Final Staff Assessment

PASTORIA ENERGY FACILITY EXPANSION

Application For Certification (05-AFC-1)
Kern County

CALIFORNIA ENERGY COMMISSION

STAFF REPORT

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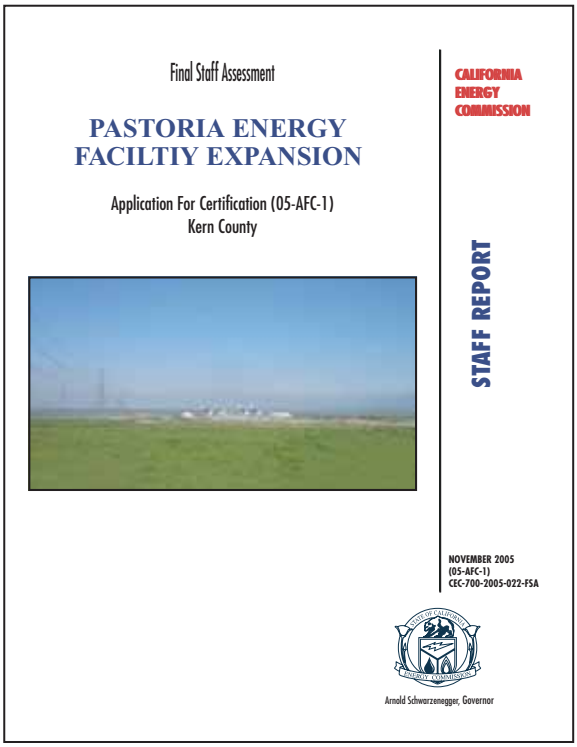

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PASTORIA ENERGY FACILITY EXPANSION PROJECT
(05-AFC-1)
FINAL STAFF ASSESSMENT

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EXECUTIVE SUMMARY

James W. Reede, Jr., Ed.D

INTRODUCTION

This Final Staff Assessment (FSA) contains the California Energy Commission staff's evaluation of Calpine Corporation's (the Applicant) Application for Certification (AFC) (05-AFC-1) for the Pastoria Energy Facility Expansion (PEFE). The proposed PEFE electric generating plant and related facilities are under the Energy Commission's jurisdiction and cannot be constructed or operated without the Energy Commission's certification. This FSA examines engineering, environmental, public health and safety aspects of PEFE, based on the information provided by the applicant and other sources available at the time the FSA was prepared. The FSA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA). When issuing a license, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the preparation of an EIR.

The Energy Commission staff has the responsibility to complete an independent assessment of the project's engineering design and its potential effects on the environment, the public's health and safety, and whether the project conforms 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 is the final iteration of staff analysis (with the exception of transmission system engineering discussed below), and will serve as staff's testimony in evidentiary hearings to be held by the Committee of two Commissioners who are hearing this case. The Committee will hold evidentiary hearings and will consider the recommendations presented by staff, the applicant, all parties, government agencies, and the public prior to proposing its decision. The Energy Commission will make the final decision, including findings, after the Committee's publication of its proposed decision.

PROJECT LOCATION AND DESCRIPTION

On April 29, 2005, the applicant filed an AFC with the Energy Commission to construct and operate the PEFE, to be located at the existing Pastoria Energy Facility (PEF) in Southern Kern County. The Energy Commission deemed the application complete at its July 13, 2005 business meeting. The analyses contained in this FSA are based upon information from: 1) the AFC; 2) subsequent supplemental information; 3) responses to data requests, workshops and site visits; 4) supplementary information from federal, state and local agencies; 5) comments on the PSA: and 6) existing documents and publications. The previously approved 750 MW Pastoria Energy Facility (PEF) was

analyzed and licensed in December 2000 as part of the Energy Commission's facility licensing proceeding, 99-AFC-7, and began operation in May 2005.

The proposed PEFE project site is about 30 miles south of Bakersfield, California, on the Tejon Ranch at the base of the Tehachapi Mountains and is 6.5 miles east of Interstate 5 at Grapevine. The site, which is approximately 2 acres in size, is located on the existing 31-acre PEF property. The Pastoria Energy Facility Expansion Project is proposed on land currently zoned Exclusive Agriculture, which allows for industrial uses and would be constructed within the fence line of the operational PEF power plant. The closest residence is approximately four miles from the site. See **PROJECT DESCRIPTION Figure 1** for the regional setting of the project. The project will be owned and operated by Calpine Corporation to provide electrical energy to the Southern California market. Construction is proposed to begin June 2006 and last 12 months. Operation of the expansion is expected in June 2007. The project costs are expected to be approximately $70 million.

The project as proposed by Calpine is a nominal 160 MW natural gas fired, simple cycle facility. The proposed PEFE incorporates one additional natural gas-fired, F-Class combustion turbine generator (CTG) operating in simple cycle mode into the original three-unit PEF, for a total of four units. The plant will use Best Available Control Technology (BACT) to minimize gas turbine emissions. The applicant plans to use dry low NOx combustors in combination with Selective Catalytic Reduction for pollution control with anhydrous ammonia as the reagent in the catalytic reduction process. The applicant has identified all required emissions reductions credits needed for operations of the proposed project. The applicant has proposed licensing this simple cycle project to operate up to 8,760 hours per year.

Electricity generated by the PEFE would be transmitted over the PEF's existing 1.38-mile long, 230kV double-circuit transmission line to Southern California Edison's substation at Pastoria. Cooling water for the new unit would be supplied by the Wheeler Ridge-Maricopa Water Storage District and Kern County Water Bank via existing water pipelines. An existing zero liquid discharge (ZLD) system will be used to treat process wastewater. The PEFE project will not require any changes to the existing facility's fuel or water supplies, but may require a yet to be determined upgrading of the transmission system and facilities. A more complete description of the project is contained in the **PROJECT DESCRIPTION** section of this FSA.

PUBLIC AND AGENCY COORDINATION

On April 29, 2005, the Energy Commission Staff provided the AFC to a comprehensive list of libraries, agencies and organizations. Extensive coordination has occurred with the numerous local, state and federal agencies that have an interest in the project. Particularly, Energy Commission staff has worked with Kern County's Fire Department and Public Works staffs, the California Independent System Operator (CAISO), San Joaquin Valley Air Pollution Control District, California Air Resources Board, Central Valley Regional Water Quality Control Board, and the U.S. Environmental Protection Agency to identify and resolve issues of concern. In addition, staff has coordinated the review and analysis of the project with U.S. Fish and Wildlife Service, California

Department of Fish and Game, U.S. Army Corp of Engineers, Native American tribes and other interested parties. Staff also contacted the two local water agencies to ensure minimization of water usage and a clearer understanding of potential impacts.

A publicly noticed workshop was conducted on the Preliminary Staff Assessment (PSA) on October 4, 2005. Information gathered during this workshop was used to prepare the Final Staff Assessment (FSA). Additionally, responses to comments on the PSA were included in the FSA.

ENVIRONMENTAL JUSTICE

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

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." In light of the progress made by federal environmental agencies on environmental justice, the Energy Commission has examined federal guidelines pursuant to its desire to follow environmental justice principles for the environmental review of this project.

The steps recommended by these guidance documents to assure compliance with the Executive Order 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. The purpose of the 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.

There are no people living within four miles of the site. The 2000 Census found that there are only 155 people within six miles of the site and there was no fifty-percent minority or low income populations identified within that area.

OUTREACH

The Commission held an Informational Hearing and Site Visit for the PEFE on September 9, 2005. In preparation for that event, the Public Adviser's Office had 10,000 flyers placed in local newspapers to notify the public of the upcoming hearing. Staff subsequently conducted a workshop to receive comment on its PSA.

STAFF'S ASSESSMENT

Each technical area section of the FSA contains a discussion of the project setting, impacts, and where appropriate, mitigation measures and 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, when appropriate; and
- proposed conditions of certification.

Staff has prepared its final analyses and has made final recommendations for all technical areas with the exception of transmission system engineering as discussed below.

SUMMARY OF PROJECT RELATED IMPACTS

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 PEFE will comply with all applicable laws, ordinances, regulations, and standards (LORS), and that significant adverse direct, indirect, and cumulative impacts will not occur. 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 identifies the items necessary for completion of the FSA and provides a discussion of associated issues.

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	Yes	Yes
Biological Resources	Yes	Yes
Cultural Resources	Yes	Yes
Efficiency	N/A	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	To be determined
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

In the area of transmission system engineering, staff is awaiting additional information that will result from completion of Southern California Edison's Facility Study that determines the necessity of additional facilities, mitigation and, related evaluation by the CAISO. The applicant submitted a worst case description of potential environmental impacts previously identified in the System Impact Study. The additional information will be analyzed and discussed in a supplement to this FSA prior to evidentiary hearings.

In the area of efficiency, staff analyzed the applicant's proposal regarding the efficiency of potentially operating the proposed simple-cycle project in a baseload manner for up to 8,760 hours per year as stated in the AFC. The applicant subsequently submitted a revised operating scenario, as PSA comments that reduced the operation to 8,000

hours per year. Staff analyzed this revision and is recommending that the project not be limited in operation. However, should the committee choose to limit operations, staff has suggested a Condition of Certification to address those concerns.

CONCLUSIONS AND RECOMMENDATIONS

The FSA is a document of the Energy Commission staff so, by its very nature, the conclusions and recommendations presented are considered staff's final analysis of the project.

Each technical area assessment in the FSA includes a discussion of the project and the existing environmental setting; the project's conformance with laws, ordinances, regulations and standards (LORS); whether the facility can be constructed and operated safely and reliably; project specific direct and cumulative impacts; the environmental consequences of the project using the proposed mitigation measures; conclusions and recommendations; and any proposed conditions of certification under which the project should be constructed and operated, should it be approved.

In summary this FSA finds that:

- The project is in conformance with all Laws, Ordinances, Regulations and Standards (LORS).
- With the proposed conditions of certification included in the various technical areas, the project's construction and operation impacts can be mitigated to a level less than significant with the exception of Transmission Systems Engineering.
- Transmission system impacts and appropriate mitigation have not been fully identified at this point. When staff has more complete information resulting from Southern California Edison's Facility Study and related evaluation by the CAISO, the additional information will be analyzed and discussed in a supplement to the FSA.
- The San Joaquin Valley Air Pollution Control District has determined that the project complies with the appropriate rules and requirements of the District and will not contribute to the degradation of the air quality. The applicant has identified all required emissions reductions credits needed for operation of the proposed project.
- Staff analyzed the applicant's revised proposal regarding the efficiency of potentially operating the proposed simple-cycle project in a baseload manner for up to 8,000 hours per year versus the 8,760 hours as stated in the AFC. While staff recommends that the project not be limited in operation, staff has suggested a Condition of Certification should the Committee choose to limit operations.

INTRODUCTION

James W. Reede, Jr., Ed.D

PURPOSE OF THIS REPORT

The Final Staff Assessment (FSA) presents the California Energy Commission (Energy Commission) staff's independent analysis of the Calpine Corporation's Application for Certification (AFC) of the Pastoria Energy Facility Expansion. The FSA is a staff document that is staff's testimony. It is neither a Committee document, nor a draft decision or proposed decision. The FSA describes the following:

- the existing environment;
- the proposed project;
- whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations and standards (LORS);
- the environmental consequences of the project including potential public health and safety impacts;
- mitigation measures proposed by the applicant, staff, interested agencies 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;
- project alternatives; and
- project closure.

The analyses contained in this FSA are based upon information from: 1) the AFC; 2) subsequent supplemental information; 3) responses to data requests; 4) supplementary information from local and state agencies and interested individuals; 5) existing documents and publications; 6) independent field studies and research; and, 7) comments on the 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 verification is not part of the proposed condition, but is the Energy Commission Compliance Unit's method of ensuring post-certification compliance with adopted requirements. The FSA presents conclusions and proposed conditions that apply to the design, construction, operation and closure of the proposed 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 Regulation section 1701 et seq., and the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 15000 et seq.).

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

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

- laws, ordinances, regulations and standards (LORS);
- the regional and site-specific setting;
- project specific direct 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 California Energy Commission has the exclusive authority to certify the construction and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, section 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, section 25519), conformance with the most recent integrated assessment of need for new resources (Pub. Resources Code, section 25523(f)), and compliance with applicable governmental laws or standards (Pub. Resources Code, section 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, sections 1742 and 1742.5(a)). Staff's independent review shall be presented in a report (Cal. Code Regs., tit. 20, section 1742.5).

In addition, staff must assess the completeness and adequacy of the health and safety standards, and the reliability of power plant operations (Cal. Code Regs., tit. 20, section 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, section 1744(b)).

Staff conducts its environmental analysis in accordance with the requirements of the California Environmental Quality Act. No Environmental Impact Report (EIR) is required because the Energy Commission's site certification program has been certified by the Resources Agency (Pub. Resources Code, section 21080.5 and Cal. Code Regs., tit. 14, section 15251 (k)).

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

Staff uses the PSA to resolve issues between the parties and to narrow the scope of adjudicated issues in the evidentiary hearings. During the period between publishing the PSA and the Final Staff Assessment (FSA), staff conducted a workshop to discuss their findings, proposed mitigation, and proposed compliance monitoring requirements. Based on the workshop and written comments, staff refined its analysis, corrected errors, and finalized conditions of certification to reflect areas where the parties have reached agreement. The refined analysis, along with responses to written comments on the PSA, is this FSA. This FSA serves as staff's testimony on a proposal.

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

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Members' Proposed Decision (PMPD). Following publication, the PMPD is circulated for a minimum of 30 days in order to receive written public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD. A revised PMPD is required to undergo a 15-day comment period. At the close of the comment period for the revised PMPD, the PMPD is submitted to the full Energy Commission for a decision. Within 30 days of the Energy Commission decision, any party may appeal the decision to the Energy Commission.

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

PROJECT DESCRIPTION

Testimony of James W. Reede, Jr., Ed.D

INTRODUCTION

On April 29, 2005, Calpine Corporation filed an Application for Certification (AFC) for the Pastoria Energy Facility Expansion (PEFE) Project, seeking approval from the Energy Commission to construct and operate an additional 160 MW unit at its existing power plant site. The 750 MW Pastoria Energy Facility, (99-AFC-7) was approved by the Energy Commission in December 2000, and began commercial operation in May 2005.

NATURE AND PURPOSE OF PROJECT

The Calpine Corporation (referred to as the "Applicant") proposes to construct and operate the Pastoria Energy Facility Expansion (PEFE). The proposed project is a nominal 160 megawatt (MW) natural gas-fired, electrical generating unit addition at its existing 750 MW combined-cycle power plant which is located on Tejon Ranch in southern Kern County. It will be a merchant-class, simple-cycle facility. The Applicant's objectives which were used to guide the selection of a project location, the equipment to be used, and the commercial arrangements for project success are:

- A project that could obtain all required permits on an expedited basis due to a lack of significant adverse environmental impacts.
- A location that offers access to the Southern California/greater Los Angeles market for the sale of much needed peaking capacity and electric energy through the California Independent System Operator (CAISO).
- A site that has access to existing fuel and water lines.
- A site that is located near an existing transmission line and substation.
- A location for engaging in a long term bi-lateral sale of electricity to a large customer (the State of California, Southern California Edison, and/or Department of Water Resources Edmonston Pumping Station).
- A project that will provide a fair return on the project investment.
- A project that will be sufficiently attractive to the investment community so that the required construction funds can be obtained at reasonable rates.

