ranges of California, this system is strung along 16 different river basins and annually generates approximately five percent of the power consumed each year in California. The proposed sale of assets also includes approximately 140,000 acres of land proposed for sale with the hydroelectric system. The EIR analyzes the range of operational changes that could occur under new ownership, including complex integrated models that analyze power generation and water management. The land use section of the EIR examines the implications of the change in ownership of lands and the potential for impacts due to development or potential changes in use. Contributed significantly to the extensive GIS analysis, which was conducted to determine the development suitability and potential intensity of development that might occur on the lands if sold. These results served as one of the primary bases for analysis of impacts associated with the sale of the hydroelectric assets.

- **Section 108 Loan Guarantee EA/FONSI for the Waterfront Development Project.** Served as the Manager and Principal Preparer for this EA/FONSI for the City of Huntington Beach Economic Development Department. Prepared NEPA documentation evaluating the impacts resulting from the use of HUD Section 108 Loan guarantee funds for the Waterfront Resort Expansion Project in accordance with The HUD NEPA Guidelines and Format 1 (Environmental Assessments at the Community Level). Tasks included: (1) Evaluation of activities that would be categorically excluded from NEPA based on an assessment of the NEPA Implementing Guidelines for HUD Projects; (2) Evaluation of proposed actions compliance with all applicable federal statutes, regulations, and policies; and (3) Preparation of an Environmental Assessment/Mitigated Finding of No Significant Impact (EA/FONSI) for proposed actions that are not categorically excluded. Proposed actions to be evaluated consisted mainly of infrastructure improvement projects, rehabilitation and/or development of affordable housing, provision of relocation assistance, facilitation of development and/or redevelopment plans, property acquisition, provision of open space, etc.

- **MTA Mid Cities/Westside Transit Corridor Study EIS/EIR.** Served as the EIS/EIR Deputy Project Manager (DPM) for this 3-phase (including prepared the Major Investment Study (MIS), the Environmental Impact Statement (EIS), and an evaluation of the urban design implications of transit interventions on selected routes) study intended to address current and long range traffic congestion in the central and westside areas of the Los Angeles, Basin. Three east/west corridors and a range of transit alternatives ranging including Rapid Bus, light rail, and heavy rail are being evaluated. In addition to her duties as DPM for this comprehensive joint EIS/EIR, Ms. Vahidi prepared the Environmental Justice Analysis (per Executive Order 12898), the Section 4(f) Parklands discussion, and the land use and socioeconomics sections of the EIS/EIR.

- **Wes Thompson Ranch Development Project EIR.** Served as the EIR Project Manager for this hillside residential development in the City of Santa Clarita. Issues of concern included seismic and air quality impacts associated with the excavation of 2 million cubic yards of soil, the project's non-compliance with the City's hillside ordinance for innovative design, and traffic generated by project-related population growth in the area. Four different site configuration alternatives were developed as part of the EIR analysis. Other issues of concern included sensitive biological resources, the potential for hydrological impacts due to disturbance of the hillside, and cultural resources.

- **City of Santa Monica Environmental Assessments.** As one of the City's qualified CEQA consultants managed several environmental assessment documents for housing, commercial, institutional, and mixed-use developments in compliance with CEQA, including:
  - **Berkeley Manor Condominium EIR and Technical Reports**. This one-issue EIR originally was a CEQA Categorical Exemption per direction of the City. During preparation of the Categorical Exemption documentation, it was determined that project-generated traffic would have potentially significant impacts. As a result, a traffic technical report was prepared as the background document for and EIR. In addition, shade and shadow impacts were evaluated in a technical report to ensure that shading impacts from the proposed structure on surrounding uses would not be significant. A simple Excel model was developed for calculation of shade and shadow angles.
  - **Seaview Court Condominiums IS/MND.** This comprehensive Initial Study/Mitigated Negative Declaration included six technical reports including traffic, cultural resources, parking survey, shade and shadow analysis, and a geotechnical assessment to evaluate the level of severity of this development in the waterfront area of Santa Monica. Major issues of concern were; parking and project-generated traffic on adjacent narrow residential streets; visual obstruction and shading impacts of the proposed structure; liquefaction and seismic impacts to adjacent properties as result of the project's excavation for a subterranean parking garage; and the potential impacts of the project to impact the integrity of a historic district and the historic Seaview Walkway to the beachfront.
  - **Four-Story Hotel IS/MND.** A comprehensive Initial Study/Mitigated Negative Declaration was prepared for this four-story hotel adjacent to St. John's Hospital in Santa Monica. Major issues of concern included project-generated traffic on surrounding multi-family residential uses and emergency access to the hospital.
  - **Santa Monica College Parking Structure B Replacement EIR.** This focused EIR addressed issues related to traffic and neighborhood land use impacts associated with the addition of a 3-story parking structure in the center of the SMC campus. Major issues of concern included the potential for project-generated traffic to cause congestion at the school's main entrance on Pico Boulevard, and the potential for overflow traffic to impact the Sunset Community of single-family homes adjacent to the school.
  - **North Main St. Mixed-Use Development Project EIR.** This EIR included evaluation of impacts resulting from the development of a mixed-use development in Santa Monica's "Commercial Corridor" on Main Street, with ground-floor residences and boutique commercial uses. Major issues of concern included traffic and parking impacts to Main Street and surrounding residential land uses, shade and shadow impacts, and neighborhood impacts.
- **Specific Plans and Redevelopment Projects.** As the senior technical lead for land use, prepared the project description, alternatives screening and development, cumulative scenario, and land use analysis for:
  - **Cabrillo Plaza Specific Plan EIR in Santa Barbara.** This project consisted of a mixed-use commercial development on Santa Barbara's waterfront on Cabrillo Boulevard. On-site uses included an aquarium, specialty retail, restaurants, and office space.
  - **Culver City Redevelopment Plan and Merger EIR.** This programmatic EIR evaluated the impacts of the City's redevelopment of its redevelopment zones. A major land use survey and calculation of acreage of redevelopment lands was conducted as part of the EIR.
  - **Dana Point Headlands Specific Plan EIR.** This EIR evaluated the development of coastal bluff in the City with hotel, single- and multi-family residential, and commercial uses. Major issues of concern included ground disturbance as a result of excavation, impacts to terrestrial and wildlife biology, recreation impacts to beachgoers, and project-generated population inducement.
  - **Blocks 104/105 Redevelopment Project EIR in Huntington Beach (Project Manager).** This EIR evaluated the development of a supermarket, retail shops, and office space in the City's Waterfront Redevelopment Zone. Issues of concern evaluated included traffic, land use, and impacts to on-site historic structures.

HONORS AND AWARDS

- 2006 American Planning Association, Los Angeles Section Environmental Award for the Los Angeles Unified School District New School Construction Program, Program EIR
- 2004 Association of Environmental Professionals Statewide Best EIR Award for the Jefferson-Martin 230 kV Transmission Project EIR.
- 2001 Outstanding Performance Award from the State of California Energy Commission.
- 1992-93 recipient of the USC Merit ("Ides of March") Scholarship from the Southern California Association of Public Administrators (SCAPA).
- University of California, Irvine, School of Social Sciences. Graduated with Highest Honors in Political Science.

PROFESSIONAL ASSOCIATIONS

- American Planning Association (APA), Los Angeles Section Executive Board Member
- Association of Environmental Professionals (AEP)

DECLARATION OF
Steve Baker

I, Steve Baker, declare as follows:

1. I am presently employed by the California Energy Commission in the Engineering Office of the Energy Facilities Siting Division as a Senior Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Noise and Vibration**, and supervised preparation of the staff testimony on **Power Plant Efficiency**, **Power Plant Reliability**, **Facility Design** and **Geology and Paleontology**, for the CPV Sentinel Energy Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/19/2008 Signed: Steve Baker

At: Sacramento, California

STEVE BAKER, P.E.
Senior Mechanical Engineer

Experience Summary

Thirty-four years experience in the electric power generation field, including mechanical design, QA/QC, construction/startup and business development/licensing of nuclear, coal-fired, hydroelectric, geothermal and windpower plants; and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Long Beach--Master of Business Administration
- California State Polytechnic University, Pomona--Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California —
  No. M27737 expires 6/30/2010

Professional Experience

1990 to Present--Senior Mechanical Engineer, Facilities Siting Division - California Energy Commission

Technical lead person for the analysis of generating capacity, reliability, efficiency, noise, geology, paleontology and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases. Key contributor to Commission's investigation into market impediments to the deployment of advanced high-efficiency generating technologies.

1987 to 1990--Generation Systems/Facility Design Unit Supervisor, Siting & Environmental Division - California Energy Commission

Responsible for supervising the analysis of generating capacity, reliability, efficiency, safety, and mechanical, civil/structural, and geotechnical engineering aspects of power plant siting cases.

1981-1986--Operations Manager, Alternate Energy - Santa Fe Pacific Realty Corporation

Participated in and supervised identification, evaluation and feasibility analysis, licensing and permitting of hydroelectric, geothermal, windpower and biomass power projects.

1974-1981--Mechanical Engineer, Quality Engineer - Bechtel Power Corporation and Bechtel National, Inc.

Wrote equipment specifications, drew flow diagrams and P&ID's, performed system design and safety analysis for nuclear power plants and nuclear fuel processing plant. Wrote and implemented QA/QC procedures for nuclear power plant. Participated in construction/startup of large coal-fired power plant.

DECLARATION OF
Dr.Obed Odoemelam

I, **Obed Odoemelam** declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Division as a Staff Toxicologist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff testimony on **Public Health** for the CPV Sentinel Energy Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/23/08 Signed: OOdoemelam

At: Sacramento, California

RESUME

DR. OBED ODOEMELAM

EDUCATION:

1979-1981 University of California, Davis, California. Ph.D., Ecotoxicology

1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.

1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989
The Present: California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

DECLARATION OF E. HEDY BORN

I, Elizabeth Hedy Born, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Senior Associate.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Socioeconomics** for the CPV Sentinel Energy Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 19, 2008 Signed: EHB

At: San Francisco, California

Aspen
Environmental Group

E. HEDY BORN
Associate Environmental Scientist

ACADEMIC BACKGROUND
M.S., Earth Systems, Stanford University, 2001
B.S., Earth Systems, Stanford University, 2000

PROFESSIONAL EXPERIENCE

Ms. Born is an environmental scientist with management and technical experience preparing Environmental Impact Reports and Statements in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Her project experience includes both linear and site-specific projects such as transmission lines, pipelines, power plants, and infrastructure development and improvement projects. She prepares technical analyses, coordinates with specialty subcontractors, and she provides management support in client interaction, public involvement, and supervises overall document coordination. She has performed the alternatives analysis for several power plant siting cases and controversial transmission line projects, which ultimately incorporated alternatives developed during the screening process into the approved project design.

Aspen Environmental Group — 2002 to present

- **California Energy Commission (CEC).** Under Aspen's CEC contract, Ms. Born is an author and technical specialist in the environmental review of power plant applications. She researches and writes planning and siting reports, such as alternative analyses, in compliance with CEQA and NEPA. Each alternative site evaluation involves identifying potential locations that would meet most of the objectives stated by the applicant, but that could have less impact on the environment. Analyses have included the following proposed power plants and reports:
  - **CEC Power Plant Siting Alternatives Analyses.** Ms. Born has researched, updated, and written the alternatives analyses for the following 10 power plant siting projects: South Bay Replacement Project (SBRP); Avenal Energy Power Plant Project; San Francisco Electricity Reliability Project (SFERP); Blythe Energy Project, Phase Two; East Altamont Energy Center; El Segundo Power Redevelopment Project; El Segundo Cooling Options Report; Roseville Energy Facility Power Plant Project; SMUD Cosumnes Power Plant Project; and SMUD Cosumnes Power Plant Cooling Options Report.
  - **Colusa Generating Station (CGS) Project (2007).** Project manager, researcher, and writer of the Transmission System Engineering Assessment, which is attached as an appendix to the Staff Assessment and analyzes the indirect impacts of future reconductoring of the 8.75-mile Shasta-Flanagan-Keswick 230 kV transmission line and associated substation upgrades. The reconductoring project would be required as a result of the CGS project for the plant to operate at full capacity. The Final Staff Assessment was released on November 30, 2007.
  - **Chevron Richmond Power Plant Replacement Project (2007-2008).** Project manager, researcher, and writer of the Socioeconomic analysis for Chevron's proposed addition of 60 MW net generation to its existing Refinery electrical generation located within Chevron's Richmond Refinery in the City of Richmond in Contra Costa County. The Applicant withdrew its SPPE application in September 2008.
  - **Blythe Energy Project Transmission Line Modifications (2004-2006).** Researched and wrote the alternatives analysis and coordinated on the level and scope of the alternatives analysis between the CEC (CEQA lead agency) and the two NEPA lead agencies, the Western Area Power Administration and U.S.

Bureau of Land Management, was required for this joint Staff Assessment/Environmental Assessment. More than 23 alternatives were considered, and five transmission alternatives, plus the No Project Alternative/Action, were carried through for full evaluation. The analysis began in 2004 and the CEC approved the proposed amendment on October 11, 2006.

- **WESTCARB Carbon Sequestration Demonstration Projects (2005-present).** Ms. Born researched and wrote one CEQA Initial Study and three USDOE environmental documents for multi-site, multi-state pilot studies and preliminary investigations of methods for sequestering CO2 at terrestrial sites and in geologic formations for the Public Interest Energy Research (PIER) group at the CEC.
- **Comparative Study of Transmission Alternatives Background Report (2004).** Researched and wrote portions of the draft report, which presents background information related to transmission alternatives and the transmission planning process. The information in the report is being used to assess potential approaches to evaluation of non-transmission alternatives to transmission projects. Ms. Born also attended the public workshop where the report was disseminated. The workshop was a forum for discussion regarding transmission alternatives methodology. Following the workshop, Ms. Born prepared a summary of the workshop and comments received as an appendix to the final white paper report, which was published by the Energy Commission in July 2004
- **Hydroelectric Energy/Environment Report (2003).** Collected and logged data on over 200 hydroelectric power plants from FERC licenses. The final draft of the report was published in October 2003.
- **Coastal Study (2003).** Researched and wrote the alternative cooling technologies section for a statewide evaluation of California's 25 coastal power plants. The report was used to facilitate licensing of repower and replacement projects by providing better pre-filing guidance to developers, and minimizing data adequacy and other issues that could delay licensing. Ms. Born also gathered and copied federal permits for the Northern California coastal power plants. The report was released in April 2003.

- **Sunrise Powerlink Project EIS/EIR, California Public Utilities Commission (CPUC) and Bureau of Land Management (BLM).** Under contract to the CPUC, and under a Memorandum of Understanding with the Bureau of Land Management (BLM), Ms. Born has provided management support, attended public meetings, and has written numerous EIR/EIS sections for a highly controversial 150-mile transmission line from Imperial County to coastal San Diego County. The 500 kV line would pass through Anza-Borrego Desert State Park, and a 230 kV line would continue through rural San Diego County with both overhead and underground segments. Ms. Born researched and analyzed route segment alternatives for a comprehensive Alternatives Screening Report that screened over 100 alternatives, 27 of which were carried forward for full evaluation. Ms. Born also wrote the Socioeconomics, Services, and Utilities section and the setting and impacts for Connected Actions, Future Transmission Expansion, Cumulative Impacts, among others. She managed the writing of the Environmental Justice analysis and was responsible for compiling and writing the Comparison of Alternatives, which identified the overall Environmentally Superior Alternative out of 27 route segments, options, transmission and system alternatives and non-wire alternatives. She also wrote a portion of the Executive Summary, a critical component for the public to clearly summarize the 7,000-page Draft EIR/EIS document. The Draft EIR/EIS was published in January 2008 and Ms. Born managed the preparation for eight public informational workshops in January and February 2008 and is managing the process of responding to over 3,000 pages of comments that were received on the Draft EIR/EIS. She was also responsible for writing the analysis of new alternative reroutes that were included in the Recirculated Draft EIR/Supplemental Draft EIS that was published in July 2008 and will manage the response to comments process..
- **CPUC When-Needed Environmental Services, CPUC.** Project Manager, Public Involvement Specialist, and/or technical writer for Socioeconomics, Public Utilities and Environmental Justice for Aspen's on-call contract for provision of CEQA services to the CPUC's Energy Division.

- **Riverway Substation Project MND,** CPUC. As Deputy Project Manager, Ms. Born wrote the Project Description, website content, and assisted with all-around management support for this substation project in the City of Visalia. SCE proposed to built a 1.7-acre 66/12 kV low-profile substation and approximately 1,200 feet of underground 66 kV subtransmission lines, as well as new fiber optic cable and communication equipment to connect the substation to SCE's existing telecommunication system. The CPUC approved the project on September 6, 2007.

- **Devers-Palo Verde No. 2 Transmission Line Project EIR/EIS,** CPUC **and** BLM. Ms. Born served on the project management team and in this role she managed preparation of the 100-page Alternatives Screening Report, which evaluated and screened over 30 alternatives. She also prepared the Introduction, Alternatives, and part of the Executive Summary sections for the EIR/EIS. The EIR/EIS evaluated a proposed 280-mile 500 kV and 230 kV transmission line between the Palo Verde generating hub in Arizona and SCE's system in Riverside County. Ms. Born assisted in management of a subconsultant team that included 11 subcontractors and coordination with the BLM to ensure that the EIR/EIS met both NEPA and CEQA requirements. Ms. Born was responsible managing preparation of responses to over 400 pages of comments, including 6 Informational Workshops and 3 ALJ Public Participation Hearings, on the Draft EIR/EIS that was published in May 2006. Following publication of the Final EIR/EIS on October 24, 2006, Ms. Born assisted with decision support, including helping to prepare comments on the USFWS Compatibility Determination, editing the project description for the Administrative Law Judge's Draft Decision, and writing the CPUC CEQA Findings of Fact. The Environmentally Superior Alternative in the EIR/EIS, which incorporated three of the route segment alternatives, was approved by the CPUC on January 25, 2007.

- **Jefferson-Martin 230 kV Transmission Line Project EIR,** CPUC. Ms. Born served as the assistant to the Project Manager on this major and controversial 27-mile transmission line through scenic San Mateo County in the Highway 280 corridor, urban Colma and Daly City, and across San Bruno Mountain. This high profile project is an essential component of San Francisco's energy supply, and involved coordination with numerous local and regional jurisdictions, as well as the development of 38 alternatives including the No Project Alternative into a 200-page Alternatives Screening Report. Responsibilities included the following:
  - Prepared the cumulative impact scenario section based on a compilation of projects gathered from local planning agency representatives and coordinated nearly 200 route maps and figures for the EIR.
  - Wrote the following EIR sections: Introduction, Project Description, Alternatives, Other CEQA Considerations/Cumulative Impacts, Mitigation Monitoring and Reporting, Public Participation, Alternatives Screening Report, and Report Preparation, as well as other minor parts of sections or miscellaneous documents (e.g., website content, NOA, and newspaper ads, etc.).
  - Assisted in managing and writing responses to over 800 pages of comments received on the Draft EIR and with the preparation of the Final EIR, a three-volume, 2,700-page document.
  - Helped manage the compilation of the project's entire administrative record.
  - Provided support to the CPUC and the Administrative Law Judge on technical issues after release of the Final EIR.
  - Assisted in the writing and preparation of a full analysis on two additional alternatives as ordered by the CPUC, on a tight schedule.

  In April 2004, the Association of Environmental Professionals presented to Aspen the Outstanding Environmental Analysis Document Award for the Jefferson-Martin EIR, based on the document's detailed alternatives analysis, extensive public outreach, and high quality production.