PROJECT LOCATION

The site is about 30 miles south of Bakersfield and about 6.5 miles east of Interstate 5 on the Tejon Ranch near the base of the Tehachapi Mountains, in Township 10 North, Range 18 West. It is approximately 0.85 mile north of the California Aqueduct and about 1.3 miles north of the Edmonston Pumping Plant (California Department of Water Resources). The facility address is 39789 Edmonston Pumping Plant Road, Lebec, CA. See **PROJECT DESCRIPTION Figure 1** for the regional setting of the project.

PROJECT DESCRIPTION

POWER PLANT

PROJECT DESCRIPTION Figure 1 shows the vicinity of the proposed power plant and the related existing linear facilities (transmission line and raw water supply pipelines). The major PEFE project components will be:

- approximately 2-acre development on an open graveled area of the existing 31-acre power plant site;
- approximately 12 acres of an existing 25 acre construction laydown area,
- existing infrastructure associated with the recently constructed PEF project, including:
    1. an onsite sanitary wastewater treatment facility;
    2. a 1.38-mile, 230 kV electrical transmission line connecting a new high voltage switchyard located at the PEF to Southern California Edison's Pastoria substation located south of the project;
    3. an approximately 0.2-mile water supply pipeline from the existing Wheeler Ridge-Maricopa Water Storage District pipeline to the PEF site;
    4. a 14-mile, 20-inch diameter natural gas line from the PEF site north to the interstate Mojave-Kern River pipeline;
    5. a 0.85 mile access road from the Edmonston Pumping Plant Road;
    6. storm water detention ponds at the power plant site; and
    7. flood control berms adjacent to the power plant site.

The proposed PEFE incorporates one additional natural gas-fired, F-Class combustion turbine generator (CTG) operating in simple cycle mode into the original three-unit PEF, for a total of four units. The plant will continue to use Best Available Control Technology (BACT) to minimize gas turbine emissions. The PEFE applicant plans to use dry low NOx combustors in combination with Selective Catalytic Reduction for pollution control with anhydrous ammonia as the reagent in the catalytic reduction process. The PEFE project will not require any changes to the existing facility's fuel or water supplies, but may require upgrading the transmission system and facilities. The PEFE plant is expected to have an overall availability of approximately 95 percent.

TRANSMISSION CONNECTION

The PEFE generation step-up transformer will tie-in to the PEF plant switchyard. The project will then connect to Southern California Edison's (SCE) 230 kilovolt (kV) network at the existing Pastoria substation with an existing 1.38-mile long, double circuit transmission line interconnection from the PEF plant switchyard. See **PROJECT DESCRIPTION Figure 1** for the location of the plant transmission line.

NATURAL GAS CONNECTION

The proposed PEFE project will use natural gas supplied through an existing 14-mile, 20-inch diameter interconnection pipeline at the PEF site to the existing 42-inch diameter pipeline jointly owned by the Mojave Pipeline Company and Kern River Gas Transmission Company which is pressurized at 700-900 psig. The Mojave-Kern River pipeline runs north and east of the plant site. The project will utilize up to an estimated 40 million standard cubic feet per day of pipeline quality natural gas. The gas line is shown on **PROJECT DESCRIPTION Figure 2**.

WATER SUPPLY

PEF will use two existing contracts with the Wheeler Ridge-Maricopa Water Storage District (WRMWSD or District) and the Kern Water Bank Authority for its water supply under a rate for large industrial customers. The current contracts are adequate to supply the needs of the proposed Expansion. Supplies from WRMWSD come from the California Aqueduct at a tie-in located about one mile southwest of the PEF site and delivered through an existing District pipeline network and an existing approximately 0.2 mile water supply pipeline (see **PROJECT DESCRIPTION Figure 1**). The project has the option to purchase up to 5,000 acre feet of water from WRMWSD's "pool water" which is made available when other District customers do not take their full entitlement. When this surface water is not available PEFE will use a back up water supply from the Kern Water Bank Authority (KWBA), which agrees to deliver up to an annual 5,000 acre-feet of surface water exchanged from their State Water Project allocation with groundwater from the Kern Water Bank.

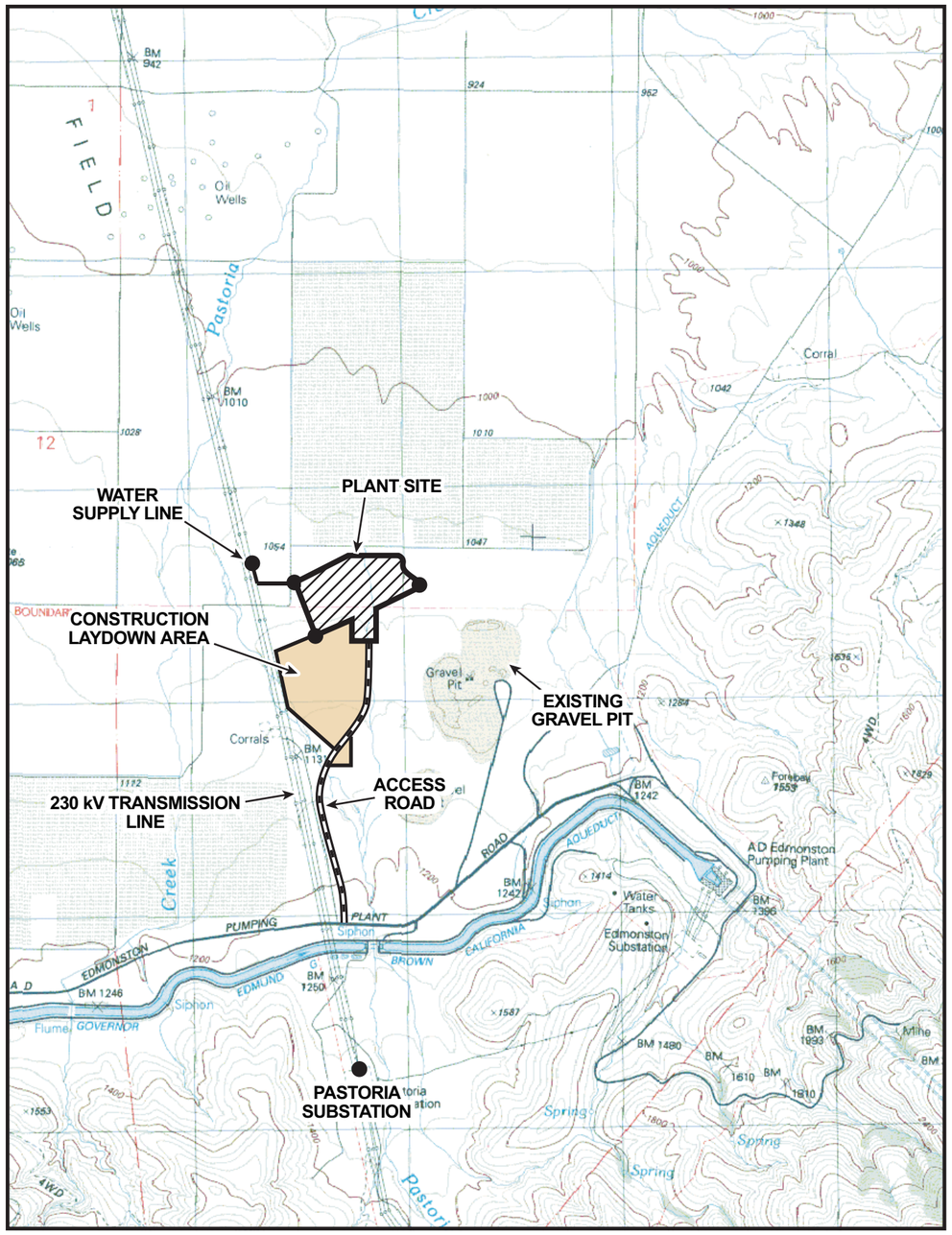
WASTEWATER TREATMENT

To dispose of process wastewater, PEFE proposes to use an existing wastewater management system which incorporates treatment for zero liquid discharge (ZLD). The existing ZLD system will process all wastewater streams from the plant except sanitation and stormwater streams. The ZLD process concentrates the dissolved and suspended constituents in the wastewater through a combination of evaporation and crystallization will result in two to eight cubic yards per day of non-hazardous salt cake. The ZLD process system consists of filtration, an evaporator-condenser, a brine crystallizer, and related equipment such as mixing tanks and pumps. Sanitary wastewater will be disposed of onsite through an existing septic system and leach field. Construction workers will be using portable chemical toilets.

CONSTRUCTION AND OPERATION

The PEFE project is estimated to have a capital cost of about $70 million. The applicant plans to complete the 12-months of construction work and start operation of the PEFE project by June 2007. See the **Socioeconomics** chapter of this staff assessment for additional details on project construction schedule and work force necessary to support this project. The overall sequence and start-up includes: site preparation, construction of foundations, erecting major structures, installing major equipment, connecting to major interfaces (pipelines and the switchyard for interconnection to the transmission line), commissioning, and final siting cleanup and landscaping.

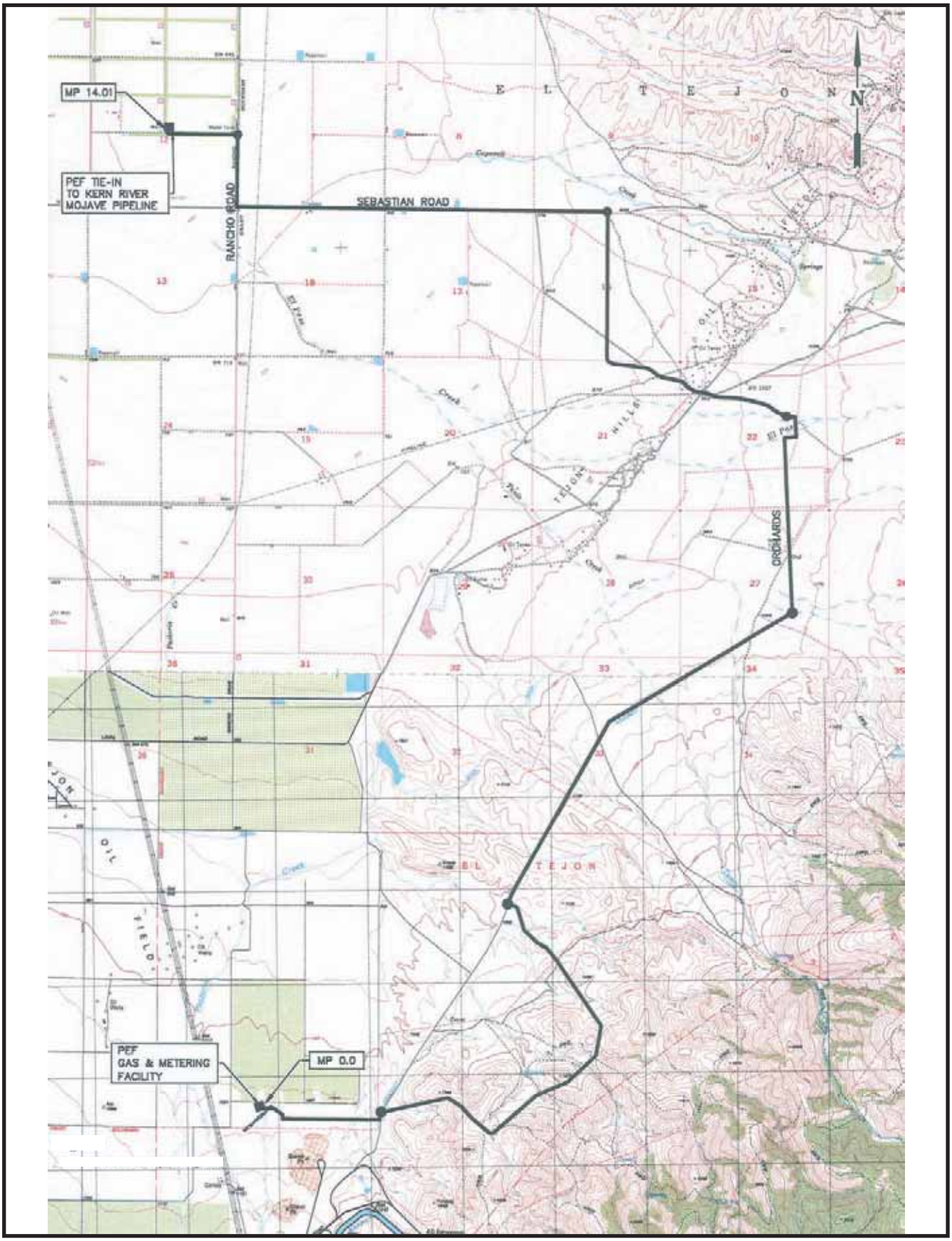
PROJECT DESCRIPTION - FIGURE 1
Pastoria Energy Facility Expansion Project - Location of Existing
PEF Water Supply Pipeline and Transmission Line



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2005
SOURCE: AFC April 2005 - FIGURE 3.1-4 A

PROJECT DESCRIPTION - FIGURE 2

Pastoria Energy Facility Expansion Project - Location of Existing PEF Fuel Gas Supply Pipeline



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2005

SOURCE: AFC April 2005 - FIGURE 3.1-4

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Testimony of William Walters and Lisa Blewitt

SUMMARY OF CONCLUSIONS

Staff concludes that, with the inclusion of the Conditions of Certification, the proposed project would be in compliance with all applicable laws, ordinances, regulations, and standards, and would not result in any significant air quality-related impacts. Staff also concludes that:

- The project ozone precursor emissions (oxides of nitrogen and volatile organic compounds) and particulate matter less than 10 and 2.5 microns in diameter precursor emissions (oxides of nitrogen, volatile organic compounds, sulfur dioxide) impacts would be mitigated to a level of less than significant by the surrender of emission reduction credits (offsets).
- The project would incorporate Best Available Control Technology in accordance with the San Joaquin Valley Air Pollution Control District New Source Review requirements.
- The project will not cause new violations of any nitrogen dioxide, sulfur dioxide, or carbon monoxide ambient air quality standards, and therefore, its emission impacts are not significant for those pollutants.
- The project's construction emissions impacts would be mitigated to a level of less than significant by the incorporation of Staff's recommended construction mitigation measures.

INTRODUCTION

This analysis evaluates the expected air quality impacts of the emissions of criteria air pollutants due to the construction and operation of the proposed Pastoria Energy Facility Expansion (PEFE) by Calpine (Calpine or applicant). The PEFE will be located at the existing Pastoria Energy Facility (PEF), which is located about 30 miles south of Bakersfield, California, on the Tejon Ranch at the base of the Tehachapi Mountains and 6.5 miles east of Interstate 5 at Grapevine, Kern County.