- **SONGS/Diablo Canyon Steam Generator Replacement Project EIRs, CPUC.** Provided assistance to the Project Managers and helped to organize the public participation process during the preparation of two EIRs for projects proposing to replace the steam generators at SCE's San Onofre Nuclear Generating Station (SONGS) near San Clemente, as well as at the PG&E Diablo Canyon nuclear power plant near San Luis Obispo. Arranged two public scoping meetings in October 2004 and wrote the Notice of Preparation for SONGS, organized the publication of newspaper notices for both projects, and wrote content for the projects' websites. She assisted in editing and production of the Draft EIR and responded to comments for the Final EIR. Wrote the Alternatives section for SONGS.
- **South San Joaquin Irrigation District's (SSJID) Acquisition of the Pacific Gas and Electric Company System, San Joaquin County.** On behalf of San Joaquin County, Aspen prepared an application and an EIR on SSJID's proposal to acquire specific electric distribution assets currently owned and operated by PG&E within southeastern San Joaquin County. The acquisition would result in the construction of some new facilities, including a new substation, and some changes in operation of existing facilities. Responsible for writing the Socioeconomics, Visual, Cultural Resources, Land Use, Public Services/Utilities, Agricultural Resources, and Recreation sections for the application and prepared the same sections for the EIR. The EIR was certified in June 2006.
- **Kirby Hills Natural Gas Storage Facility IS/MND, CPUC**. As Deputy Project Manager, Ms. Born was responsible for the research and writing of the Aesthetics, Agricultural Resources, Population and Housing, Public Services, and Utilities and Service Systems sections of the IS/MND for the proposed use of a depleted gas reservoir in Solano County, for the temporary storage of natural gas by Lodi Gas. The project consists of the drilling of 10 injection/withdrawal wells, and the construction of 7 miles of pipeline and ancillary facilities. A CPCN was granted in March 2006.

PREVIOUS EXPERIENCE

Ms. Born was a Facilities Coordinator at *Publicis and Hal Riney* from November 2001 to May 2002. She managed the daily office operations of a 14-department, 300-person advertising company and organized the scheduling, setup, and operation of client meetings and company events. She also has worked as a laboratory and fieldwork researcher at Stanford University (Palo Alto, California) and James Cook University (Townsville, Australia) from 1999 to 2001. Her work focused primarily on biological, ecological, and marine geochemical analyses.

TRAINING AND PROFESSIONAL ORGANIZATIONS

- 2006 Environmental Award for Los Angeles Unified School District's New School Construction Program EIR (certified in June 2004), American Planning Association (APA), Los Angeles Section
- 2004 AEP Outstanding Environmental Analysis Document, Jefferson-Martin Final EIR
- *UC Davis Extension Courses Attended*: Planning in California: An Overview and Update; GIS for Resource Managers and Professionals; National Environmental Policy Act Overview and Refresher, Making Effective Use of Mitigated Negative Declarations, and California Environmental Quality Act Two-Day Workshop.
- Member of Society of Ecological Restoration, 2002-2003

DECLARATION OF
Christopher B. Dennis, P.G.

I, **Christopher B. Dennis** declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Siting, Transmission and Environmental Protection Division as an Engineering Geologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Waste Management, for the CPV Sentinel Energy Project based on my independent analysis of the Application for Certification and supplement hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9-19-2008 Signed: C.B. D

At: Sacramento, California

CHRISTOPHER B. DENNIS, P.G., J.D.

EXPERIENCE SUMMARY

Mr. Dennis is a licensed Professional Geologist within the State of California. His professional experience includes over 15 years of innovative technical and management experience in California. He has worked with a wide variety of soil, water, and waste management focused environmental issues and processes – compliance, investigation, remediation, and CEQA. He has worked with siting and compliance of power plants. He has been a portfolio manager for several major oil companies and the East Bay Municipal Utility District's (EBMUD) trench spoils program. He actively managed Unocal CERT, ExxonMobil, and ChevronTexaco pipeline, service station, bulk fueling, and terminal sites. He developed and received California. He is knowledgeable of California regulatory personnel, structure, and laws, and proficient in CEQA analysis and mitigation, risk assessment, site assessment, and remediation, environmental due diligence, and database/GIS development and management.

EDUCATION/REGISTRATION/CERTIFICATIONS

Pepperdine Law School, Certificate in Dispute Resolution, 1997
Whittier College of Law, J.D., 1996
California State University, Fullerton, B.S. Geology, 1989
Licensed Professional Geologist, State of California #7184
OSHA-SARA 40-Hour Hazardous Waste Activity Training 29 CFR 1910.120

PROFESSIONAL HISTORY

2007 to Current California Energy Commission, Engineering Geologist
2004 to 2007 Science Applications International Corporation, Senior Geologist
2004 to 2004 Bay Consulting Services, LLC, Principal
2001 to 2004 Cambria Environmental Technology, Inc., Senior Geologist
2000 to 2001 Alisto Engineering, Inc, Senior Geologist
1998 to 2000 TRC, Inc., Senior Geologist
1993 to 1995 GeoResearch, Inc., Project Manager
1990 to 1993 AeroVironment, Inc., Staff Geologist
1989 to 1990 Applied Geosciences, Inc., Technician

2007 to Current California Energy Commission, Sacramento, CA

Part of the Siting, Transmission, and Environmental Protection Division, focusing on siting and compliance for simple-cycle and combined cycle, solar, and hybrid power plants for the technical areas of water resources, water quality, soil resources, and waste management. Broad knowledge of regional and basin groundwater management issues, CEQA impact analysis and mitigation, effects of overdraft, issues of water quality, water conservation, water transfers, wind and water soil erosion, and large-scale grading and floods management issues. Also participating in the Quarterly Fuels and Energy Reporting (QFER) program and Environmental Policy Report. Overseeing the development of a database for the collection and management of the QFER data.

2004 to 2007 Science Applications International Corporation, Sacramento, CA

Chevron Various Sites, Northern California. Managed several former pipeline right-of-way and pump stations sites within the Central California region. Developed and implemented new written field quality assurance/quality control procedures for the entire portfolio of sites. Developed and implemented an analytical laboratory evaluation plan. Managed the groundwater monitoring and sampling program for the portfolio. Initiated low-flow sampling and the use of pre-packed filter screens in boreholes to reduce turbidity in groundwater samples and attain low risk-assessment level detection limits. Initiated a crude oil remediation study for the portfolio that is proving to be a pivotal tool for closure of the pipeline sites. Submitted the first soil vapor survey workplan to the RWQCB for the portfolio and was given approval of that workplan without comment. Worked with a GIS team to incorporate all pertinent site data into a web-based GIS and geo-reference the GIS as appropriate. This portfolio required a significant amount of for-end planning and coordination. Developed and managed all sites budgets and billing.

2004 to 2004 Bay Consulting Services, LLC, Rocklin, CA

Chevron Various Sites, Northern California, 2004 to 2005. Completed several closure requests with Tier I/II risk analysis. Started and operated this experimental company for two months.

2001 to 2004 Cambria Environmental Technology, San Ramon and Rocklin, CA

Chevron Various Sites, Northern California. Responsible for a large portfolio (40 - 60+ active sites) of ChevronTexaco service station, bulk fueling, and terminal sites in Northern California, some of which were located in the sensitive Lake Tahoe area. Started Cambria's Rocklin office and grew that office to a staff of over 12 in less than a year through initiative and hard work. Helped develop and received State Underground Storage Tank (UST) Fund pre-approved for ~100 low-risk ChevronTexaco sites as part of a management transfer initiative. Through good regulatory communication, solid analysis, and hard work, closed over 30 sites in two years (half of one portfolio). Site closures were risk-based using both natural attenuation and active remediation approaches. Worked with Caltrans on a freeway (CA I-80) expansion project that required excavation and dewatering beneath a former Chevron site. Through a series of constructive meetings, built into the Caltrans request for bid, specifications for handling petroleum impacted excavated soils and water. The expansion project has proceeded as expected and planned. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

East Bay Municipal Utility District Various Sites, Northern California. Brought to Cambria a three-year, $275K/yr maximum EBMUD contract. The contract focused on pre-trenching activity soil sampling/analysis for potential contaminant identification and on trench spoils sampling/analyses for soil disposal. Developed a small group of professionals to manage this portfolio. As part of this project, managed several EPA SW-846 statistical soil analysis projects at District landfill sites with volumes up to ~180,000 cubic yards of landfilled soil. Created and surveyed statistical grids on the landfills and characterized the soil for removal to Class III or Class II landfills. Conducted site investigations and quarterly groundwater monitoring projects. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

2000 - 2001 Alisto Engineering, Lafayette, CA

Caltrans Various Sites, Northern California. Conducted statistical analyses of the soil from the shoulders of several Caltrans highways in Southern California. Performed the statistical analyses to determine lead hazard levels for use soil management planning in proposed construction corridors. The statistical analyses were performed on sample populations ranging from approximately 80 to 300. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

Industrial Various Sites, Northern California. Conducted site investigations at several industrial sites in Northern California. Developed storm water pollution prevention plans (SWPPPs) for development projects in downtown San Jose and a Caltrans project along CA I-680. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

1998 - 2000 TRC, Concord, CA

ExxonMobil Various Sites, Northern California. Responsible for a mid-size portfolio (15 - 20+ active sites) of ExxonMobil service station and bulk fueling sites in Northern California. Through good regulatory communication, solid analysis, and hard work, closed over 30 sites. Site closures were risk-based using both natural attenuation and active remediation approaches. For one bulk plant on the sensitive Napa River, secured a public recession of a RWQCB cleanup and abatement order and site closure for Mobil after two years of negotiations, technical presentations, and meetings. Conducted high vacuum, dual-phase extraction at several ExxonMobil sites. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

Quick Stop Markets Various Sites, Northern California. Developed and managed a small portfolio of Quick Stop Market sites in Northern California. Saved the client thousands of dollars in lease fees by closing a site through solid regulatory negotiation and communication, and aggressive site assessment and remediation. The site was located a few blocks upgradient from Lake Merritt in Oakland. Conducted high vacuum, dual-phase extraction at several Quick Stop sites. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

Miscellaneous Sites, Northern California. Team member of the Level 3 Communications environmental impact report (EIR) submittals, preparing geologic hazard evaluations. Conducted site investigations at several industrial sites in Northern California. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

1993 - 1995 Project Manager, GeoResearch, Long Beach, CA

Project manager of a portfolio of active Unocal CERT sites. Frequently utilized mobile laboratories to assist in the placement of soil borings, vapor extraction, and groundwater wells. Conducted risk assessments, site assessments, tanks pulls, station demolitions, aquifer and vapor extraction tests, and remediation system designs and installations.

1990 - 1993 Staff Geologist, AeroVironment, Monrovia, CA

Project manager and project geologist for industrial sites and government projects. Team leader for documenting homestead well locations and archaeological and biological concerns at over 400 sites at Edwards AFB using GPS technology. Conducted groundwater sampling according to AFCEE protocols, and soil-vapor and geophysical surveys at Vandenberg AFB. Member of the design team of a mobile soil-vapor laboratory. Lead designer of an insitu soil-vapor sample collection system. Managed two teams for monitoring landfill vapor emissions and subsurface migration at active county operated landfills, and wrote the standard operating procedures, conducted field training, and prepared quarterly AQMD reports.

DECLARATION OF
John L. Fio

I, John L. Fio, declare as follows:

1. I am presently a consultant to the California Energy Commission for the Siting Office of the Energy Facilities Siting Division as a Hydrogeologic Consultant through Aspen Environmental Group.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Soil and Water Resources** for the CPV Sentinel Energy Project based on my independent analysis of the Application for Certification and the supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 29, 2008 Signed: ______________

At: Dixon, California

JOHN L. FIO

QUALIFICATIONS

John L. Fio has over 25 years of problem-solving experience. Mr. Fio analyzes groundwater systems, quantifies chemical transport in the subsurface, and evaluates groundwater surface-water interactions. He is a recognized expert on hydrologic and water quality issues in the San Francisco Bay Area and the San Joaquin Valley, California.

John Fio:

- Develops and employs numerical models for site, water district, and basin-wide investigations.
- Calculates extraction effects on groundwater levels, stream flow, and lake levels.
- Establishes water quality monitoring programs.
- Designs water management plans.
- Evaluates groundwater quality effects of wastewater and recycled water disposal to land.
- Develops and implements Geographic Information System (GIS) databases.
- Determines water sources using chemical and age-dating techniques.

PROFESSIONAL EXPERIENCE

January, 1998 – present

Principal Hydrologist, HydroFocus, Inc. *Davis, CA*

- Technical Groundwater Expert, Bureau of Water and Power, City of Beijing, China. Providing review, oversight, and direction for data collection, data interpretation, and groundwater-flow and constituent transport modeling of recycled water groundwater storage project.
- Water supply master plan, California Water Service Company, South San Francisco, California. Assessed water supply and quality benefits of alternative water supply projects in the Westside Groundwater Basin.
- Data and modeling analysis of regional drainage conditions – San Joaquin Valley, California.
- Groundwater-flow, solute-transport, and water-quality impacts from wastewater disposal to land: sanitary districts and municipalities located in San Joaquin and Contra Costa Counties, California.
- Groundwater quality, sea water intrusion and groundwater flow in San Francisco and San Mateo Counties, California. Field data collection, groundwater-flow and geochemical modeling to define seawater intrusion and quantify processes affecting groundwater quality.
- Groundwater extraction to control and remediate solvent plume – San Mateo County. Use of groundwater-flow model and field data collection and analysis to quantify contaminant movement and remediation.

- Quantitative hydrogeochemical assessment of contaminant transport near Menlo Park, California. Development of groundwater-flow and solute-transport models to quantify hydrocarbon transport beneath industrial facility near San Francisco Bay.
- Groundwater recharge and subsurface storage, Merced County, California. Developed and implemented regional groundwater-flow model to assess groundwater recharge and pumping projects.
- Depletion of subsurface flow to the North Platte River, Wyoming and Nebraska. Data analysis and modeling of stream aquifer interactions in support of interstate water rights conflict.
- Hydrologic and geochemical impacts of groundwater pumping and surface water injection-- Sacramento County.

1995 to 1997

Senior Project Hydrologist, Hydrologic Consultants, Inc. *Sacramento, CA*

Project experience in the evaluation of groundwater flow, water quality, and solute transport. Consulting assignments included the following:

- Developed relationships to describe geologic controls and load-flow relationships for Santa Ynez River drainage system. The Santa Ynez River is a significant source of water recharging the Lompoc Groundwater Basin, and the relationships were part of a network of interacting reservoir operations, surface-water, and groundwater-flow and transport models.
- Evaluation of groundwater-flow paths beneath South San Francisco Bay. The groundwater-flow system was quantified using a groundwater-flow model to assess system response to pumping centers located east and west of the Bay.
- Coordination with the California Regional Water Quality Control Board on the remediation of a VOC plume in Mountain View, California.
- Assess the response of groundwater levels, streamflow, and spring discharge to groundwater pumpage in the Mammoth Basin, California.
- Quantifying stream flow depletions owing to increased consumption and groundwater pumping.

1990 to 1995

Research Grade Hydraulic Engineer, U.S. Geological Survey Sacramento, CA

- Conducted regional and geohydrologic and groundwater quality investigations in the western San Joaquin Valley, California.
- Directed the development of a regional Geographic Information System database for the South San Francisco and Peninsula Area, California.
- Supervised data collection and development of databases, data analyses, and report writing.
- Constructed groundwater flow models for parts of the western San Joaquin Valley and South San Francisco Bay areas, California.
- Interacted with private and public cooperators and funding agencies.

1987 to 1990

Civil Engineer, U.S. Geological Survey *Sacramento, CA*

- Conducted field-scale investigations of on-farm drainage systems.
- Developed groundwater-flow model of tile drainage system. Assessed flow paths and salt transport in shallow flow-system. Quantified regional groundwater-flow paths intercepted by on-farm drainage systems.
- Integrated particle-tracking models with groundwater-flow model results to assess advective transport of salts and selenium.

1985 to 1987

Hydrologist, U.S. Geological Survey *Sacramento, CA*

- Designed and conducted sorption experiments and incorporated results into a solute transport model.
- Assessed the distribution of salts and selenium in unsaturated and saturated soil profiles.
- Developed analytical method to estimate organic selenium concentrations in soil extracts.

1983 to 1984

Research Assistant, University of California *Davis, CA*

- Conducted an assessment of methods used to analyze for selenium in soil extracts, aqueous samples, and animal tissues.
- Implemented experiments to assess arsenic volatilization from soils.
- Conducted laboratory analyses to estimate the buffering capacity of soils in response to acidic deposition.

ACADEMIC BACKGROUND

Master of Science, 1987, Civil Engineering, University of California at Davis
Bachelor of Science, 1984, Soil and Water Science, University of California at Davis

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
Association of Groundwater Scientists and Engineers
California Groundwater Resources Association

AWARDS AND HONORS

U.S. Geological Survey Performance Award: 1989, 1990, 1992, 1993, and 1994
Citation for Outstanding Performance, University of California, Davis (1981)
Edward Kraft Scholarship Prize, University of California, Davis (1981)

RELEVANT PUBLICATIONS

Hydrogeology of the San Francisco Bay Area

Metzger, L.F. and ***Fio, John L.***, 1997, Ground-water development and the effects on ground-water levels and water quality in the Town of Atherton, San Mateo County, California, U.S. Geological Survey Water-Resources Investigations Report 97-4033, 31p.

Fio, John L., and Leighton, D.A., 1995, Geohydrologic framework, Historical Development of the ground-water system, and general hydrologic and water-quality conditions in 1990, south San Francisco Bay and Peninsula area, California: U.S. Geologic Survey Open-File Report 94-357, 46 p.

Leighton, D.A., ***Fio, John L.***, and Metzger, L.F., 1995, Database of well and areal data, South San Francisco Bay and Peninsula area, California: U.S. Geological Survey Water-Resources Investigation Report 94-4151, 47 p.

Geochemistry and Salt Migration

Fio, John L., Fujii, R. and Deverel, S.J., 1991, Selenium mobility and distribution in irrigated and nonirrigated alluvial soils: Soil Science Society of America Journal, v. 55, p. 1313-1320.

Deverel, S.J., and ***Fio, John L.***, 1991, Ground-water Flow and solute movement to drain laterals, western San Joaquin Valley, California. 1: Geochemical Assessment, Water Resources Research, v. 27, no. 9, 2233-2246 p.

Fio, John L., and Fujii, R., 1990, Selenium speciation methods and application to soil saturation extracts from San Joaquin Valley, California: Soil Science Society of America Journal, v. 54, p. 363-369.

Fujii, R, and ***Fio, John L.***, 1988, Partitioning and speciation of soluble and adsorbed selenium in soils: Agronomy Abstracts, Amer. Soc. Agron. Annual meetings, Anaheim, California, p. 196-97.

Numerical Modeling – Groundwater flow and contaminant transport

Fio, John L., 1997, Geohydrologic effects on drainwater quality: Journal of Irrigation and Drainage Engineering, ASCE 123(3).

Fio, John L., and Leighton, D.A., 1994, Effects of ground-water chemistry and flow on quality of drainflow in the western San Joaquin Valley, California: U.S. Geological Survey Open-File Report 94-72, 28 p.

Fio, John L., 1994 Calculation of a water budget and delineation of contributing sources to drain flows in the western San Joaquin Valley, California: U.S. Geological Survey Open-File Report 94-45, 28 p.