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

- whether the PEFE is likely to conform with applicable federal, state and San Joaquin Valley Air Pollution Control District (SJVAPCD) air quality laws, ordinances, regulations and standards, as required by Title 20, California Code of Regulations, section 1744 (b);
- whether the PEFE is likely to cause significant air quality impacts, including new violations of ambient air quality standards or contributions to existing violations of those standards, as required by Title 20, California Code of Regulations, section 1742 (b); and

- whether the mitigation proposed for the PEFE is adequate to lessen the potential impacts to a level of insignificance, as required by Title 20, California Code of Regulations, section 1744 (b).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

AIR QUALITY Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
40 CFR 52	Nonattainment New Source Review (NSR) requires permit and requires Best Available Control Technology (BACT) and Offsets. Permitting and enforcement delegated to SJVAPCD. Prevention of Significant Deterioration (PSD) requires major sources obtain permits for attainment pollutants. PEFE is a major source of NO_x and CO. United States Environmental Protection Agency (USEPA) retains jurisdiction for PSD permitting in the San Joaquin Valley.
40 CFR 60 Subpart GG	New Source Performance Standard for gas turbines: 75 ppm NO_x and 150 ppm SO_x @15%O_2. BACT will be more restrictive. Enforcement delegated to SJVAPCD
40 CFR Part 70	Title V: Federal permit. Title V permit application required within one year of start of operation. Permitting and enforcement delegated to SJVAPCD.
40 CFR Part 72	Acid Rain Program. Requires permit and obtaining of sulfur oxides credits. Permitting and enforcement delegated to SJVAPCD.
State	
HSC Section 40910-40930	Permitting of source needs to be consistent with approved Clean Air Plan.
HSC Section 39606	Provides for California Air Resources Board to set State Ambient Air Quality Standards.
HSC Section 41700	Restricts emissions that would cause nuisance or injury.
Local	
Regulation I – General Provisions	Rule 1080 defines requirements for stack monitoring. Rule 1081 defines requirements for stack testing.
	Rule 1100 defines procedures for equipment breakdowns.
Regulation II – Permits	Rule 2010 specifies permit requirements.
Rule 2201	New Source Review - Specifies requirements for permitting major and minor sources.
	Section 4.1 specifies the use of BACT for sources with criteria pollutant emissions greater than 2 lbs/day (except CO – 200,000 lbs/yr). PM2.5 is not currently a listed criteria pollutant in the District's NSR regulation. PEFE triggers BACT for all criteria pollutants.
	Section 4.5 specifies emission offset requirements where the appropriate offset triggers for the PEFE project are: 20,000 lbs/year for NO_x and VOC, 29,200 lbs/year for PM10, 54,750 lbs/year for SO_x, and 200,000 lbs/year for CO (Section 4.6 specifies exemption for CO offset requirements when CO emissions are shown to not cause or contribute to a violation of an Ambient Air Quality Standard (AAQS). The entire PEFE/PEF facility triggers offsets for NO_x, VOC, PM10 and SO_x.
	Section 4.8 specifies distance ratios for emission offsets which are 1:1 for onsite emission reductions, 1:3 to 1 for emission reductions that occurred within 15

Applicable LORS	Description
	miles from project, and 1:5 to 1 for emission reductions occurring greater than 15 miles from project.
	Section 4.13 allows the use of interpollutant offsets on a case by case basis.
Rule 2520	Federally Mandated Operating Permits – Requires major sources such as PEF/PEFE, to obtain Title V permit within one year of commencing operation.
Rule 2540	Acid Rain Program – Requires permit and specifies emission monitoring requirements. Permit will be part of Title V permit.
Regulation IV – Prohibitions	Rules within Regulation IV specify New Source Performance Standards (Rule 4001 – see Federal 40 CFR 60 Subpart GG), restrict visible emissions (Rule 4101), prohibit nuisance emissions (Rule 4102), specify particulate matter concentration and emission rate limits (Rules 4201 and 4202), specify NO_x emission limit of ppm and NO_x and CO monitoring requirements for gas turbines (Rule 4703), and limit sulfur compound emissions (Rule 4801).
Regulation VIII – Fugitive PM10 Prohibitions	Rules within Regulation VIII specify general fugitive dust control definitions, requirements, and recordkeeping (Rule 8011), and require the control of fugitive dust emissions from construction activities (Rule 8021), bulk material handling (Rule 8031), material carryout and trackout (Rule 8041), open areas (Rule 8051), paved and unpaved roads (Rule 8061), and unpaved vehicle/equipment traffic areas (Rule 8071).

SETTING

METEOROLOGICAL CONDITIONS

The climate of the San Joaquin Valley is controlled by a semi-permanent subtropical high-pressure system that is located off the Pacific Ocean. In the summer, this strong high-pressure system results in clear skies, high temperatures, and low humidity. Very little precipitation occurs during the summer months because storms are blocked by the high-pressure system. Beginning in the fall and continuing through the winter, the high pressure weakens and moves south, allowing storm systems to move through the area. Temperature, winds, and rainfall are more variable during these months, and stagnant conditions occur more frequently than during summer months. Weather patterns include periods of stormy weather with rain and gusty winds, clear weather that can occur after a storm, or persistent fog. The project site receives an average of 6.5 inches of rain annually (WC 2005).

Temperature, wind speed, and wind direction data have been collected in Bakersfield at the California Avenue monitoring station (PEFE 2005a, p. 5.2-3). The predominant annual wind direction in the project area is from the west through west-southwest. This west through west-southwest wind direction is particularly predominating during the spring and summer. The winds during the winter show two almost equal predominating directions, from the north and from the south (i.e., up and down valley directions). The wind speeds are generally higher during daylight hours, and higher during the spring, summer, and fall seasons and lower in winter.

Along with the wind flow, atmospheric stability and mixing heights are important factors in the determination of pollutant dispersion. Atmospheric stability reflects the amount of atmospheric turbulence and mixing. In general, the less stable an atmosphere, the greater the turbulence, which results in more mixing and better dispersion. The mixing

height, measured from the ground upward, is the height of the atmospheric layer in which convection and mechanical turbulence promote mixing. Good ventilation results from a high mixing height and at least moderate wind speeds with the mixing layer.

EXISTING AIR QUALITY

The project is located within the jurisdiction of the San Joaquin Valley Air Pollution Control District (District). The applicable federal and California ambient air quality standards (AAQS) are presented in **AIR QUALITY Table 2**. As indicated in this table, the averaging times for the various air quality standards (the duration over which they are measured) range from one-hour to annual average. The standards are read as a mass fraction, in parts per million (ppm), or as a concentration, in milligrams or micrograms of pollutant per cubic meter of air (mg/m^3 or µg/m^3).

AIR QUALITY Table 2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	8 Hour	0.08 ppm (157 µg/m^3)	0.07 ppm (137 µg/m^3)
	1 Hour	0.12 ppm (235 µg/m^3)	0.09 ppm (180 µg/m^3)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual Average	0.053 ppm (100 µg/m^3)	—
	1 Hour	—	0.25 ppm (470 µg/m^3)
Sulfur Dioxide (SO_2)	Annual Average	0.030 ppm (80 µg/m^3)	—
	24 Hour	0.14 ppm (365 µg/m^3)	0.04 ppm (105 µg/m^3)
	3 Hour	0.5 ppm (1300 µg/m^3)	—
	1 Hour	—	0.25 ppm (655 µg/m^3)
Respirable Particulate Matter (PM10)	Annual Arithmetic Mean	50 µg/m^3	20 µg/m^3
	24 Hour	150 µg/m^3	50 µg/m^3
Fine Particulate Matter (PM2.5)	Annual Arithmetic Mean	15 µg/m^3	12 µg/m^3
	24 Hour	65 µg/m^3	—
Sulfates (SO_4)	24 Hour	—	25 µg/m^3
Lead	30 Day Average	—	1.5 µg/m^3
	Calendar Quarter	1.5 µg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 µg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 µg/m^3)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

Source: CARB 2005a.

The U.S. Environmental Protection Agency (USEPA or U.S. EPA), California Air Resource Board (CARB), and the local air district classify an area as attainment, unclassified, or nonattainment, depending on whether or not the monitored ambient air quality data show compliance, insufficient data is available, or non-compliance with the ambient air quality standards, respectively. The PEFE is located within the San Joaquin Valley Air Basin (SJVAB) and, as stated above, is under the jurisdiction of the SJVAPCD. This area is designated as nonattainment for both the federal and state ozone and PM10 standards. **AIR QUALITY Table 3** summarizes federal and state attainment status of criteria pollutants for the SJVAB.

AIR QUALITY Table 3
Federal and State Attainment Status for the San Joaquin Valley Air Basin

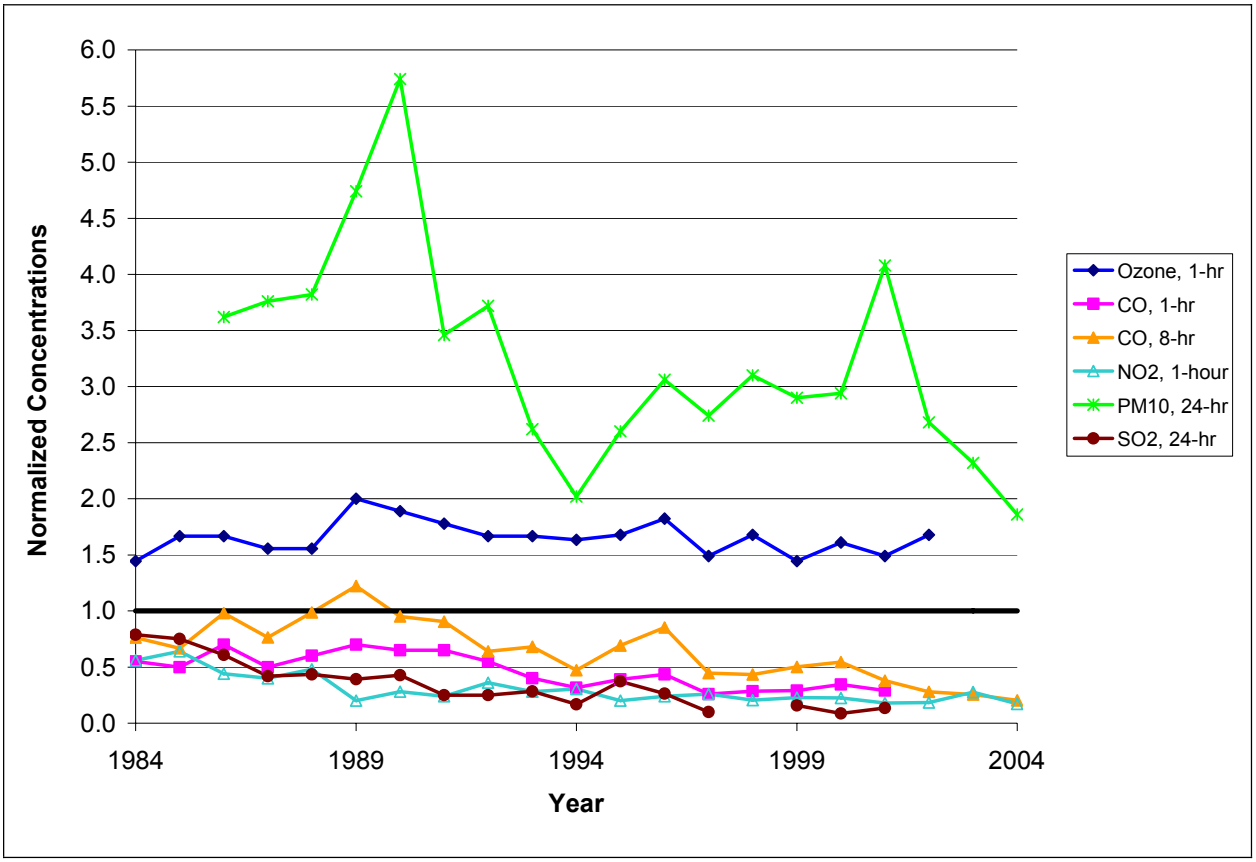
Pollutant	Attainment Status	
	Federal	State
Ozone – One hour	Extreme Nonattainment	Severe Nonattainment
Ozone – Eight hour	Serious Nonattainment	No State Standard
CO	Unclassified/Attainment [a]	Attainment
NO_2	Unclassified/Attainment [a]	Attainment
SO_2	Attainment	Attainment
PM10	Serious Nonattainment	Nonattainment
PM2.5	Nonattainment	Nonattainment

Source: (SJVAPCD 2005d) web site accessed February 2005 (www.valleyair.org/aqinfo/attainment.htm), USEPA 2005b.
a. Unclassified/Attainment – The status for the subject pollutant is classified as either attainment or unclassified.

The project site is in Kern County, about 30 miles south of Bakersfield, California, on the Tejon Ranch at the base of the Tehachapi Mountains and 6.5 miles east of Interstate 5 at Grapevine. The monitoring station closest to the proposed project site is the Arvin-Bear Mountain Boulevard Station, located approximately 15 miles north of the project site. This station monitors ambient concentrations of ozone and NO_2. The Bakersfield California Avenue station monitors ozone, CO, NO_2, SO_2 (only until 2001), PM10, and fine particulate matter (PM2.5), and is located approximately 27 miles northwest of the project site. The Bakersfield Golden State Highway station also monitors ozone, CO, NO_2, PM10, and PM2.5, and is also located approximately 27 miles northwest of the project site. The Bakersfield Chester Street monitoring station previously monitored ozone, CO, NO_2, PM10 and SO_2 until 1994 when the Bakersfield California Avenue station began monitoring these air pollutants.

AIR QUALITY Figure 1 summarizes the historical air quality data for the project location, recorded at the Bakersfield Chester Street (1984-1993 for PM10, CO, and SO_2; 1984-1988 for ozone and NO_2), Bakersfield California Avenue (1994-2004 for PM10, CO, and SO_2), and Arvin-Bear Mountain Boulevard (1989-2004 for ozone and NO_2) air monitoring stations. In **AIR QUALITY Figure 1**, the short term normalized concentrations are provided from 1984 to 2004. Normalized concentrations represent the ratio of the highest measured concentrations in a given year to the most-stringent applicable national or state ambient air quality standard. Therefore, normalized concentrations lower than one indicate that the measured concentrations were lower than the most-stringent ambient air quality standard.

AIR QUALITY Figure 1
Normalized Maximum Short-Term Historical Air Pollutant Concentrations
Bakersfield Chester St. (1984-1993), Bakersfield California Ave. (1994-2004),
and Arvin-Bear Mountain Blvd. (1989-2004 for ozone and NO_2)



Source: CARB 2002, CARB 2005b.

A Normalized Concentration is the ratio of the highest measured concentration to the applicable most stringent air quality standard. For example, in 1999 the highest one-hour average ozone concentration measured at the Arvin-Bear Mountain Boulevard station was 0.130 ppm. Since the most stringent ambient air quality standard is the state standard of 0.09 ppm, the 1999 normalized concentration is 0.130/0.09 = 1.44.

Following is a more in-depth discussion of ambient air quality conditions in the project area.

Ozone

In the presence of ultraviolet radiation, both nitrogen oxides (NO_x) and volatile organic compounds (VOC) go through a number of complex chemical reactions to form ozone. **AIR QUALITY Table 4** summarizes the best representative ambient ozone data collected from the Arvin-Bear Mountain Boulevard monitoring station. The table includes the maximum one-hour and eight-hour ozone levels and the number of days above the state or national standards. Ozone formation is higher in spring and summer and lower in the winter. The SJVAB is classified as an extreme nonattainment area for the federal 1-hour ozone standard and serious nonattainment area for the federal 8-hour ozone standard. The SJVAB is also classified as a severe nonattainment area for the state 1-hour ozone standard.