Barlow, Paul M., Wagner, B.J., Belitz, K., and ***Fio, John L.***, 1993, Effects of Management alternatives on the shallow, saline ground water in the western San Joaquin Valley, California, Water Fact Sheet, Open-File Report 93-665.

Fio, John L., and Deverel, S.J., 1991, Ground-water flow and solute movement to drain laterals, western San Joaquin Valley, California. 2: Quantitative hydrologic assessment. Water Resources Research, v. 27, no. 9, 2247-2257 p.

Fio, John L., and Deverel, S.J., 1990, Interaction of shallow ground water and subsurface drains: implications for selenium transport and distribution in the western San Joaquin Valley, California. Abstract for technical session on ground-water flow systems and land use: relation to quality of shallow ground water, Association of Ground Water Scientists and Engineers, Anaheim, California, in Journal of Ground Water, v. 28, no. 5, p. 788-789.

Fio, John L., and Deverel, S.J., 1989, Ground-water flow to subsurface drains in the western San Joaquin Valley, California: U.S. Geological Survey Second National Symposium on Water Quality, Orlando, Florida, November 12-17, 1989, abstracts and technical sessions, U.S. Geological Survey Open-File Report 89-409, p. 25.

Fio, John L., and Deverel, S.J., 1988, Ground-water flow to subsurface agricultural drains in the western San Joaquin Valley, California: Transactions of the American Geophysical Union, v. 69, no. 44.

Monitoring

Leighton, D.A. and ***Fio, John L.***, 1995, Evaluation of a monitoring program for assessing the effects of management practices on the quantity and quality of drainwater from the Panoche Water District, Western San Joaquin Valley, California, U.S. Geological Survey Open-File Report 95-731, 25 p.

Puckett, L.K., Alemi, M.M., Fan, A.M., ***Fio, John L.***, Hansen, D., Wallender, and W., Wernette, F., 1992, Long-term monitoring plan, San Joaquin Valley Drainage Implementation Program.

DECLARATION OF
Mark R. Hamblin

I, **Mark R. Hamblin** declare as follows:

I am presently employed by the California Energy Commission in the Environmental Protection Office of the Energy Facilities Siting Division as a Planner II.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I prepared the staff testimony for the Traffic and Transportation section for the proposed CPV Sentinel Energy Project based on my independent analysis of the Application for Certification and supplement thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Sept. 19, 2008 Signed: Mark R. Hamblin

At: Sacramento, California

MARK R. HAMBLIN

Summary

Public administrator/land use planner with 15 years experience addressing land use development matters of concern to citizens and government leaders. Expertise in interpreting public policy pertaining to land use and environmental assessment. Demonstrated ability in working with individuals, and on teams involved in the development permitting process.

Professional Experience

California Energy Commission, Sacramento, CA.
Planner II — November 2000 to present.

Prepares an independent technical analysis in the area(s) of land use, traffic & transportation, and visual resources to inform interested persons and to make recommendations to the Energy Commission regarding the consequences of a natural gas fired power generation plant proposal; reviews information provided by the applicant and other sources to assess the environmental effects of a proposal as required by the California Environmental Quality Act (CEQA), and the California Energy Commission siting regulations; evaluates project in accordance with federal, state and local laws, ordinances, regulations, standards (LORS); coordinates proposal with federal, state and local agencies; conducts field studies; oversees technical consultant(s); participates in public workshop(s) on proposal; presents sworn testimony during evidentiary hearings; implements compliance monitoring programs for projects approved by the Energy Commission to ensure that power plants are constructed and operated according to the conditions of certification of their license.

Yolo County Planning and Public Works Department, Woodland, CA.
Associate Planner — June 1992 to October 2000.

Advised and assisted individuals in the processing of land use requests (general plan amendments, conditional use permits, subdivision maps, etc.); reviewed information provided by the applicant and other sources for consistency with the state zoning and planning law, the county General Plan, the county government code, and the requirements of the CEQA; collected and analyzed information pertaining to a land use request and presented it in a staff report for consideration by the county planning commission and/or county board of supervisors; board of supervisors liaison, and planning department staff person to citizen and inter-agency committees (county airport advisory committee, county habitat conservation plan steering committee, and community general plan citizen advisory committee(s); drafted zoning ordinances and regulations; prepared environmental assessment documents in accordance with CEQA and NEPA (National Environmental Protection Act); hired and supervised consultants; executed county zoning administrator duties; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use issues and development proposals in the County.

Yolo County Community Development Agency, Woodland, CA.
Assistant Planner — January 1991 to June 1992.

Advised and assisted individuals in the processing of land use requests; reviewed information provided by the applicant and other sources for consistency with the county

General Plan, the state and county government code, and the requirements of CEQA; collected and analyzed information pertaining to a land use request and presented it in a staff report for consideration by the county planning commission; drafted zoning ordinances; prepared environmental assessment documents in accordance to the CEQA; supervised consultants; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use and development in the County.

Tulare County Planning and Development Department, Visalia, CA.
Planning Technician II March 1988 to January 1990.
Advised and assisted individuals in the processing of land use requests, specifically special-use permits, variances, parcel and subdivision maps; reviewed information provided by the applicant and other sources for consistency with the county General Plan, the state and county government code, and the requirements of CEQA; collected and evaluated information for presentation in a staff report on the proposed land use request for consideration by the county zoning administrator, site plan review committee, or planning commission; prepared environmental assessment documents in accordance with CEQA; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use and development in the County.

Education

University of California, Davis Extension. Coursework in California Land Use Planning and the California Environmental Quality Act 1988 to 1995.
Cosumnes River College. Coursework in Television and Radio Broadcasting1990 to 1991.
California State University, Bakersfield. Master of Public Administration; August 1988. Concentration in Public Policy. Coursework in Business Administration and Political Science.
California State University, Sacramento. Bachelor of Science in Public Administration; May 1984. Concentration in Human Resources Management.
Porterville College. Associate in Arts Social Science; May 1982. Coursework in Administration of Justice.

Awards

2001 Superior Accomplishment Award - Recognition of outstanding performance and contribution as a Team Member of the "21 Day, 4, 6, and 12 Month Processes Team." California Energy Commission.

2001 Superior Accomplishment Award - Recognition of outstanding performance and contribution as a Team Member of the "Expedited 4 Month AFC/SPPE Team," California Energy Commission.

DECLARATION OF
Testimony of Martha A. Goodavish

I, **Martha A. Goodavish,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as a Visual Analysis Specialist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **the Visual Resources Technical Section** for the **CPV Sentinel Energy Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 20, 2008 Signed: Martha Goodavish

At: Walnut Creek, California

Martha Ann Goodavish

Senior Visual Analyst

Ms. Goodavish is a landscape architect and planner with over 20 years of experience in environmental planning and resource management. Her areas of expertise are visual resource management, land use planning and outdoor recreation associated with licensing and compliance, natural and water resource management, and NEPA and CEQA compliance. Recent projects have been for public and private sector utilities, irrigation districts, and federal land management and water resource agencies. She has been a project manager and task leader for visual, aesthetic, recreation and land use studies on more than 50 projects involving the preparation of technical reports, licensing and compliance documents under NEPA and CEQA.

Professional Experience

- Senior Visual Analyst, William Kanemoto & Associates, 2006 – present
- Principal/Owner, Martha Goodavish Planning & Design, May 1998 – present
- Senior Environmental Planner, EA Engineering, Lafayette, CA, 1988-1998
- Environmental Analyst, LSA Associates, Point Richmond, CA., 1986-1988
- Assistant Landscape Architect, Dames & Moore Engineers, San Francisco, CA., 1984-1986
- Architectural Model Builder, Kathleen Seifert/Jack Parker, San Francisco, CA., 1983-1984
- Planning Technician, Willamette National Forest, Eugene, OR. 1981-1983

Education

M.C.R.P.; University of California, Berkeley; City and Regional Planning, Environmental Planning; 1995
B.L.A.; University of Oregon, Eugene; Landscape Architecture; 1982

Registrations/Certifications

Caltrans Women Owned Business (WBE) Certification

Select Visual Resource Management Experience

Carmen-Smith Project, Eugene Water & Electric Board, Eugene, OR.
Task leader responsible for the development and implementation of aesthetic study for the Carmen-Smith Project located on the upper McKenzie River in central Oregon: The aesthetic study involve a hybrid VMS and SMS methodology that includes development of landscape characterizations, implementation of two constituent surveys, and visual integrity ratings. Technical lead for the social science technical subgroup, work collaboratively with Forest Service, National Park Service, and State Parks to develop and implement the studies. Technical manager for data collection and field reconnaissance, survey instrument development and data collection, and report preparation for aesthetics and land use.

Haas-Kings River Project, Pacific Gas & Electric, San Francisco, CA.
Technical task leader for the preparation of a visual resource plan for a newly licensed FERC project. The plan included a visual analysis of the Haas Kings Powerhouse, located on the Kings River and adjacent to a scenic road. The visual assessment was used to develop a planting plan of native plants that would screen views of the powerhouse. Other enhancements included

painting a penstock, surge tank, and siphon, and a restorative planting plan for a disturbed spoil piles, and relocation of a fishing access trail.

Upper North Fork American River Project, Sacramento Municipal Utility District, Sacramento, CA.
Aesthetics technical lead for the hydroelectric relicensing of SMUD's UARP Project located in the Sierra Nevada Mountains east of Sacramento, CA. Tasks have included preparation of aesthetics and land use sections of the Initial Information Packet, participation in technical working group meetings with agencies and NGO's to develop study plans. Implementation of the aesthetics study plan has involved field assessment of project facility compatibility with existing conditions and visual quality objectives, and development of a survey of user expectations and satisfaction with reservoir elevations. Other tasks included preparation of technical reports for the Exhibit E document.

Iowa Hill Pumped-Storage Project, Sacramento Municipal Utility District, Sacramento, CA.
Aesthetics technical lead for the evaluation of a proposed pumped-storage project associated with the hydroelectric relicensing of SMUD's UARP Project located in the Sierra Nevada Mountains east of Sacramento, CA. Tasks included GIS analysis to determine potential seen areas, field reconnaissance to identify photo-simulation points, development of visual simulations, and presentation of findings at public meetings in the area.