AIR QUALITY Table 4
Ozone Air Quality Summary, 1994-2004 (ppm)

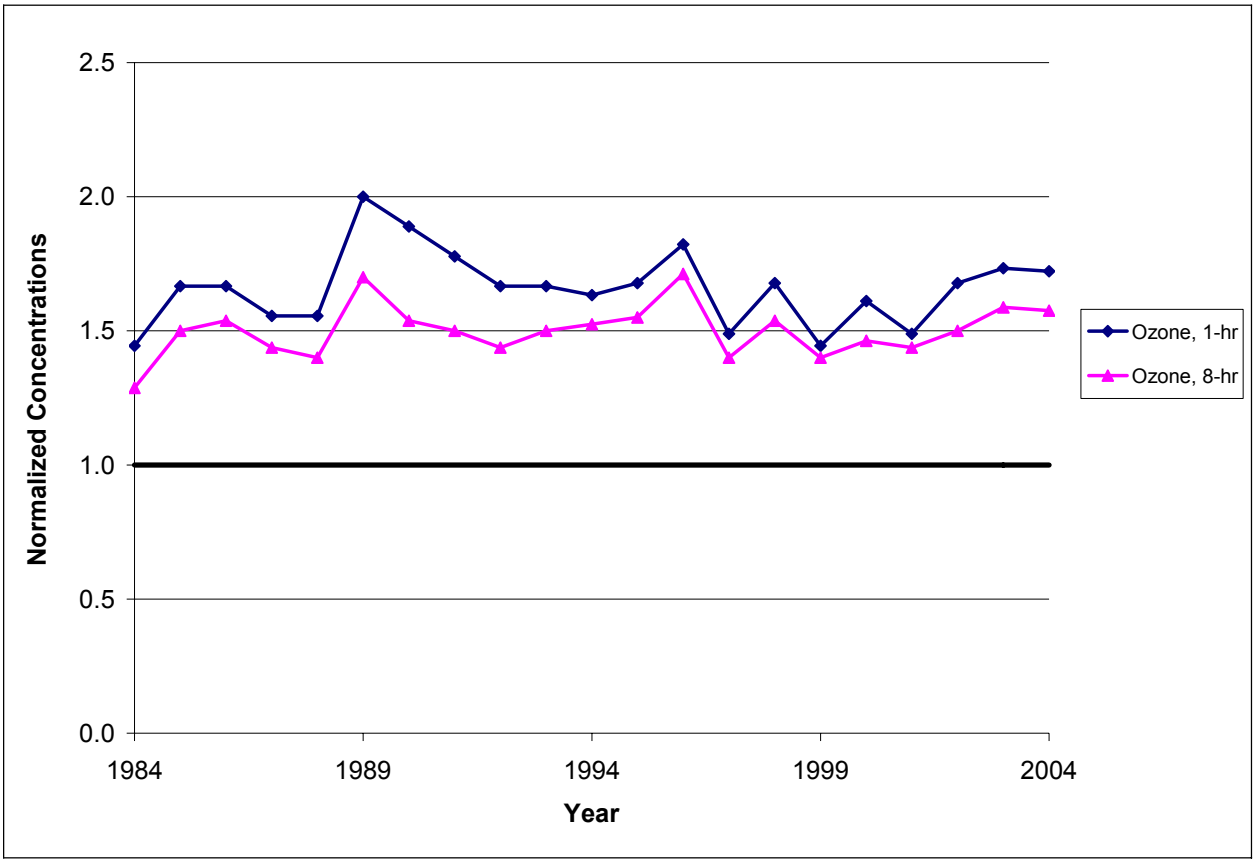
Year	Days Above CAAQS 1-Hr	Month of Max. 1-Hr Avg.	Max. 1-Hr Avg.	Days Above NAAQS 8-Hr	Month of Max. 8-Hr Avg.	Max. 8-Hr Avg.
	Arvin-Bear Mountain Boulevard					
1994	87	JUN	0.147	77	JUN	0.122
1995	87	JUL	0.151	80	JUL	0.124
1996	112	AUG	0.164	106	AUG	0.137
1997	57	SEP	0.134	46	JUL	0.112
1998	71	AUG	0.151	64	AUG	0.123
1999	94	SEP	0.130	85	SEP	0.112
2000	82	SEP	0.145	73	SEP	0.117
2001	86	MAY	0.134	81	AUG	0.115
2002	88	AUG	0.151	87	AUG	0.120
2003	121	SEP	0.156	116	MAY	0.127
2004	101	AUG	0.155	103	AUG	0.126

Source: CARB 2002, CARB 2005b.
California Ambient Air Quality Standard (CAAQS): 1-Hr, 0.09 ppm
National Ambient Air Quality Standard (NAAQS): 1-Hr, 0.12 ppm; 8-Hr, 0.08 ppm

The yearly trends from 1984 to 2004 for the maximum one-hour and eight-hour ozone concentrations, referenced to the most stringent standard, and the number of days exceeding the California one-hour standard and the federal eight-hour standard for the Bakersfield Chester Street (1984-1988) and Arvin-Bear Mountain Boulevard (1989-2004) monitoring stations are shown in **AIR QUALITY Figure 2** and **Figure 3**, respectively.

As these two figures show, the one-hour and eight-hour ozone concentrations peaked in 1989, and the number of exceedances peaked in 2003. However, there has been little or no improvement in the peak concentrations and number of exceedances since 1995.

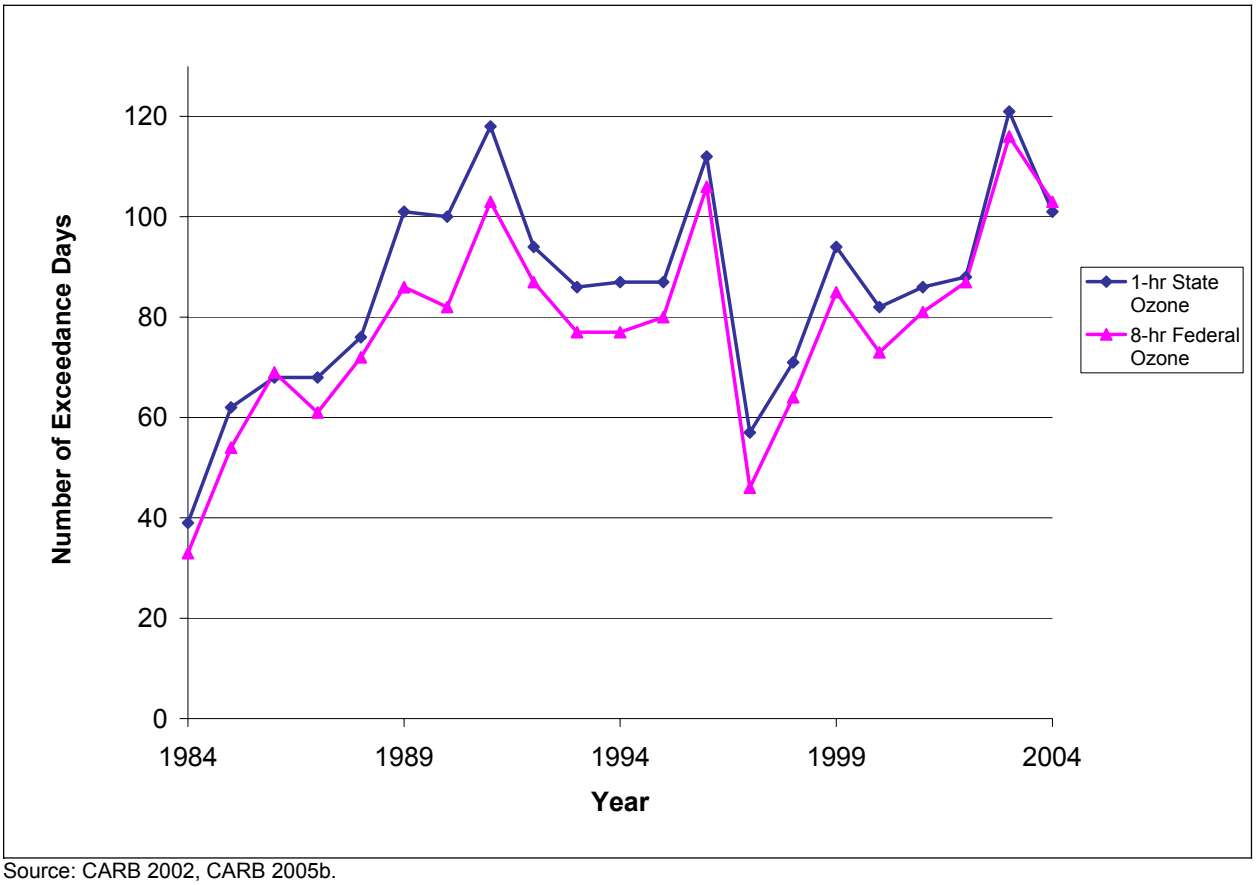
AIR QUALITY Figure 2
Normalized Ozone Air Quality Maximum Concentrations
Bakersfield Chester St. (1984-1988) and Arvin-Bear Mountain Blvd. (1989-2004)



Source: CARB 2002, CARB 2005b.

A Normalized Concentration is the ratio of the highest measured concentration to the applicable most stringent air quality standard. The standard used for one-hour ozone is the state standard of 0.09 ppm, and for eight-hour ozone is the national standard of 0.08 ppm.

AIR QUALITY Figure 3
Ozone – Number of Days Exceeding the Air Quality Standards
Bakersfield Chester St. (1984-1988) and Arvin-Bear Mountain Blvd. (1989-2004)



Source: CARB 2002, CARB 2005b.

Inhalable Particulate Matter (PM10)

As **AIR QUALITY Table 5** indicates, the project area annually experiences a number of violations of the state and federal 24-hour PM10 standards. Annual Arithmetic Mean PM10 levels have been below the federal standard since 1994 at the Bakersfield California Avenue monitoring station; however exceedances of the federal standard continue to occur at the Bakersfield Golden State Highway monitoring station. The SJVAB is classified as a serious nonattainment area for the federal PM10 standards and as a nonattainment area for the state PM10 standard.

AIR QUALITY Table 5
PM10 Air Quality Summary, 1994-2004 ($\mu g/m^3$)

Year	Days * Above Daily CAAQS	Month of Max. Daily Avg.	Max. Daily Avg.	Annual Arithmetic Mean
	Bakersfield – 5558 California Avenue			
1994	74	NOV	101	43.6
1995	139	NOV	130	46.3
1996	109	NOV	153	43.2
1997	80	DEC	137	42.3
1998	95	DEC	155	38.7
1999	115	NOV	145	47.6
2000	101	DEC	147	45.9
2001	120	JAN	204	47.7
2002	177	FEB	134	49.0
2003	160	NOV	116	47.7
2004	132	APR	93.0	--- **
	Bakersfield – Golden State Highway			
1994	106	NOV	102	44.7
1995	184	OCT	132	58.2
1996	204	NOV	153	54.1
1997	84	NOV	124	46.1
1998	109	DEC	166	35.4
1999	173	NOV	186	59.5
2000	158	NOV	153	53.1
2001	174	JAN	216	54.4
2002	256	MAY	194	59.2
2003	167	SEP	136	52.4
2004	113	OCT	85.0	42.8

Source: CARB 2002, CARB 2005b.

California Ambient Air Quality Standard: 24-Hr, 50 $\mu g/m^3$; Annual Arithmetic, 20 $\mu g/m^3$
National Ambient Air Quality Standard: 24-Hr, 150 $\mu g/m^3$; Annual Arithmetic, 50 $\mu g/m^3$

* Days above the state standard (calculated): PM10 is monitored approximately once every six days. Estimated days mathematically estimates how many days concentrations would have been greater than the level of the standard had each day been monitored.
** Data not available represented by "---".

PM10 can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere. Gaseous emissions of pollutants like NO_x, SO_x and VOC from turbines, and ammonia from NO_x control equipment, given the right meteorological conditions, can form particulate matter in the form of nitrates (NO_3), sulfates (SO_4), and organic particles. These pollutants are known as secondary particulates, because they are not directly emitted, but are formed through complex chemical reactions in the atmosphere.

PM nitrate (mainly ammonium nitrate) is formed in the atmosphere from the reaction of nitric acid and ammonia. Nitric acid in turn originates from NO_x emissions from combustion sources. The nitrate ion concentrations during the wintertime are a significant portion of the total PM10, and are likely even a higher contributor to particulate matter of less than 2.5 microns (PM2.5). The nitrate ion is only a portion of

the PM nitrate, which can be in the form of ammonium nitrate (ammonium plus nitrate ions) and some as sodium nitrate. If the ammonium and the sodium ions associated with the nitrate ion are taken into consideration, PM nitrate contributions to the total PM are even more significant.

As shown in **AIR QUALITY Table 5**, the highest PM10 concentrations are generally measured in the fall and winter when there are frequent low-level inversions. During the wintertime high PM10 episodes, the contribution of ground level releases to ambient PM10 concentrations is disproportionately high.

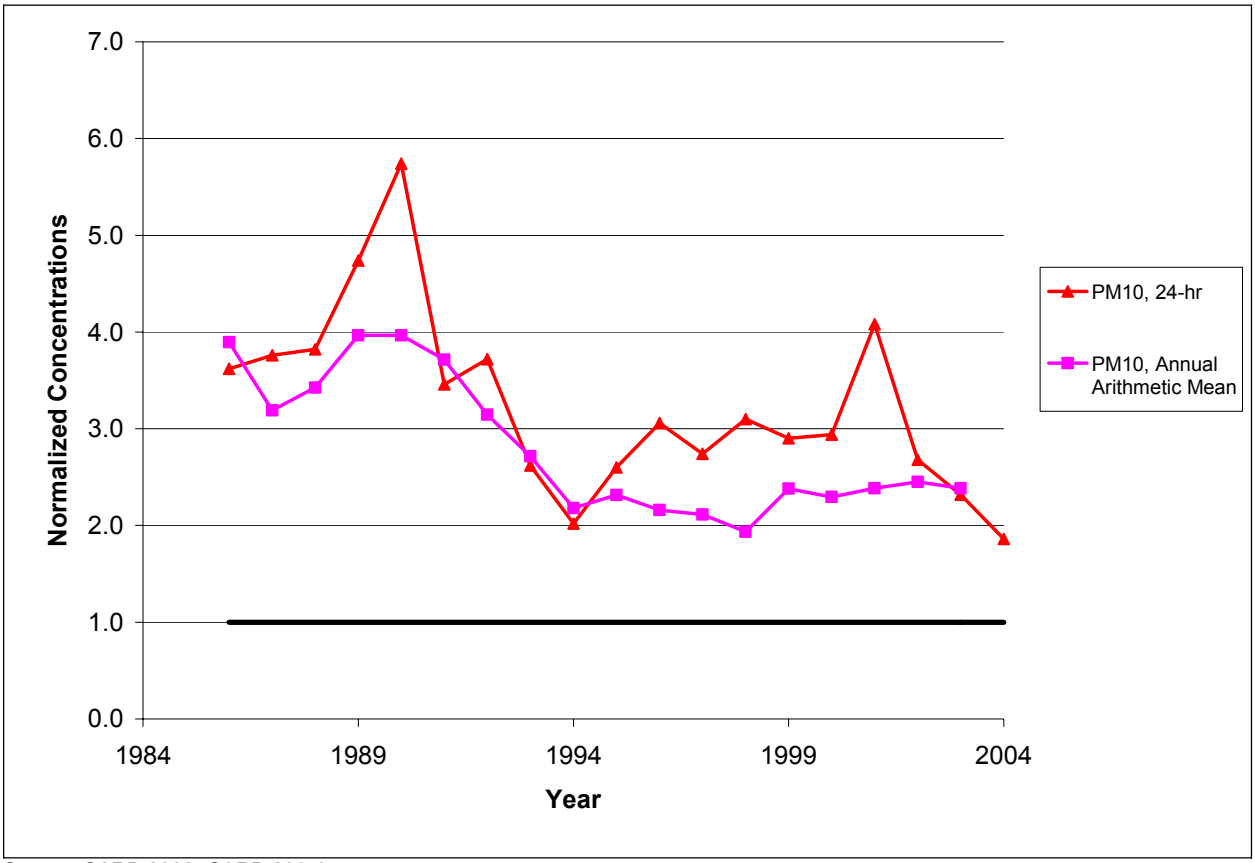
The 1986 to 2003 yearly trends for the maximum 24-hour PM10 and Annual Arithmetic Mean PM10, referenced to the most stringent standard, and the number of days exceeding the California 24-hour PM10 standard for the Bakersfield Chester Street (1986-1993) and Bakersfield California Avenue (1994-2003) monitoring stations are shown in **AIR QUALITY Figure 4** and **Figure 5**, respectively.

As the two figures show, there is an overall gradual downward trend for PM10 concentrations and number of violations of the California 24-Hour Standard since 1986; however, there has been little or no progress since 1994.

Inhalable Particulate Matter

The SJVAB is classified as nonattainment for the state inhalable particulate matter (PM2.5) standard. As shown in **AIR QUALITY Table 6**, the highest PM2.5 concentrations are generally measured in the fall and winter. The relative contribution of wood-smoke particles to the PM2.5 concentrations may be even higher than its relative contribution to PM10 concentrations, considering that most of the wood-smoke particles are smaller than 2.5 microns.

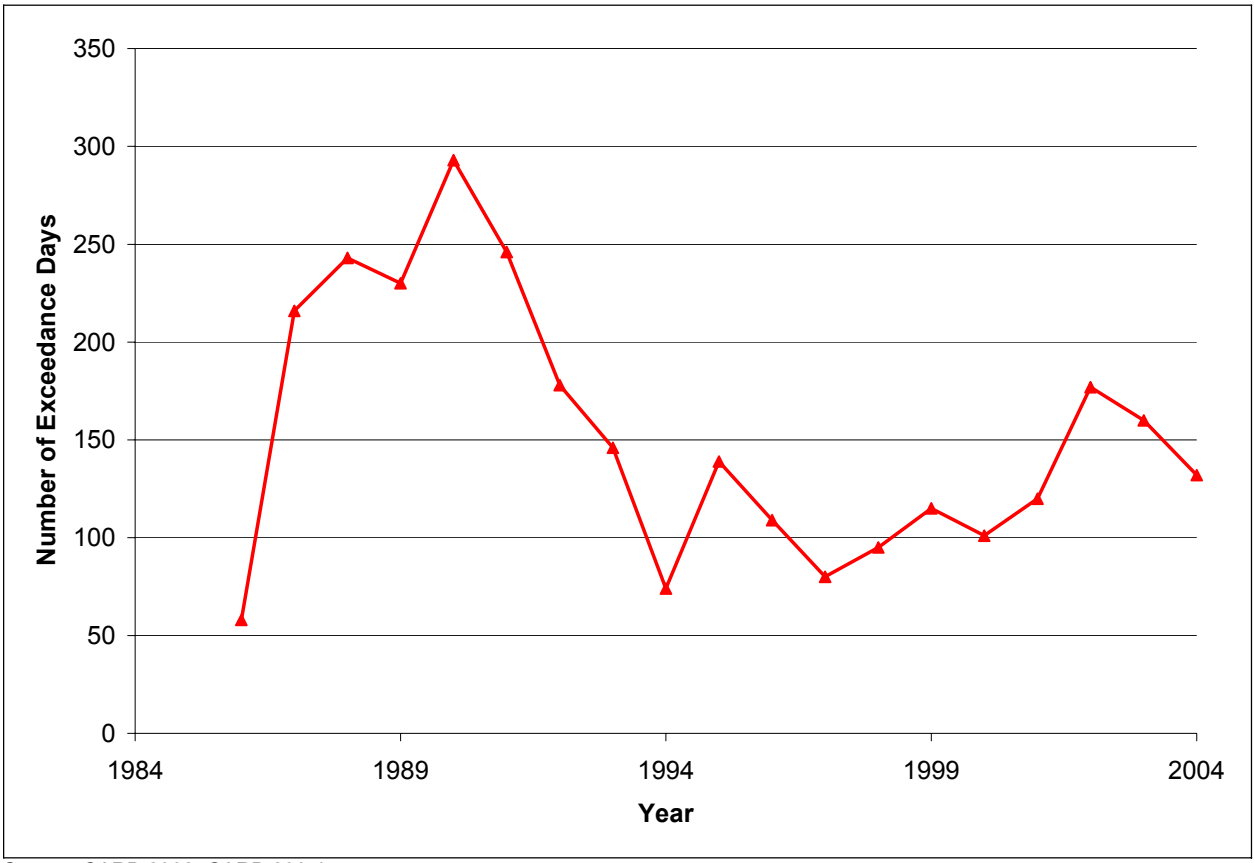
AIR QUALITY Figure 4
Normalized PM10 Air Quality Maximum Concentrations
Bakersfield Chester St. (1986-1993) and Bakersfield California Ave. (1994-2003)



Source: CARB 2002, CARB 2005b.

A Normalized Concentration is the ratio of the highest measured concentration to the applicable most stringent air quality standard. The standard used for 24-hour PM10 is the state standard of 50 $\mu g/m^3$, and for the Annual Arithmetic Mean is the state standard of 20 $\mu g/m^3$.

AIR QUALITY Figure 5
PM10 24-Hour – Number of Days Exceeding the Air Quality Standard
Bakersfield Chester St. (1986-1993) and Bakersfield California Ave. (1994-2003)



Source: CARB 2002, CARB 2005b

As **AIR QUALITY Table 6** indicates, the 24-hour (3-year average 98th percentile) PM2.5 concentration levels have been declining from 1999-2004, but were still above the NAAQS of 65 $\mu g/m^3$ in 2003 at both the Bakersfield California Avenue and Bakersfield Golden State Highway monitoring stations. The annual arithmetic means also appear to have been declining from 1999-2004, but continue to be above the NAAQS of 15 $\mu g/m^3$ and the CAAQS of 12 $\mu g/m^3$.

AIR QUALITY Table 6

PM2.5 Air Quality Summary, 1999-2004 ($\mu g/m^3$)

Year	Daily 1-Year 98th Percentile	Daily 3-Year Avg. 98th Percentile	Days Above Daily NAAQS	State Annual Average **	National Annual Average **
	Bakersfield – 5558 California Avenue				
1999	111.3	--- *	28	31.2	26.8
2000	95.4	---	19	22.0	22.0
2001	94.9	95	19	---	21.2
2002	73.0	86	14	22.8	22.8
2003	---	---	0	24.8	17.2
2004	47.8	---	3	---	18.9
	Bakersfield – Golden State Highway				
1999	95.3	---	11	---	26.2
2000	93.9	---	9	22.6	22.6
2001	95.9	95	6	---	21.8
2002	80.4	90	5	24.1	24.1
2003	51.9	76	1	---	19.7
2004	53.9	62	1	18.2	18.2

Source: CARB 2002, CARB 2005b.

California Ambient Air Quality Standard: Annual Arithmetic Mean, 12 $\mu g/m^3$
National Ambient Air Quality Standard: 24-Hr Avg. Conc., 65 $\mu g/m^3$ (based on 98 percent of the daily concentrations, average over three years); Annual Arithmetic Mean, 15 $\mu g/m^3$

* Data not available represented by "---"
**State and national statistics may differ for the following reasons:
1) State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.
2) State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

Carbon Monoxide (CO)

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. Since mobile sources (motor vehicles) are the main cause of CO, ambient concentrations of CO are highly dependent on motor vehicle activity. In fact, the peak CO concentrations occur during the rush hour traffic in the mornings and afternoons. CO concentrations in Kern County and the rest of 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 areas of California, with the sole exception of certain locations within Los Angeles County, are in attainment with the CO ambient air quality standards.

As **AIR QUALITY Table 7** shows, the maximum one-hour and eight-hour CO concentrations in the project area are less than the California Ambient Air Quality Standards. CO is considered a local pollutant, as it is found in high concentrations only near the source of emission. Automobiles and other mobile sources are the principal

sources of the CO emissions. High levels of CO emissions can also be generated from fireplaces and wood-burning stoves. According to the data recorded at the Bakersfield California Avenue and Bakersfield Golden State Highway air monitoring stations, there have been no violations of California Ambient Air Quality Standards or National Ambient Air Quality Standards since at least 1994 for the one-hour and the eight-hour CO standards (see **AIR QUALITY Table 7**).

AIR QUALITY Table 7
CO Air Quality Summary, 1994-2004 (ppm)

Year	Month of Max. 8-Hr Average	Maximum 1-Hr Average	Maximum 8-Hr Average	Month of Max. 8-Hr Average	Maximum 1-Hr Average	Maximum 8-Hr Average
	Bakersfield – 5558 California Avenue			Bakersfield – Golden State Highway		
1994	DEC	6.3	4.25	DEC	7.9	4.63
1995	DEC	7.8	6.22	DEC	7.4	4.64
1996	NOV	8.7	7.67	NOV	6.2	3.70
1997	DEC	5.2	4.01	NOV	6.1	2.91
1998	NOV	5.7	3.90	NOV	5.2	3.11
1999	DEC	5.8	4.51	JAN	10.5	5.00
2000	JAN	6.9	4.89	DEC	10.1	5.38
2001	JAN	5.8	3.41	JAN	16.0	3.49
2002	DEC	4.4	2.51	NOV	4.5	2.50
2003	NOV	3.3	2.29	DEC	4.5	3.06
2004	NOV	3.1	1.83	DEC	4.1	2.60

Source: CARB 2002, CARB 2005b, USEPA 2005c.
California Ambient Air Quality Standard: 1-Hr, 20 ppm; 8-Hr, 9 ppm
National Ambient Air Quality Standard: 1-Hr, 35 ppm; 8-Hr, 9 ppm

Nitrogen Dioxide (NO_2)

As shown in **AIR QUALITY Table 8,** the maximum one-hour and annual concentrations of NO_2 at the Arvin-Bear Mountain Boulevard monitoring station are lower than the California and National Ambient Air Quality Standards. Approximately 75 to 90 percent of the NO_x emitted from combustion sources is NO, while the balance is NO_2. NO is oxidized in the atmosphere to NO_2, but some level of photochemical activity is needed for this conversion. This is why the highest concentrations of NO_2 generally occur during the fall and not in the winter, when atmospheric conditions favor the trapping of ground level releases, but lack significant photochemical activity (less sunlight). In the summer, the conversion rates of NO to NO_2 are high, but the relatively high temperatures and windy conditions (atmospheric unstable conditions) generally disperse pollutants, preventing the accumulation of NO_2 to levels approaching the California one-hour ambient air quality standard. The formation of NO_2 in the summer, in the presence of ozone, is according to the following reaction:

$$NO + O_3 \rightarrow NO_2 + O_2$$

In urban areas, ozone concentration levels are typically high. These levels drop substantially at night as the above reaction takes place between ozone and NO. This reaction explains why, in urban areas, ozone concentrations at ground level drop, while

aloft and in downwind rural areas (without sources of fresh NO_x emissions) ozone concentrations can remain relatively high.

AIR QUALITY Table 8
NO_2 Air Quality Summary, 1994-2004 (ppm)

Year	Month of Max. 1-Hr Average	Maximum 1-Hr Average	Maximum Annual Average
	Arvin-Bear Mountain Boulevard		
1994	JAN	0.076	0.011
1995	AUG	0.050	0.008
1996	OCT	0.060	0.009
1997	SEP	0.065	0.008
1998	AUG	0.051	0.008
1999	OCT	0.057	0.009
2000	OCT	0.056	0.010
2001	OCT	0.045	0.009
2002	OCT	0.046	0.009
2003	NOV	0.069	0.009
2004	OCT	0.043	0.009

Source: CARB 2002, CARB 2005b.
California 1-Hr Ambient Air Quality Standard: 0.25 ppm
National Annual Ambient Air Quality Standard: 0.053 ppm

Sulfur Dioxide (SO_2)

Sulfur dioxide is typically emitted as a result of the combustion of a fuel containing sulfur. Fuels, such as natural gas, contain very little sulfur and consequently have very low SO_2 emissions when burned. By contrast, fuels high in sulfur content, such as coal, emit very large amounts of SO_2 when combusted.

Sources of SO_2 emissions within the SJVAB come from every economic sector and include a wide variety of fuels: gaseous, liquid and solid. The SJVAB is designated attainment for all the SO_2 state and federal ambient air quality standards. **AIR QUALITY Table 9** shows the historic one-hour, 24-hour and annual average SO_2 concentrations collected from the Bakersfield California Avenue monitoring station. No monitoring of SO_2 has occurred at this station past 2001. As **AIR QUALITY Table 9** shows, concentrations of SO_2 are far below the state and federal SO_2 ambient air quality standards.

Visibility

Visibility in the region of the project site depends upon the area's natural relative humidity and the intensity of both particulate and gaseous pollution in the atmosphere. The most straightforward characterization of visibility is probably the visual range (the greatest distance that a large dark object can be seen). However, in order to characterize visibility over a range of distances, it is more common to analyze the changes in visibility in terms of the change in light-extinction that occurs over each additional kilometer of distance (1/km). In the case of a greater light-extinction, the visual range will decrease.

The SJVAB is currently designated as unclassified for visibility reducing particles.