Lewis River Visual Resources Studies, PacifiCorp, OR
Visual resources technical lead for the relicensing of three of PacifiCorp's hydroelectric projects on the Lewis River in south central Washington. Prepared the visual section of the initial information packet, conducted field assessments of project facilities, reservoir fluctuations, and instream flows in bypass reaches of the project.

Wasatch Range Visual Resources Studies, PacifiCorp, Portland, OR
Visual resources technical lead for the relicensing of 3 hydroelectric projects in the National Forest east of Salt Lake City, Utah. Evaluated the visual effects of project facilities and bypass reaches, and conducted an aesthetic comparative- flow analysis of six flows in the American Fork bypass reach using photography, video and transect data.

Select Recreation Resource Management Experience

Carmen-Smith Project, Eugene Water & Electric Board, Eugene, OR.
Task leader responsible for the development and implementation of recreation studies for the Carmen-Smith Project located on the McKenzie River in central Oregon: (1) a year-long recreation survey involving interview, windshield and mail-in surveys; (2) a recreation suitability study that includes an inventory of developed facilities and dispersed recreation sites associated with the project, and an analysis of regional and local demand, supply, and needs.

Rock Creek-Cresta Project, Pacific Gas and Electric Company, San Francisco, CA.
Task leader responsible for implementing three license articles associated with the issuance of a new FERC license. Tasks include agency and Native American consultation, design, development and installation of interpretative materials; including interpretative text on the history of the Feather River Canyon for an audio travel tape; four interpretive panels on the floral and fauna of the canyon, pre-historical, historical, and hydroelectric development in the Feather River Canyon, and a bronze commemorative plaque for the Maidu Indian Tribe.

Old Ridge Route Interpretive Plan, Angeles National Forest, San Bernardino, CA.
Designed an interpretive plan for an historical auto route through the San Bernardino Mountains. Conducted historical research, identified themes for interpretation, developed visual displays and text in two languages, identified site locations and developed maps, and designed artwork.

DECLARATION OF
Erin Bright

I, **Erin Bright,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Energy Facilities Siting Division as a **Mechanical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Facility Design** for the **CPV Sentinel Energy Project** based on my independent analysis of the Application, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 23, 2008 Signed: ______________________

At: Sacramento, California

Erin Bright
Mechanical Engineer

Experience Summary

One year of experience in the electric power generation field, including analysis of noise pollution, construction/licensing of electric generating power plants, and engineering and policy analysis of thermal power plant regulatory issues. One year of experience in the alternative energy field, including analysis of alternative fuel production and use.

Education

- University of California, Davis--Bachelor of Science, Mechanical Engineering and Materials Science
- University of California, Davis Extension Program--Renewable Energy Systems

Professional Experience

2007 to Present-- Mechanical Engineer, Energy Facilities Siting Division - California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

2006 to 2007--Energy Analyst, Fuels & Transportation Division - California Energy Commission

Performed analysis of use potential and environmental effects of emerging non-petroleum fuels, including compressed natural gas, biomass, hydrogen and electricity, in heavy and light duty transportation vehicles. Contributor to Energy Commission's alternative fuels plan.

DECLARATION OF
Testimony of Michael S. Lindholm, P.G.

I, **Michael S. Lindholm, P.G.**, declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as an engineering geologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **GEOLOGY AND PALEONTOLOGY** for the **CPV Sentinel Energy Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 23, 2008 Signed: ______________________

At: Black Eagle Consulting, Inc.
Reno, Nevada

PROFESSIONAL GEOLOGIST
MICHAEL
SCOTT
LINDHOLM
No. 8152
exp 8-31-10
STATE OF CALIFORNIA

9-23-08

Michael S. Lindholm, P.G.
Project Geologist

Education

- B.S. – Geology –1984 – Stephen F. Austin State University
- M.S. – Geology – 1989 – Northern Arizona University

Registrations

- P.G. – California

Experience

2003 to Present: Black Eagle Consulting, Inc.; Project Geologist. Mr. Lindholm maintains over 18 years of geotechnical, mining and construction experience, and has supervised such projects throughout the western United States and South America. As Project Geologist, Mr. Lindholm coordinates and executes field exploration programs of future land development projects, and prepares the subsequent geotechnical reports used for bidding and construction. Additional tasks have included Quaternary fault investigations, liquefaction and slope stability analyses, septic system design, and forensic evaluation and remediation of distressed structures. Prior to his current position on the geotechnical staff, Mr. Lindholm worked in the Quality Control Department, where his duties included inspection, field sampling, and testing of soils, asphalt, and concrete. Over the past 2 years, Mr. Lindholm has assisted the California Energy Commission (CEC) in reviewing geology and paleontology sections of Applications for Certification (AFC) for various power plants throughout the State of California. The power plants included:

Walnut Creek Energy Park	Vernon Power Plant
Humboldt Bay Repowering Project	Bullard Energy Center Project
Victorville 2 Hybrid Power Project	San Gabriel Generating Station
Sentinel Peaker Project	Ivanpah Solar Electric Generating Station

2000 and 2002: AMEC Infrastructure. Mr. Lindholm was project inspector and tester during the construction of large-scale transportation and infrastructure projects. Additional experience includes inspection of traffic control, testing and inspection of concrete flatwork and structures, utility installation, and rockfall containment systems.

June 1989 to October 1999. Mr. Lindholm was an exploration and mine geologist for the minerals industry, during which time he worked to discover, explore and develop precious and base metal deposits in the western U.S. and overseas. He acquired extensive experience with geologic mapping, project drilling, geologic modeling, resource estimation, and database management.

Affiliations

- Geological Society of Nevada
- Treasurer – Association of Environmental & Engineering Geologists, Great Basin Chapter

Publications

Lindholm, M.S., 1991, "Evolution of the major structure that controls massive sulfide distribution at Jerome, Arizona," *in* Preoterozoic Geology and Ore Deposits of Arizona, Arizona Geological Society Digest 19, p. 261-270.

DECLARATION OF
SHAHAB KHOSHMASHRAB

I, **SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimonies on **Power Plant Efficiency** and **Power Plant Reliability** for the **CPV Sentinel Energy Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimonies are valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimonies and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 22, 2008 Signed: S. Khoshmashrab

At: Sacramento, California

Shahab Khoshmashrab
Mechanical Engineer

Experience Summary

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-2004--Mechanical Engineer, Systems Assessment and Facilities Siting– California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

1998-2001--Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

1995-1998--Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

DECLARATION OF
AJOY GUHA

I, **Ajoy Guha,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Transmission System Engineering unit** of the Energy Facilities Siting Division as an Associate Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Transmission System Engineering**, for the **CPV Sentinel Energy Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9-24-08 Signed: [signature]

At: Sacramento, California

RESUME

AJOY GUHA

Associate Electrical Engineer
California Energy Commission
1516 Ninth Street, MS 46
Sacramento, CA 95814

EDUCATION:

MSEE, POWER SYSTEMS ENGINEERING, PURDUE UNIVERSITY, INDIANA
BSEE, ELECTRICAL ENGINEERING, CALCUTTA UNIVERSITY, INDIA

CERTIFICATIONS:

REGISTERED PROFESSIONAL ENGINEER, CALIFORNIA, INDIANA & ILLINOIS
MEMBER OF IEEE; MEMBER OF THE INSTITUTION OF ENGINEERS OF INDIA

SUMMARY OF PROFESSIONAL BACKGROUND:

Ajoy Guha, P. E. has 34 years of electric utility experience with an extensive background in evaluating and determining current and potential transmission system reliability problems and their cost effective solutions. He has a good understanding of the transmission issues and concerns. He is proficient in utilizing computer models of electrical systems in performing power flow, dynamic stability and short circuit studies, and provide system evaluations and solutions, and had performed generator interconnection studies, area transfer and interconnected transmission studies, and prepared five year transmission alternate plans and annual operating plans. He is also experienced in utilizing Integrated Resource Planning computer models for generation production costing and long term resource plans, and had worked as an Executive in electric utilities and experienced in construction, operation, maintenance and standardization of transmission and distribution lines.

WORK EXPERIENCE:

CALIFORNIA ENERGY COMMISSION, ENERGY FACLITIES SITING AND ENVIRONMENTAL DIVISION, SACRAMENTO, CA, 11/2000-Present.
Working as Associate Electrical Engineer in the Transmission System Engineering unit on licensing generation projects. Work involves evaluating generation interconnection studies and their impacts on transmission system, and providing staff assessments and testimony to the commission, and coordination with utilities and other agencies.

ALLIANT ENERGY, DELIVERY SYSTEM PLANNING, MADISON, WI, 4/2000-9/2000.
Worked as Transmission Services Engineer, performed Generator Interconnection studies and system planning studies.

IMPERIAL IRRIGATION DISTRICT, POWER DEPT., Imperial, California, 1985-1998.
Worked as Senior Planning Engineer in a supervisory position and in Transmission, Distribution and Integrated Resource planning areas. Performed interconnection studies for 500 MW geothermal plants and developed plan for a collector system, developed methodologies for transmission service charges , scheduling fees and losses. Worked as the Project Leader in the 1992 Electricity Report (ER 92) process of the California Energy Commission. Worked as the Project Leader for installation of an engineering computer system and softwares. Assumed the Project Lead in the standardization of construction and materials, and published construction standards.

CITY LIGHT & POWER, Frankfort, Indiana, 1980 – 1985.
Worked as Assistant Superintendent and managed engineering, construction and operation depts.

WESTERN ILLINOIS POWER CO-OP., Jacksonville, Illinois, 1978 – 1980.
Worked as Planning Engineer and was involved in transmission system planning.