AIR QUALITY Table 9
SO_2 Air Quality Summary, 1994-2001 (ppm)

Year	Maximum 1-Hr Avg.	Month of Max. 24-Hr Avg.	Maximum 24-Hr Avg.	Annual Average
	Bakersfield – 5558 California Avenue			
1994	0.020	DEC	0.0067	0.0027
1995	0.026	MAR	0.0149	0.0028
1996	0.059	APR	0.0105	0.0022
1997	0.011	JAN	0.0040	0.0020
1998	--- *	---	---	---
1999	0.011	NOV	0.0063	0.0032
2000	0.019	NOV	0.0034	0.0025
2001	0.030	MAR	0.0054	0.0017

Source: CARB 2002, CARB 2005b.
California Ambient Air Quality Standard: 1-Hr, 0.25 ppm; 24-Hr, 0.04 ppm
National Ambient Air Quality Standard: 3-Hr, 0.5 ppm; 24-Hr, 0.14 ppm; Annual, 0.030 ppm
* Data not available represented by "---"

Summary

The project site is located about 30 miles south of Bakersfield, California, on the Tejon Ranch at the base of the Tehachapi Mountains in a predominately rural area, approximately 6.5 miles east of Interstate 5 at Grapevine, Kern County. Where possible, the recommended background concentrations come from nearby monitoring stations with similar characteristics. Monitoring stations located within larger urban areas (Bakersfield) provide conservative estimates for background concentrations. The recommended ozone and NO_2 background concentrations are from the Arvin-Bear Mountain Boulevard monitoring station. The recommended PM10, PM2.5, CO, and SO_2 background concentration are from the Bakersfield California Avenue monitoring station, which provides a conservative estimate that is more representative of the project area compared to the Bakersfield Golden State Highway monitoring station, which tends to have higher concentrations of these pollutants. **AIR QUALITY Table 10** presents staff's recommended background ambient concentrations for use in the PEFE impacts analysis.

AIR QUALITY Table 10
Staff Recommended Background Concentrations for PEFE (ppm) [a]

Pollutant	Averaging Time	2002 (1999)	2003 (2000)	2004 (2001)	Most Restrictive Ambient Air Quality Standard
Ozone	1 hour	0.151	**0.156**	0.155	0.09
	8 hour	0.120	**0.127**	0.126	0.08
PM10 ($\mu g/m^3$)	24 hours	**134**	116	93	50
	Annual Arithmetic Mean	**49.0**	47.7	ND	20
PM2.5 ($\mu g/m^3$)	Daily 3-Year Avg. 98th Percentile	**86**	ND	ND	65
	Annual	22.8	**24.8**	ND	12
NO_2	1 hour [b]	0.046	**0.069**	0.043	0.25
	Annual	0.009	0.009	**0.009**	0.053
CO	1 hour	**4.4**	3.3	3.1	20
	8 hour	**2.51**	2.29	1.83	9
SO_2 [c]	1 hour	(0.011)	(0.019)	**(0.030)**	0.25
	3 hour [d]	(0.010)	(0.017)	**(0.027)**	0.5
	24 hours	**(0.0063)**	(0.0034)	(0.0054)	0.04
	Annual	**(0.0032)**	(0.0025)	(0.0017)	0.030

Note(s): ND – No Data available.
a. Bold values are the background concentrations used throughout the following air quality analysis.
b. The NO_x_OLM modeling conducted by the Applicant uses 1999 meteorological and hourly ozone data; therefore, for consistency the background NO_2 concentration used to assess the NO_x _OLM modeling results is the 1999 maximum hourly background of 0.057 ppm (107 ug/m^3).
c. The SO_2 values shown in parenthesis are from 1999 to 2001.
d. 3-hour SO_2 value is assumed to equal 90 percent of one-hour SO_2 value.

PROJECT, SITE, AND VICINITY DESCRIPTION

Calpine has proposed to develop the PEFE on approximately two acres within the existing 31-acre PEF site. The PEF site is located on Tejon Ranch Property, approximately 30 miles south of Bakersfield, California, 6.5 miles east of Grapevine, and just north of the Tehachapi Mountains in Kern County, California. No known urban development is presently planned within six miles of the plant site (PEFE 2005a, p. 5.2-60). The area surrounding the plant site is undeveloped and vegetated with non-native grassland that is used for cattle grazing (PEFE 2005a, p. 5.2-60). The power plant would be accessed from Edmonston Pumping Plant Road via the existing PEF Plant Access Road constructed as part of the existing PEF. Edmonston Pumping Plant Road is accessible from Interstate 5. The PEFE would be located on the eastern part of the PEF site between the existing power block and the cooling tower.

Construction

Construction of the PEFE would consist of the following four main phases: 1) site preparation; 2) foundation work, 3) installation of major equipment; and 4) construction/installation of major structures.

Currently, the PEFE design includes no additional modifications to the existing PEF offsite linear facilities such as electric transmission lines, fuel gas or water supply pipelines.

Fugitive dust emissions during the construction of the project would result from dust entrained during site preparation and grading/excavation activities, on-site travel on paved and unpaved surfaces, and aggregate and soil loading and unloading operations, as well as wind erosion of areas disturbed during construction activities. The largest fugitive dust emissions are generated during site preparation activities, where work such as clearing, grading, excavation of footings and foundations, and backfilling operations occur. These types of activities require the use of large earth moving equipment, which generate combustion emissions, along with creating fugitive dust emissions.

Combustion emissions during the construction of the project result from exhaust sources, including diesel construction equipment used for site preparation, water trucks used to control dust emissions, diesel-powered welding machines, electric generators, air compressors, water pumps, diesel trucks used for deliveries, and automobiles and trucks used by workers to commute to and from the construction site.

Applicant estimates for the highest daily emissions during construction, based on the fifth month, are shown in **AIR QUALITY Table 11**. Peak annual on-site construction heavy equipment exhaust and fugitive dust emissions based on the average equipment mix used during the peak 12-month construction period and are summarized in **AIR QUALITY Table 12**.

AIR QUALITY Table 11
Maximum Daily Emissions During On-Site Construction
(Month 5; Maximum Emissions), lbs/day

	NO_x	CO	VOC	SO_x	PM10	PM2.5
On-Site						
Construction Equipment	94.63	30.58	5.83	0.10	3.78	3.78
Fugitive Dust	---	---	---	---	14.67	1.82
Off-Site						
Worker Travel	19.44	198.44	16.33	0.14	1.27	1.27
Truck Deliveries	95.86	46.16	6.91	0.16	2.08	2.08
Total Emissions	209.93	275.18	29.07	0.40	21.80	8.95

From AFC (PEFE 2005a), Appendix D, Table D-1 and Attachment D-1.

AIR QUALITY Table 12
Peak Annual Emissions During On-Site Construction, tons/year

	NO_x	CO	VOC	SO_x	PM10	PM2.5
On-Site						
Construction Equipment	5.84	1.99	0.38	0.01	0.23	0.23
Fugitive Dust	---	---	---	---	1.13	0.14
Off-site						
Worker Travel	1.60	16.36	1.35	0.01	0.10	0.10
Truck Deliveries	5.97	2.87	0.43	0.01	0.13	0.13
Total Emissions	13.41	21.22	2.16	0.03	1.59	0.60

From AFC (PEFE 2005a), Appendix D, Table D-2 and Attachment D-1.

Operational Phase

Equipment Description

The equipment for the proposed PEFE would include the following components:

- One natural gas-fired, General Electric 7FA combustion turbine generator (CTG) operating in simple cycle mode, which is nominally rated at 160 MW. The CTG would be equipped with dry, low-NO_x combustors;
- Exhaust dilution air system to reduce the exhaust temperature to an acceptable range for the operation of the emissions controls system;
- Combustion turbine inlet air filter (3,600,000 lb/hr);
- Exhaust stack (diameter of 22.75-feet and height of 131-feet); and
- A continuous emission monitoring (CEM) system installed on the stack of the CTG would record concentrations of NO_x, CO, and oxygen in the flue gas.

The PEFE constitutes a new power block within the existing PEF, which would include a new 18/230 kV step-up transformer and auxiliary equipment to connect the power block with existing PEF systems (water supply for CTG cooling using existing cooling towers, electric transmission, fuel gas supply, water treatment chemicals, site access, storm water control, operational safety systems, sanitary sewer, and potable water).

Facility Operation

The PEFE would use one stationary, natural gas-fired combustion turbine for power production. The CTG would generate an average of 160 MW at base load under average ambient conditions. The CTG would feature dry low-NO_x combustors and a selective catalytic reduction (SCR) system that uses ammonia vapor in the presence of a catalyst to reduce the NO_x concentration in the exhaust gases. The total net generating capacity of the power plant, when combined with the existing PEF, would be 910 MW.

The CTG exhaust will be cooled with a dilution air system. This system will include a single electric motor driven fan and mixing plenum. The CTG exhaust will be mixed with ambient air to regulate the exhaust temperature to be below 830 to 850°F, which is necessary for the SCR emission control system.

The PEFE would have an overall availability of 95 percent and could operate up to 8,760 hours per year (seven days a week, 24 hours per day). The PEFE will generally be operated to provide maximum electrical output during summer and winter peak periods when demand for electricity is highest (PEFE 2005a, p. 3-48). The unit may be shut down or operated at partial load when reduced market demand makes full load operation uneconomical.

Emission Controls

The exclusive use of pipeline-quality natural gas, a relatively clean-burning fuel, would limit the formation of VOC, PM10, and SO_2 emissions. Natural gas contains very little

noncombustible gas or solid residues and a small amount of reduced sulfur compounds, including mercaptan. The CTG would be equipped with a dry low NO_x combustion system to control NO_x concentrations in the exhaust gas. Dry low NO_x combustors for GE F-class turbines typically control NO_x emissions at or below 9.0 parts per million by volume, dry (ppmvd) at 15 percent oxygen (O_2) and CO emissions at or below 6.0 ppmvd at 15 percent O_2 (PEFE 2005a, p. 3-12). Post-combustion NO_x control would be provided using a selective catalytic reduction (SCR) system. The SCR system would use anhydrous ammonia to further reduce NO_x emissions to 2.5 ppmvd or less at 15 percent O_2 on a one-hour rolling average (PEFE 2005a, p. 3-28). Ammonia slip would be limited to 10.0 ppmvd or less at 15 percent O_2 (PEFE 2005a, p. 3-12). Particulate emissions would be controlled using natural gas as the sole fuel for the CTG and inlet air filtration (PEFE 2005a, p. 3-29).

An exhaust dilution air system is necessary to reduce the exhaust temperature to acceptable levels for the operation of the SCR emissions control system. The dilution air system will be started before the turbine and will operate continuously during turbine operation. The catalyst temperature will be monitored to ensure that the dilution air system is working properly. The plant control system will be set so that the turbine would automatically trip (shutdown) if the SCR catalyst grid exceeds the manufacturer's recommended maximum continuous operating level (PEFE 2005j, DR 8 and 10).

One 131-foot-tall, 22.75-foot diameter stack would release the CTG exhaust gas into the atmosphere. A continuous emission monitoring (CEM) system would be installed on the CTG stack to monitor NO_x, CO, and oxygen concentrations in the flue gas to assure adherence with the proposed emission limits. The CEM system would generate reports of emissions data in accordance with permit requirements and send alarm signals to the plant's control room when the level of emissions approaches or exceeds pre-selected limits.

Project Operating Emissions

Air emissions would be generated from operating the CTG. The normal operating emission rates for the CTG are provided in **AIR QUALITY Table 13.**

AIR QUALITY Table 13
Maximum Pollutant Emission Rates – Expansion CTG [a]

Pollutant	ppmv @ 15% O_2	lb/MMBtu	lb/hr
NO_x	2.5	0.0091	16.25
CO	6.0	0.0133	23.75
VOC	1.3	0.0016	2.95
PM10	---	---	9.0
SO_2	0.402 [b]	0.0020	3.495
NH_3	10.0	---	24.06

From AFC (PEFE 2005a) Table 5.2-18 and Table A-1; (Sierra 2005) Table 5.2-18 REVISED (VOC).
Note(s):
a. Maximum pollutant emissions estimated at 35°F and 100 percent load (Case 5 - Cold Base).
b. SO_2 emissions are based on annual average natural gas sulfur content of 0.75 grains/100 scf and the hourly SO_2 permit limit for the existing PEF CTGs.

Expected event emission rates during startup and shutdown events and occasional combustor tuning events are summarized in **AIR QUALITY Table 14**. PM10 and SO_2 emissions are not included in this table as emissions of these pollutants will not be higher during these short-term events than during normal CTG operations.

AIR QUALITY Table 14
PEFE Criteria Pollutant Emission Rates
Maximum Short-Term Event Emissions

	NO_x	CO	VOC
Startup and Shutdown, lb/hr	80	902	16
Combustor Tuning, lb/hr	300	2,514	48
Combustor Tuning lb/event	600	2,514	96

From AFC (PEFE 2005a) Table 5.2-19, (PEFE 2005h, DR 32).

Startups and shutdowns will last up to one hour, the combustor tuning events will last up to 6 hours, and the applicant has requested that an annual allowance of 6 hours of combustor tuning be included as an operating condition (PEFE 2005h, DR 32).

Combustor tuning may be required on occasion to re-tune the combustor performance, including the emissions performance; or to tune the combustor after a physical modification or repair is performed. The maximum hourly and event NO_x, CO, and VOC emissions for combustor tuning can be much higher than startup and shutdown emissions; therefore, combustor tuning requires separate maximum hourly and daily NO_x, CO, and VOC emission limits. While the emission potential is higher during combustor tuning events, they will occur very infrequently and may not occur for intervals of a year or more.

AIR QUALITY Table 15 summarizes the maximum (worst-case) estimated levels of the different criteria pollutants from the CTG for the PEFE. Maximum daily operations are based on full-load operations of the CTG for 22 hours and up to two 1-hour startups per day, with a total of 2 hours of startup/shutdown activity. Maximum annual emissions are based on full-time, full-load operation for 8,460 hours and 300 hours per year of startup activity (PEFE 2005a, p. 5.2-30 and Table A-2).

The proposed PEFE project is considered by the District to be a modification to the existing PEF, as the two facilities are located on the same property, owned by the same entity, and are interconnected. The total combined emissions from the existing PEF and the PEFE are summarized in **AIR QUALITY Table 16**.

AIR QUALITY Table 15
PEFE Worst-Case Hourly, Daily and Annual Emissions [a]

	Pollutant					
Emissions/Equipment	**NO_x**	**SO_2**	**CO**	**VOC**	**PM10**	**NH_3 [b]**
Maximum Hourly Emissions CTG, lb/hr	80.0	3.495	902	16.0	9.0	24.06
Maximum Daily Emissions CTG, lb/day	450	84	2,113	97	216	577
Maximum Annual Emissions CTG, lb/year	161,480	30,616	471,492	29,730	78,840	210,766

From AFC (PEFE 2005a) Table 5.2-20 and Table A-2; (PEFE 2005h, DR 14).
Note(s):
a. Table includes startup/shutdown events in hourly/daily totals but does not include combustor tuning events in these totals.
b. Maximum ammonia emissions base on 24 hours/day and 8,760 hours/year at base load conditions.

AIR QUALITY Table 16
Total Annual Emissions

	Maximum Annual, lb/year					
	NO_x	**SO_2**	**CO**	**VOC**	**PM10**	**NH_3**
PEF Expansion	161,480	30,616	471,492	29,730	78,840	210,766
Existing PEF	345,741	84,802	1,220,936	227,683	236,472	632,298
Total, lb/year	507,221	115,418	1,692,428	257,413	315,312	843,064
Total, tons/year	253.6	57.7	846.2	128.7	157.7	421.5

From AFC (PEFE 2005a) Table 5.2-20 and 5.2-21; (Sierra 2005) Table 5.2-20, Table 5.2-36 and Table A-2 REVISED (VOC); and (PEFE 2005g) Table A-2 Second Revision (NO_x).