THE CALCUTTA ELECTRIC SUPPLY CORPORATION LTD. (CESC), Calcutta, India, 1964 –1978.
Worked as District Engineer and was responsible for managing customer relations, purchasing and stores, system planning, construction, operation and maintenance departments of the most industrialized Transmission and Distribution division of the Utility. Worked as PROJECT MANAGER for construction of a 30 mile Double Circuit 132 kV gas-filled Underground Cable urban project. During 1961-63, worked as Factory Engineer for design, manufacturing and testing of transformers, motor starters and worked in a coal-fired generating plant.

DECLARATION OF
Mark Hesters

I, **Mark Hesters** declare as follows:

1. I am presently employed by the California Energy Commission in the **Strategic Transmission Planning Office** of the Energy Facilities Siting Division as a **Senior Electrical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Transmission System Engineering**, for the **CPV Sentinel Energy Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: Sept 19, 2008 Signed: ______________

At: Sacramento, California

Mark Hesters
Associate Electrical Engineer

Mark Hesters has sixteen years of experience in electric power regulation. He worked in the Engineering Office of the California Energy Commission's Energy Facilities Siting & Environmental Protection Division since 1998 providing analysis of California transmission systems and testimony on transmission systems in several Commission power plant certification processes. Prior to that Mark worked in the CEC's Electricity Analysis Office providing lead analysis on Southern California Edison resource issues and modeling support for all areas of California. He holds a B.S. degree from the University of California at Davis in Environmental Policy Analysis and Planning.

DECLARATION OF
Suzanne L. Phinney, D.Env.

I, Suzanne L. Phinney, declare as follows:

1. I am presently employed by Aspen Environmental Group, consultant to the California Energy Commission's Facilities Siting Office of the Systems Assessments and Facilities Siting Division as a Senior Associate.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Alternatives for the CPV Sentinel Energy Plant Licensing Case Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: September 19, 2008 Signed: Suzanne L Phinney

At: Sacramento, California

Aspen
Environmental Group

SUZANNE L. PHINNEY, D. ENV.
Senior Associate, Energy and Infrastructure

ACADEMIC BACKGROUND

Doctorate, Environmental Science & Engineering (D.Env.), University of California, Los Angeles, 1981

M.S., Marine Biology, Dalhousie University, Halifax, Nova Scotia, Canada, 1975

B.A., Biological Sciences, University of California, Berkeley, 1973

PROFESSIONAL EXPERIENCE

Dr. Phinney has 30 years of experience in the environmental and energy field, providing technical and policy support in energy analysis, environmental assessment, environmental remediation, air and water quality assessments, risk assessment, regulatory compliance, permitting, and project/program management. Her particular emphasis is energy and infrastructure with projects addressing climate change, alternative energy generation technologies, liquefied natural gas, petroleum infrastructure, advanced transportation vehicles and fuels, land use and energy, and power plant siting. Prior to employment at Aspen, Dr. Phinney worked for 16 years with Aerojet, where she oversaw all environmental and safety issues.

Aspen Environmental Group — 2001 to present

Dr. Phinney manages energy and infrastructure projects for Aspen and provides environmental support on major projects. She has provided energy and environmental expertise to the following clients:

California Energy Commission

- **California Energy Commission.** Dr. Phinney has supported CEC staff since 2001. She has prepared analyses for several power plants throughout the State, and has authored or contributed to over a dozen special studies. She is currently Deputy Program Manager for planning studies conducted by the Aspen team. Her major efforts for the CEC include the following.
  - Dr. Phinney was Project Manager for Aspen's technical contributions, graphics and production efforts for the 2001 **Environmental Performance Report** (EPR) which detailed the current and historical air, water and biological impacts from in-state generation facilities. She provided support to the water resources discussion in the 2003 EPR and managed the analysis of out-of-state generation facilities for the 2005 EPR.
  - Dr. Phinney has been instrumental in the preparation of numerous safety and policy reports on **liquefied natural gas (LNG).** She authored the Commission document: *International and National Efforts to Address the Safety and Security of Importing Liquefied Natural Gas: A Compendium*. This report reviewed national and international LNG regulations, standards and guidelines, reviewed risk assessment techniques, and identified, compiled and reviewed LNG safety/risk studies. Dr. Phinney helped organize LNG Access Workshops held in June 2005 and prepared a 40 page summary of presentations made at the workshops. She developed over 30 fact sheets on LNG subject areas for distribution to the public. Dr. Phinney compiled state and local comments on a proposed LNG terminal at the Port of Long Beach; these were presented in the *Safety Advisory Report on the Proposed Sound Energy Solutions Natural Gas Terminal at the Port of Long Beach, California,* which was delivered to the Federal Energy Regulatory Commission within the mandated 30-day period imposed by the 2005 federal Energy Bill. She has provided technical support to the LNG Interagency Working Group since 2002.

- Dr. Phinney contributed to **natural gas** supply and demand analyses for the Commission document, *Natural Gas Assessment Update*. She provided technical and editorial support to the 2005 and 2007 Integrated Energy Policy Report (IEPR) documents, *Preliminary (and subsequently the revised report) Reference Case in Support of the 2005 Natural Gas Market Assessment* and *2007 Natural Gas Market Assessment*. She edited the Commission document *Natural Gas Quality: Power Turbine Performance during Heat Content Surges*.
- Dr. Phinney is a key member of a team evaluating nuclear power issues in the state in response to recent legislation (AB 1632). She will be evaluating the impacts to local communities and the environmental issues and costs associated with alternatives, including renewables, to the state's two nuclear facilities.
- Dr. Phinney served as Project Manager for the 2005 IEPR document ***Petroleum Infrastructure*** *Environmental Performance Report*. In addition to managing preparation of the report and workshop presentations, she prepared responses to comments and compiled policy recommendations.
- Dr. Phinney coauthored the document *Potential Changes in* ***Hydropower Production*** *from* ***Global Climate Change*** *in California and the Western United States*. This report investigated the effects of climate change on hydropower production in the West and compared impacts and policy actions in California, the Pacific Northwest, and the Southwest.
- Dr. Phinney is currently the Project Manager for a 3-year study evaluating the effects of **advanced transportation technologies and fuels** (out to 2050) on California's natural gas and electricity systems. This report involves the development of baseline and alternative energy demand and supply scenarios, in-depth technical analysis of advanced transportation technologies and fuels, and the development of an energy-rich model.
- Dr. Phinney recently authored a CEC report on the linkages between **land use and energy**. This report highlighted how energy can be better integrated in land use planning, and was one of two chapters of the 2006 IEPR Update. She was a key participant in a follow-up report on further defining the role of land use in meeting California's energy and climate change goals; this report became one of the chapters in the 2007 IEPR.
- Dr. Phinney prepared a review and update of **alternative electric generation technologies**. This report provided in-depth analysis of how solar thermal, solar PV, geothermal, hydropower, and wind technologies could be used as alternatives to central power stations.
- Dr. Phinney has prepared staff assessment **Alternatives Analyses** for several power plants and reports on use of **alternative cooling approaches**.

- **California Public Utilities Commission.** Dr. Phinney has managed several environmental assessments for the CPUC and has been heavily involved in editorial support of many other CPUC documents prepared by Aspen.
  - Dr. Phinney served as Project Manager for preparation of an Initial Study and Mitigated Negative Declaration (IS/MND) for the expansion of the **Kirby Hills natural gas storage** field in Northern California.
  - Dr. Phinney served as Project Manager for the preparation of IS/MNDs for two telecommunications projects. The **Looking Glass Networks** project involved construction in the San Francisco Bay Area and the Los Angeles Basin to allow fiber optic connections in numerous locations. The **Williams Communications Sentry Marysville Project** provided fiber optic connection to an Air Force base in Yuba County.
  - Dr. Phinney provided editorial and QA/QC review for the Diablo Canyon Steam Generator Replacement EIR, for the Miguel Mission Transmission Line EIR and the Sunrise Powerlink EIR.

- **CalTech/University of California.** Dr. Phinney managed the **Combined Array for Research in Millimeter-wave Astronomy** joint EIS/EIR for the US Forest Service and the University of California for a radio telescope antenna array to be placed at a high altitude site in the Inyo

National Forest. The evaluation of alternatives was especially contentious, and Aspen's field analyses of several potential sites were pivotal in the ultimate selection of one of these alternative sites. The project was built and is currently operational.

- **Aerojet.** Dr. Phinney is currently providing regulatory, legislative and political support regarding renewable technologies, land development and sustainment energy.

GenCorp — 1999 to 2000

As Vice President, Environmental and Regulatory Affairs, Dr. Phinney held primary responsibility for coordinating the company's aerospace and automotive environmental activities with various federal, State, and local regulatory agencies. Her specific responsibilities included: working with external groups and entities to develop responsible environmental legislation, regulations, and standards and the implementation of sound public policy; developing stakeholder base and strategy to ensure that company objectives were achieved; facilitating company and regulatory agency discussions to achieve more comprehensive and quicker remediation of sites; and spearheading a stakeholder group to develop and fund scientific studies on selected chemicals of concern.

Aerojet General Corporation — 1984 to 1999

As Vice President, Environmental Health and Safety, Dr. Phinney ensured that programs were in place to meet all regulatory requirements and company initiatives. Her responsibilities included: providing strategic direction and management of all superfund-related investigation and remediation activities; developing environmental management plans; communicating environmental requirements, concerns, and successes to both internal and external audiences, including the board of directors, investment banking, and the analyst community; and participating as a member of the leadership council in defining company-wide business objectives and targets.

Dr. Phinney created the first corporate EHS department, defining and staffing key functional areas. She managed a $20,000,000 annual budget and oversaw a staff of up to 30 professionals. Select accomplishments include: the development of remediation technologies that resulted in the cleanup of over 50 billion gallons of contaminated groundwater; development of the world's first groundwater treatment facility for perchlorate; significant reductions in emissions and hazardous waste generation; representation on numerous legislative and regulatory task forces and leadership positions on external business and community EHS committees and councils; and extensive public outreach efforts.