Initial Commissioning

The initial commissioning of a power plant refers to the time between the completion of construction and the reliable production of electricity for sale on the market. For most power plants, normal operating emission limits usually do not apply during the initial commissioning activities.

Commissioning activities for the PEFE CTG are expected to last approximately 96 hours (PEFE 2005a, Table B-7). These 96 hours of commissioning will not be sequential and the total calendar duration for initial commissioning may be as long as 6 months (SJVAPCD 2005e, Attachment H). The range of commissioning tests for each CTG/HRSG at the PEFE includes the following: 1) full speed no load tests; 2) minimum load tests, with no SCR; 3) full speed, no load tests with no SCR; and 4) multiple load tests with fully operational SCR (PEFE 2005a, p. 5.2-41). **AIR QUALITY Table 17** presents the applicant's estimated typical initial commissioning activity emissions for the PEFE CTG.

The PM10 and SO_2 emissions during initial commissioning are not estimated to be higher than normal full load operations.

The applicant has indicated that to ensure that the facility does not exceed permitted short-term commissioning emission rates, the worst case hourly and daily emission rates should be similar to those requested in a recent PEF Energy Commission license amendment/District variance. **AIR QUALITY Table 18** presents the applicant's requested worst-case short-term initial commissioning emissions.

AIR QUALITY Table 17
PEFE Typical Commissioning Emissions

Commissioning Activities	Operation Duration [a]	Fuel Use	NO_x	CO	VOC
Expansion CTG	**(Hours)**	**(MMBtu/h, HHV)**	**Hourly Emissions, lb/hr**		
Full Speed, No Load Test	4	358.22	129.8	902.0	16.0
Minimum Load Test	20	358.22	54.5	80.6	7.2
Full Speed, No Load Test, No SCR	24	358.22	129.8	80.6	7.2
Multiple Load Test, Full SCR	48	1,791.1	105.5	23.8	4.5
Total (1 CTG)	96	---	9,788.4	8,296.8	596.8

From AFC (PEFE 2005a), Table B-7.
Note(s):
a. Hours of operation based on information supplied by Calpine for the Gilroy plant.

AIR QUALITY Table 18
PEFE Requested Worst-Case Short-Term Commissioning Emissions

Pollutant	Lbs/hr	Lbs/day
NO_x	308	3,200
CO	2,527	10,824
VOC	273	355

(PEFE 2005j, DR 8).

The initial commissioning modeling analysis presented in the impacts section uses these worst-case emission values.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses three kinds of impacts: construction, operation, and cumulative effects. As the name implies, construction impacts result from the emissions occurring during the construction of the project. The operation impacts result from the emissions of the proposed project during operation. Cumulative impacts analysis assesses the impacts that result from the proposed project's incremental effect viewed over time, together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project. (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and15355.)

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 (NO_x, VOC, PM10 and SO_2) are considered to be significant and need to be mitigated to the extent

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

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 several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions. The model results are often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$).

The applicant has used EPA-approved screening (SCREEN3 and CTSCREEN) and refined (ISCST3) models to estimate the direct impacts of the project's NO_x, PM10, CO, and SO_x emissions resulting from project construction and operation. Additional modeling of the regional haze, acid deposition, other air quality related value impacts to the San Rafael Wilderness Class 1 Area, located approximately 55 miles away in Eastern Santa Barbara County, were completed using the Calpuff model. A description of the modeling analysis and its results are provided in Section 5.2.5 and Appendix D of the AFC (PEFE 2005a). Staff added the applicant's modeled impacts to the available highest ambient background concentrations recorded during the previous three years from nearby monitoring stations. Staff then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or would contribute to an existing violation.

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

In general, the inputs 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 Bakersfield, which is the closest complete meteorological data source to the project site, and is meteorological data approved for use by the SJVAPCD.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Construction Impacts and Mitigation

The following section discusses the project's short-term direct construction ambient air quality impacts, as estimated by the applicant, and provides a discussion of appropriate mitigation. Staff reviewed the construction emissions estimates and air dispersions

modeling procedures and considers them to be adequate and generally conservative for this siting case.

Construction Impact Analysis

The applicant modeled the emissions of the PEFE on-site construction using the ISCST3 model. The windblown dust emissions were modeled as single area sources that covered the total active area of the construction site. The exhaust and fugitive dust emissions were modeled as volume sources.

For one-hour average construction NO_x modeling (turbine startup, turbine commissioning, and emergency diesel engine operation), the Applicant provided a refined modeling analysis using the ozone limiting method (OLM) model (ISC3_OLM, Version 96113). This method calculates the maximum NO to NO_2 conversion rate, using ozone concentration files to determine maximum one-hour NO_2 concentrations, assuming that 10 percent of the tailpipe NO_x is NO_2 and that there is a 100 percent conversion of NO to NO_2 through a chemical reaction with the ozone. This method is somewhat conservative in that it does not consider mixing or ozone consumption limitations in determining maximum NO_2 concentrations. This modeling method is accepted by the USEPA and CARB for one-hour NO_2 modeling.

To determine the construction impacts on short-term ambient standards (i.e., 1-hour through 24 hours), the worst-case daily on-site construction emission levels shown in **AIR QUALITY Table 11** were used. For pollutants with annual average ambient standards, the annual on-site emissions levels shown in **AIR QUALITY Table 12** were used. Modeling assumed that all of the equipment would operate from 7 am to 5 pm daily, five days per week (PEFE 2005b). **AIR QUALITY Table 19** provides the results of this modeling analysis.

AIR QUALITY Table 19
PEFE Ambient Air Quality Impact
Applicant Construction ISC Modeling Results

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$) [b]	Total Impact ($\mu g/m^3$)	Limiting Standard ($\mu g/m^3$)	Type of Standard	Percent of Standard
NO_2 [a]	one-hour	252.7	107	360	470	CAAQS	77
	Annual	5.1	17.0	22.1	100	NAAQS	22
PM10	24-Hour	**51.7**	**134**	**186**	50	CAAQS	**371**
	Annual Arithmetic	**1.9**	**49**	**50.9**	20	CAAQS	**255**
PM2.5	24-Hour	**39.2**	**86**	**125**	65	NAAQS	**193**
	Annual Arithmetic	**0.5**	**24.8**	**25.3**	12	CAAQS	**211**
CO	one-hour	554.9	5,060	5,615	23,000	CAAQS	24
	eight-hour	162.5	2,887	3,049	10,000	CAAQS	30
SO_2	one-hour	1.8	78.6	80.4	655	CAAQS	12
	three-hour	1.1	70.2	71.3	1,300	NAAQS	5
	24-Hour	0.2	16.5	16.7	105	CAAQS	16
	Annual	0.01	8.5	8.5	80	NAAQS	11

From AFC (PEFE 2005a) Table D-4 and modeling files PSTRSC09.OUT (all except NO_2) and PSTRSC10.OUT (OLM for NO_2).
Note(s):
a. One-hour NO_x value was modeled using OLM_ISC. The annual value is multiplied by the Annual NO_x Ratio Method (ARM) EPA default value of 0.75.
b. Background values have been adjusted per staff recommended background concentrations shown in AIR QUALITY Table 10.

As can be seen from the modeling results provided in **AIR QUALITY Table 19**, the construction PM10 and PM2.5 (24-hour and annual) impacts exceed the ambient air quality standards and are, therefore, potentially significant. The applicant's construction modeling analysis indicates that the maximum NO_x, CO and SO_2 impacts will remain below the CAAQS and NAAQS and staff concurs.

The applicant's results (PEFE 2005a, Table D-4, Note b) show that less than 48 percent (25.0 $\mu g/m^3$) of the maximum modeled 24-hour PM10 concentrations from construction activities are due to exhaust from construction equipment, with the other 52 percent due to fugitive dust from construction activities. On an annual average basis, the exhaust contribution is about 16 percent (0.3 $\mu g/m^3$) of the maximum annual PM10 impact.

Construction Mitigation

As described in the applicable LORS section, District Regulation VIII (i.e., Series 8000) limits fugitive dust during the construction phase of a project. Staff recommends that construction emission impacts be mitigated to the greatest feasible extent including all feasible measures from the LORS, as well as other measures considered necessary by staff to fully mitigate the construction emissions.

Applicant's Proposed Mitigation

The applicant proposes to implement the following measures to reduce emissions during construction activities (PEFE 2005a, Appendix D). The applicant's PM10 emissions estimates in **AIR QUALITY Tables 11** to **12** and construction modeling results in **AIR QUALITY Table 19** assume the use of these emission control measures.

To control exhaust emissions from heavy diesel construction equipment:

- use diesel construction equipment meeting EPA Tier I off-road Diesel standards; and
- use CARB ultra low-sulfur fuel for all heavy construction equipment.

To control fugitive dust emissions:

- apply water to all unpaved roads and disturbed areas in the project construction site as frequently as necessary to prevent fugitive dust plumes (frequency of watering may be reduced or eliminated during precipitation);
- limit vehicle speeds to 10 miles-per-hour (mph) within the construction site;
- post visible speed limit signs at the entrances to the construction site;
- inspect construction equipment vehicle tires and wash as necessary to clear away dirt prior to entering paved roadways;
- use gravel ramps of at least 20 feet in length at the tire washing/cleaning station;
- gravel or treat all unpaved exits from the construction site to prevent track-out to public roadways;
- require all construction vehicles to enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the Compliance Project Manager;
- sandbags or other measures specified in the Storm Water Pollution Prevention Plan (SWPPP) shall be installed in construction areas adjacent to any paved roadway to prevent run-off to roadways;
- sweep all paved roads within the construction site at least twice daily (or less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris;
- Sweep at least the first 500 feet of any public roadway exiting the construction site at least twice daily (or less during periods of precipitation) on days when construction activity occurs or on days when dirt or runoff from the construction site is visible on the public roadways;
- Cover or treat with appropriate dust suppressant compounds all soil storage piles and disturbed areas that remain inactive for longer than 10 days;
- Cover or sufficiently wet the materials in all vehicles transporting solid bulk material on public roadways with the potential to cause visible emissions and maintain a minimum of one foot of freeboard;
- use wind erosion control techniques such as wind breaks, water, chemical dust suppressants, and/or vegetation on all construction areas that may be disturbed; and
- Maintain windbreaks in place until soil is stabilized or permanently covered with vegetation.

Adequacy of Proposed Mitigation

In general, the applicant's proposed construction emissions mitigation measures are substantial. The applicant's revised PM10 emission estimate assumes a very aggressive control efficiency factor for fugitive dust (89 percent) from unpaved roads, which staff believes to be potentially overly optimistic. However, even if the emission and modeling analyses performed by the applicant were assumed to be reasonably accurate, the modeling analysis shows that the mitigated construction PM10 impacts are predicted to be potentially significant beyond the project fence line. Therefore, staff believes that all reasonable feasible construction emission mitigation measures are needed to mitigate the potentially significant construction PM10 impacts.

Staff Proposed Mitigation

Staff recommends construction PM10 and NO_x emission mitigation measures that include some of the mitigation measures proposed by the applicant, and a few additional construction PM10 emission mitigation measures and compliance assurance measures in Conditions of Certification **AQ-SC1** through **AQ-SC5**.

Staff recommends **AQ-SC1** to require the applicant to have an on-site construction mitigation manager who will be responsible for the implementation and compliance of the construction mitigation program. The documentation of the ongoing implementation and compliance with the construction mitigation program would be provided in the monthly construction compliance report that is required in staff's recommended Condition of Certification **AQ-SC2**.

Staff recommends fugitive dust mitigation measures be provided in Condition of Certification **AQ-SC3** which essentially formalizes the construction emission mitigation measures proposed by the applicant.

Staff recommends Condition of Certification **AQ-SC4** to limit the potential offsite impacts from visible dust emissions from the construction activities.

Staff recommends Condition of Certification **AQ-SC5** to mitigate the emissions from the large diesel-fueled construction equipment. This condition modifies the applicant's proposed heavy diesel construction equipment mitigation measures by requiring EPA/CARB Tier 2 engine compliant equipment where available and including equipment idle time restrictions.

Due to the worst-case PM10 impacts identified for project construction and the existing serious PM10 nonattainment status in the project site area, staff has recommended requiring all feasible construction emission mitigation measures. The worst-case construction impacts are relatively short-term in nature and staff has recommended requiring all feasible construction emission mitigation measures. Therefore, staff believes that the construction air quality impacts will be less than significant with the implementation of the mitigation measures contained in the recommended Conditions of Certification.

Operation Impacts and Mitigation

The following section discusses the project's direct ambient air quality impacts, as estimated by the applicant, and evaluated by staff, as well as the combined impacts of the PEFE with the existing PEF. Additionally, this section discusses the recommended mitigation measures.

The applicant performed direct impact modeling analyses, including operations, fumigation, startup, and commissioning impact modeling.

Operational Modeling Analysis

A refined modeling analysis was performed to identify off-site criteria pollutant impacts from operational emissions of the proposed project. Turbine emission rates were calculated from equipment vendor estimates for six load conditions:

- Case 1) Hot Base - 102°F ambient temperature, 100 percent load;
- Case 2) Hot Low - 102°F, 50 percent load;
- Case 3) Avg. Base - 66°F, 100 percent load;
- Case 4) Avg. Low - 66°F, 50 percent load;
- Case 5) Cold Base - 35°F, 100 percent load; and
- Case 6) Cold Low - 35°F, 50 percent load.

The ISCST3 model (Version 02035) and CTSCREEN models were used for the modeling analysis. The applicant's predicted maximum concentrations of the non-reactive pollutants for the PEFE (CTG only) are summarized in **AIR QUALITY Table 20.**

AIR QUALITY Table 20
PEFE Ambient Air Quality Impact
Applicant Normal Operating Impact ISC Modeling Results

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$) [a]	Total Impact ($\mu g/m^3$)	Limiting Standard ($\mu g/m^3$)	Type of Standard	Percent of Standard
NO_2	one-hour	5.9	130	136	470	CAAQS	29
	Annual	0.3	17.0	17.3	100	NAAQS	17
PM10	24-Hour	0.9	**134**	**134.9**	50	CAAQS	**270**
	Annual	0.2	**49**	**49.2**	20	CAAQS	**246**
PM2.5	24-Hour	0.9	**86**	**86.9**	65	NAAQS	**134**
	Annual	0.2	**24.8**	**25.0**	12	CAAQS	**209**
CO	one-hour	8.6	5,060	5,069	23,000	CAAQS	22
	eight-hour	4.3	2,887	2,891	10,000	CAAQS	29
SO_2	one-hour	1.3	78.6	79.9	655	CAAQS	12
	three-hour	0.9	70.2	71.1	1,300	NAAQS	5
	24-Hour	0.2	16.5	16.7	105	CAAQS	16
	Annual	0.06	8.5	8.6	80	NAAQS	11

From AFC (PEFE 2005a) Table 5.2-23 and Table B-3.
Note(s):
a. Background values have been adjusted per staff recommended background concentrations shown in AIR QUALITY Table 10.

The applicant's modeling results indicate that the project's normal operational impacts would not create violations of NO_2, SO_2 or CO standards, but could further exacerbate violations of the PM10 and PM2.5 standards. In light of the existing PM10 and PM2.5 non-attainment status for the project site area, staff considers the modeled impacts to be significant and, therefore, require mitigation.