Previous Experience — 1976 to 1984

As a Senior Environmental Scientist for **Jacobs Engineering Group,** Dr. Phinney conducted toxicological, ecological, and air and water quality assessments.

As Research Associate for the **Department of Environmental Science and Engineering at the University of California**, Los Angeles, analyzed legal, economic, public health, and administrative barriers to waste water reuse. She also conducted analysis of ecological and institutional factors in coastal siting of power plants.

As Instructor at **Southwest Los Angeles Junior College,** Dr. Phinney taught lecture and laboratory course in general science.

TRAINING

- Certificate, Executive Program, University of California, Davis, 1989

- Expert Witness Training, California Energy Commission, 2001

HONORS AND AWARDS

- Who's Who of American Women, 18th Edition
- YWCA Outstanding Woman of the Year (Sciences) Award, 1992
- Woman of Achievement Award, Downtown Capitol Business and Professional Women, 1993
- Individual Award for Outstanding Contribution in Air Quality, 1995
- Sacramento Safety Center Incorporated, Eagle Award for Safety, 1998
- Regional Award for Outstanding Contribution in Air Quality, 2003

ACTIVITIES AND ASSOCIATIONS

- Editorial Board, The Environmental Professional, 1987-1989
- City of Sacramento Toxic Substances Commission, 1986-1988
- Sacramento Environmental Commission, 1988-1991
- Board of Directors, League of Women Voters of Sacramento, 1989-1999; President 1996-1997; Co-President 1997-1998; 2003-2005; Energy Study Committee 2005; Moderator/Facilitator of Debates and Forums (e.g., climate change, the SACOG's MTP, and flood control)
- Toxics Consultant, League of Women Voters of Sacramento, 1988-1989
- Member, Advisory Committee on AB 3777 (Risk Management Prevention Programs)
- Board of Directors, American Lung Association of Sacramento-Emigrant Trails, 1992-2000; President 1998-1999;
- Board of Directors, Sacramento Metropolitan Chamber of Commerce, 1992-1997; Vice President, Public Policy, 1996-1997
- Board of Directors, Air and Waste Management Association, 1991-1994
- Steering Committee Chair, Cleaner Air Partnership, 1993-1996, 2000-2001; Executive Committee 1993 to present
- Co-chair, TCE Issues Group, 1994-2000
- Sacramento Water Forum, 1995-2000
- Rate Advisory Committee, Sacramento Municipal Utility District, 1999-2001

SELECTED PUBLICATIONS/PRESENTATIONS

Phinney, S.L., Panel Moderator, Climate Change Initiatives for California, Association of Environmental Professionals (AEP) Annual Conference, Shell Beach, California, 2007.

Phinney, S.L., Panel Moderator, Is there a Need for LNG in California, AEP Annual Conference, Shell beach, California, 2007.

Phinney, S.L., "LNG Safety Analysis in California – Federal, State and Local Processes" Presented at California Foundation on the Environment and the Economy, 2005.

Phinney, S.L., "Energy Basics" Presented at League of Women Voters of California Annual Convention, 2005.

Phinney, S.L., Presentation to U.S. Department of Justice, Office of the U.S. Attorney, on Women and Equality, 2004.

Phinney, S.L., "Trends in Industrial Waste Generation and Management" Presented at National Ground Water Association Conference, Las Vegas, Nevada, 1996.

Phinney, S.L., "Effective Management of an RI/FS to Reduce Financial Exposure," Manufacturers Alliance Environmental Management Council, Washington, D.C., 1995.

Phinney, S.L., "Knowing Your Compliance Challenge," 7th Annual California Statewide Community Awareness and Emergency Response (CAER) Conference, Sacramento, California, 1995.

Phinney, S.L., "Industry's Role in Broadening the Use of Alternative Fuels in America," Clean Cities Ceremony, Sacramento, California, 1994.

Phinney, S.L., "Aerospace Industry Perspective on Defense Conversion," AAAS Annual Meeting, San Francisco, California, 1994.

Phinney, S.L., "Aerojet's Waste Reduction Successes," Business for the Environment Conference, Sacramento, California, 1993.

Phinney, S.L., "Company Worker Trip Reduction Programs Under the Clean Air Act Amendments." MAPI Hazardous Materials Management Council, Washington, D.C., 1993.

Phinney, S.L., Testimony Before House Government Operations Subcommittee, 1993.

Phinney, S.L., Moderator, The Clean Air Act, A Public Forum, Sacramento, California, 1993.

Phinney, S.L., Plenary Session Chairperson and Speaker, "Business and the Environment: Must You Sacrifice One for the Other?" National Association of Environmental Professionals Conference, Seattle, Washington, 1992.

Phinney, S.L., "Facing the Challenge: The New California EPA." HazMat Northern California Conference, San Jose, California, 1992.

Phinney, S.L., "Understanding the Client Perspective." Environmental Business Conference, Pasadena, California, 1991.

Phinney, S.L., Panelist – Women of Science: Secrets of Success. Workshop, AAAS Annual Meeting, Washington, D.C., 1991.

Phinney, S.L., Keynote Address, ADPA International Symposium on Compatibility and Processing, San Diego, California, 1991.

Phinney, S.L., Keynote Address, Women in Science and Technology Conference, Jackson, Mississippi, 1991.

Phinney, S.L., Guest Speaker, Sacramento County Bar Association, Environmental Law Section, Sacramento, California, 1991.

Phinney, S.L., "Managing CERCLA Compliance from the Corporate Perspective." Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Phinney, S.L. and C.A. Fegan, "Identifying a Feasible, Effective Treatment Method for an Unusual Chemical of Concern." Proceedings, American Defense Preparedness Association 16th Environmental Symposium, New Orleans, Louisiana, 1988.

Phinney, S.L., "A Proactive Superfund Cleanup by Industry." Proceedings of the 4th Annual Hazardous Materials Management Conference/West, Long Beach, California, 1988.

Thompson, C.H., S.L. Phinney and F.R. McLaren., "Aerojet: A Regional Site Program – Problem Definition." Proceedings of the Hazardous Waste and Environmental Emergencies Conference, Cincinnati, Ohio, 1985.

Kahane S.W., S.L. Phinney and A. Wright, "The Tightening Environmental Regulatory Climate for Hazardous Waste Management – Current Mandates and Future Directions for Industrial Compliance." Proceedings of the 1984 AIChE Summer National Meeting, Philadelphia, Pennsylvania, 1984.

Bachrach, A., D.M. Morycz, S.L. Phinney and S.W. Kahane, "Regulation and Offshore Oil and Gas Facilities." In: Emerging Energy/Environmental Trends and the Engineer. Eds. R.D. Nuefeld and R.W. Goodwins, 1983.

Lindberg, R.G., S.L. Phinney, J. Daniels and J. Hastings (eds)., "Environmental Assessment of the U.S. Department of Energy's Solar Thermal Technology Program." Prepared for the U.S. Department of Energy, June 1982.

Kahane, S.W., S.L. Phinney, J.A. Hill and R.C. Sklarew, "Key Considerations in Assessing the Air Impacts of Projected Outer Continental Shelf Oil and Gas Development," presented at the 74th Annual Air Pollution Control Association Meeting, Philadelphia, Pennsylvania, 1981

Phinney, S.L., "The U.S. Environmental Protection Agency's Pesticide Registration Program: A Case Study - Chloramben." Doctoral Dissertation, Environmental Science and Engineering Program, University of California, Los Angeles, California, 1981.

Phinney, S.L., (contributing author) et al. "Institutional Barriers to Wastewater Reuse in Southern California." Environmental Science and Engineering Report Prepared for the Office of Water Research and Technology, U.S. Department of the Interior, 1979.

Phinney, S.L., "Area-Restricted Feeding in American Plaice." Masters Thesis. Dalhousie University, Halifax, Nova Scotia, Canada, 1975.

DECLARATION OF
Ron Yasny

I, Ron Yasny declare as follows:

1. I am presently employed by the California Energy Commission in the Compliance Office of the Siting, Transmission & Environmental Protection Division. as a Compliance Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on General Conditions for the CPV Sentinel Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 9/27/08 Signed: RY

At: Sacramento, California

RON YASNY

Planner I

EXPERIENCE SUMMARY

Ron Yasny has twenty five years of experience in project management. He has worked in construction, real estate, and finance since 1980 overseeing construction projects as a general contractor and residential real estate and residential financing as a licensed broker. Ron now works in the Energy Commission's Compliance Unit of the Siting, Transmission & Environmental Protection Division.

EXPERIENCE

March 2007
To Present

Compliance Project Manager – California Energy Commission
Siting, Transmission & Environmental Protection Division

Provides oversight of energy facility construction and operation activities to ensure compliance with conditions of certification. Functions as a team leader for all compliance monitoring activities, processing of post-certification amendments, complaints, and facility closures.

May 1999 -
March 2007

Licensed California Real Estate Broker
Licensed California Mortgage Broker

- Market, negotiate and oversee successful close to sale of real estate transactions.
- Originate and process a wide variety of loans including FHA, VA, B loans, and conventional loans.

September 1986 -
May 1999

Licensed California B-1 General Contractor

- Marketing residential and commercial construction projects and supervising completion of those projects.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE
CPV SENTINEL ENERGY PROJECT
BY THE *CPV SENTINEL, L.L.C*

DOCKET NO. 07-AFC-3
PROOF OF SERVICE
(Revised 10/01/2008)

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-3
1516 Ninth Street, MS-15
Sacramento, CA 95814-5512
docket@energy.state.ca.us

APPLICANT

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mturner@cpv.com

APPLICANT'S CONSULTANT

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cholmes@energy.state.ca.us

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publicadviser@energy.state.ca.us

DECLARATION OF SERVICE

I, Maria Santourdjian, declare that on October 10, 2008, I deposited copies of the attached Final Staff Assessment for CPV Sentinel Energy Upgrade Project (07-AFC-3) 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 Signature in Dockets
Maria Santourdjian