However, the PEFE CTG will operate in concert with the existing PEF emission sources (CTGs, cooling tower). To determine the total operational air quality impacts for the combined facility, the normal operating modeled concentrations for the PEFE would be added to the normal operating modeled existing PEF equipment as shown in **AIR QUALITY Table 21.**

As discussed for the PEFE, the applicant's modeling results for the combined facilities (PEFE+PEF) indicate that the project's normal operational impacts would not create violations of NO_2, SO_2 or CO standards, but could further exacerbate violations of the PM10 and PM2.5 standards. In light of the existing PM10 and PM2.5 non-attainment status for the project site area, staff considers the modeled impacts to be significant and, therefore, require mitigation.

AIR QUALITY Table 21
PEFE and PEF Ambient Air Quality Impact
Applicant Normal Operating Impact ISC Modeling Results

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$) [b]	Total Impact ($\mu g/m^3$)	Limiting Standard ($\mu g/m^3$)	Type of Standard	Percent of Standard
NO_2	one-hour	59.6	130	190	470	CAAQS	40
	Annual	2.4 [a]	17.0	19.4	100	NAAQS	19
PM10	24-Hour	4.8	**134**	**139**	50	CAAQS	**278**
	Annual	2.0	**49**	**51.0**	20	CAAQS	**255**
PM2.5	24-Hour	4.8	**86**	**90.8**	65	NAAQS	**140**
	Annual	2.0	**24.8**	**26.8**	12	CAAQS	**223**
CO	one-hour	87.3	5,060	5,147	23,000	CAAQS	22
	eight-hour	56.0	2,887	2,953	10,000	CAAQS	30
SO_2	one-hour	12.2	78.6	90.8	655	CAAQS	14
	three-hour	11.0 [c]	70.2	81.2	1,300	NAAQS	6
	24-Hour	1.8	16.5	18.3	105	CAAQS	17
	Annual	0.4	8.5	8.9	80	NAAQS	11

Source: (PEFE 2005j, DR 25)
Note(s):
a. Modeled annual NO_x corrected to NO_2 using ARM default value of 0.75.
b. Background values have been adjusted per staff recommended background concentrations shown in AIR QUALITY Table 10.
c. Staff used the applicant's CTSCREEN 1-hour results multiplied by 0.9 to convert to a 3-hour average.

Fumigation Modeling Impact Analysis

There is the potential that higher short-term concentrations may occur during fumigation conditions. During the early morning hours before sunrise, the air is usually very stable. During such stable meteorological conditions, emissions from elevated stacks rise through this stable layer and are dispersed. When the sun first rises, the air at ground level is heated, resulting in a vertical (both rising and sinking air) mixing of air for a few hundred feet or so. Emissions from a stack that enter this vertically mixed layer of air will also be vertically mixed, bringing some of those emissions down to the ground level.

Later in the day, as the sun continues to heat the ground, this vertical mixing layer becomes higher and higher, and the emissions plume becomes better dispersed. The early morning pollution event, called fumigation, usually lasts approximately 30 to 90 minutes.

Fumigation conditions are generally only compared to one-hour standards. The applicant analyzed the maximum one-hour, three-hour, eight-hour, and 24-hour air quality impacts under fumigation conditions from the expansion CTG using the SCREEN3 model (PEFE 2005a, p. 5.2-39). The results of the analysis, as shown in **AIR QUALITY Table 22**, indicate that the fumigation impacts could minimally further exacerbate violations of the PM10 and PM2.5 standards.

AIR QUALITY Table 22
Maximum PEFE Fumigation Impacts, ($\mu g/m^3$)

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$) [d]	Total Impact ($\mu g/m^3$)	Limiting Standard ($\mu g/m^3$)	Type of Standard	Percent of Standard
NO_2	one-hour	0.60 [a]	130	131	470	CAAQS	28
PM10	24-Hour	0.13 [b]	**134**	**134**	50	CAAQS	**268**
PM2.5	24-Hour	0.13 [b]	**86**	**86**	65	NAAQS	**133**
CO	one-hour	0.87 [a]	5,060	5,061	23,000	CAAQS	22
	eight-hour	0.48 [a]	2,887	2,887	10,000	CAAQS	29
SO_2	one-hour	0.13 [c]	78.6	78.7	655	CAAQS	12
	three-hour	0.10 [c]	70.2	70.3	1,300	NAAQS	5
	24-hour	0.04 [c]	16.5	16.5	105	CAAQS	16

From AFC (PEFE 2005a) Table 5.2-23 and Table B-5.
Note(s):
a. Inversion fumigation maxima from Case 5 - Cold Base.
b. Inversion fumigation maxima from Case 6 – Cold Low.
c. Inversion fumigation maxima from Case 3 – Avg. Base.
d. Background values have been adjusted per staff recommended background concentrations shown in AIR QUALITY Table 10.

Maximum fumigation impacts for the turbines were predicted to occur about 26.8 miles (40 km) from the facility (PEFE 2005a, p. 5.2-39). The impacts under fumigation conditions are expected to be lower than the maximum concentrations calculated by CTSCREEN in complex terrain (PEFE 2005a, p. 5.2-39). This is due to the very high stack temperatures which reduce the potential for fumigation and the fact that the fumigation modeling does not consider elevated terrain.

Startup Modeling Impact Analysis

The applicant modeled facility impacts during the startup of the new turbine and also modeled assuming simultaneous startup of one of the existing PEF combined cycle turbines to evaluate worst-case short-term impacts under startup conditions (PEFE 2005a, p. 5.2-39). Emissions rates for this scenario were based on permitted NO_x and CO emission rates during startup. Exhaust parameters for the minimum operating load point (50 percent) were used to characterize turbine exhaust during startup, and maximum one-hour NO_x and CO emissions rates of 80 lbs/hr and 902 lbs/hr were used, respectively. Startup impacts were evaluated using the CTSCREEN model. The results of the startup emissions modeling analysis are shown in **AIR QUALITY Table 23.**

As shown in **AIR QUALITY Table 23**, the worst-case emissions would not cause an exceedance of the one-hour NO_2 standard or the one-hour and eight-hour CO standards. Therefore, the modeling results indicate that the startup emissions do not have the potential to cause significant short-term ambient air quality impacts.

AIR QUALITY Table 23
PEFE Ambient Air Quality Impact
Applicant Turbine Startup Worst-Case Short-Term Impact Modeling

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$) [a]	Total Impact ($\mu g/m^3$)	Limiting Standard ($\mu g/m^3$)	Type of Standard	Percent of Standard
PEFE Turbine Startup							
NO_2	one-hour	34.7	130	164.7	470	CAAQS	35
CO	one-hour	391.0	5,060	5,451	23,000	CAAQS	24
CO	eight-hour	51.4	2,887	2,938	10,000	CAAQS	29
PEFE Turbine and PEF Turbine Startup							
NO_2	one-hour	204.0	130	334.0	470	CAAQS	71
CO	one-hour	1,946.3	5,060	7,006	23,000	CAAQS	30
CO	eight-hour	268.5	2,887	3,156	10,000	CAAQS	32

From AFC (PEFE 2005a), Table 5.2-23; (PEFE 2005j, DR 25).
Note(s):
a. Background values have been adjusted per staff recommended background concentrations shown in AIR QUALITY Table 10.

The worst-case short-term combustor tuning impacts for the CTG would be somewhat lower than the impacts presented below for commissioning, since the requested combustor tuning emission limits are somewhat lower than the requested commissioning emission limits.

Commissioning Modeling Impact Analysis

There are two high-emissions scenarios possible during commissioning. The first would be when the combustor is being tuned prior to the installation of the SCR system (PEFE 2005a, p. 5.2-40). NO_x emissions would be high because the NO_x emissions control system would not be functioning and because the combustor would not be tuned for optimum performance. CO emissions would also be high because combustor performance would not be optimized. The second high-emissions scenario for CO and NO_x would occur after the combustor had been tuned, but before completing the installation of the SCR system, when other parts of the turbine operating system are being checked out (PEFE 2005a, p. 5.2-40).

The applicant's estimated NO_x and CO emissions during commissioning under the turbine operating conditions that are least favorable for dispersion, which are expected to occur under part-load, low-temperature conditions (Case 6). It was also assumed by the applicant that the existing PEF turbines (3 total) would be operating at full load while the new turbine is undergoing commissioning. As such, the air quality impacts during commissioning include the existing units. The applicant modeled the commissioning impacts using ISCST3 (8-hour CO) and CTSCREEN (1-hour NO_2 and CO). The results of the commissioning emissions modeling analysis are shown in **AIR QUALITY Table 24.**

As shown in **AIR QUALITY Table 24**, the worst-case emissions would not cause an exceedance of the one-hour NO_2 standard or the one-hour and eight-hour CO standards. Therefore, the modeling results indicate that the commissioning emissions do not have the potential to cause significant short-term ambient air quality impacts.

Air Quality Table 24
PEFE Ambient Air Quality Impact
Applicant's Commissioning Worst-Case Short-Term Engine Impact ISC Modeling

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$) [a]	Total Impact ($\mu g/m^3$)	Limiting Standard ($\mu g/m^3$)	Type of Standard	Percent of Standard
NO_2	one-hour	137.4	130	267.4	470	CAAQS	57
CO	one-hour	1,111.4	5,060	6,171	23,000	CAAQS	27
CO	eight-hour	555.7	2,887	3,443	10,000	CAAQS	34

Source: (PEFE 2005j, DR 31).
Note(s):
a. Background values have been adjusted per staff recommended background concentrations shown in AIR QUALITY Table 10.

PSD Modeling Analysis

The applicant performed a modeling analysis, required for the PSD permit application, using the ISCST3 and/or CTSCREEN model to assess PSD increment consumption, and the Calpuff model to assess air quality related value impacts to the San Rafael Wilderness Class 1 Area. The San Rafael Wilderness is the only Class 1 Area within 100 kilometers of the project site. The air quality related values modeling includes analyses of regional haze, acid deposition, and PSD increment consumption within the Class 1 Area.

Staff's review of the PSD modeling analysis has not found any problems or issues with the modeling procedures or methods and this modeling analysis. The results of the PSD modeling analysis indicates that maximum modeled impacts are within allowable PSD increment consumption significance criteria, and that the impacts to the San Rafael Wilderness Class 1 Area will be less than significant (PEFE 2005a). The final regulatory review of the PSD increment consumption analysis is the responsibility of USEPA and the final regulatory review of the Class 1 Area air quality related values modeling assessment is the responsibility of the appropriate Federal Land Manager (United States Forest Service). The review of the Class 1 Area modeling assessment has been completed by the Federal Land Manager and this modeling assessment has been approved. However, the PSD increment consumption modeling review has not yet been completed by USEPA. This modeling review will be completed before the PSD permit issuance.

Operations Mitigation

Applicant's Proposed Mitigation

Emission Controls

As discussed in the project description section, the applicant proposes to employ dry low NO_x (DLN) combustors, SCR with ammonia injection, and operate exclusively on pipeline quality natural gas to limit turbine emission levels (PEFE 2005a, pp. 3-27

through 3-29). The AFC (PEFE 2005a, Table 5.2-18, p. 5.2-29) and subsequent information (Sierra 2005) provide the following BACT emission limits for the expansion CTG:

- NO_x: Emissions - 2.5 ppmvd at 15 percent O_2 (one-hour average, excluding startup/shutdown) and 16.25 lb/hr, with up to 10 hours per year of excursions at a level of 30 ppmvd at 15 percent O_2
- CO: Emissions - 6.0 ppmvd at 15 percent O_2 (3-hr rolling average, excluding startup/shutdown) and 23.75 lb/hr
- VOC: Emissions – 1.3 ppmvd at 15 percent O_2 and 2.95 lb/hr
- PM10: Emissions – 9.00 lb/hr
- SO_2: Emissions – 0.40 ppmvd at 15 percent O_2 and 3.495 lb/hr with fuel sulfur content of 0.75 grains/100 scf
- NH_3: Emissions - 10 ppmvd at 15 percent O_2 (24-hour rolling average) and 24.06 lb/hr

Emission Offsets

District Rule 2201 requires that the applicant provide emission offsets, in the form of banked ERCs, for the project's emissions exceeding the SJVAPCD offset thresholds. The PEFE would require offsets for NO_x, VOC, PM10, and SO_2. District rules do not currently require offsets for PM2.5 emissions. **AIR QUALITY Table 25** shows the District's summary of the emission liabilities that need to be offset under Rule 2201 requirements.

AIR QUALITY Table 25
PEFE District Offset Calculations (lb/year)

Offsets Triggered?	NO_x	VOC	PM10	SO_2	CO [b]
PEFE Emissions [a]	161,480	29,730	78,840	30,616	471,492
PEF Permitted Emissions [c]	344,484	227,619	236,462	84,780	1,220,166
Offset Threshold	20,000	20,000	29,200	54,750	200,000
Offsets Triggered?	**Yes**	**Yes**	**Yes**	**Yes**	**No**
Offset Calculations					
Required Offset Ratio [d]	1.5	1.5	1.5 [e]	1.5	---
PEFE Offsets Required [f]	242,220	44,596	118,260 [e]	45,924	---

From AFC (PEFE 2005a), Table 5.2-37; (PEFE 2005h, DR14).
Note(s):
a. PEFE emissions assume base load operation for 8,460 hr/year and startup.
b. Emission offsets are not required for CO in attainment areas since the Applicant has demonstrated to the satisfaction of the Air Pollution Control Officer (APCO) that the AAQS are not violated in the areas to be affected, and such emissions will be consistent with Reasonable Further Progress, and will not cause or contribute to a violation of the AAQS.
c. The PEF Permitted Emissions have already been offset, but their emissions are included in the major source offset threshold determination. The PEF Permitted Emissions totals do not include emergency equipment emissions that are included in Air Quality Table 15.
d. Based on assumption that all ERCs are obtained from sources more than 15 miles away.
e. Distance based offset ratio only. Interpollutant offset ratio for PM10 is discussed separately, and AIR QUALITY Table 28 provides the total quantity of ERCs necessary to offset PM10 emissions.
f. Calculated as 1.5 times the PEFE emissions (provided in row 1 of table), except CO.

All air pollutant offsets provided for the project are estimated on a quarterly basis (PEFE 2005h, DR 28). The applicant is proposing several sources of offsets to mitigate the project's potential emissions. Calculations of the required ERCs are based on the distance of the project from different sources of offsets. For major sources, the District requires a 1.3:1 offsetting ratio for off-site ERCs within 15 miles. For areas outside of the 15 miles, ERCs must be provided at a ratio of 1.5:1. The applicant has assumed that ERCs are obtained from sources more than 15 miles away, and is therefore using a ratio of 1.5:1 (PEFE 2005a, p. 5.2-58). The District determines appropriate interpollutant offset ratios on a case-by-case basis.

As shown in **AIR QUALITY Tables 26** through **AIR QUALITY Table 29**, the applicant has demonstrated, per District requirements, that it owns ERCs in quantities sufficient to offset the project's NO_x, VOC, PM10, and SO_2 emissions.

NO_x Emission Offsets

AIR QUALITY Table 26 provides a summary of the total project NO_x emissions and identifies the project offset sources. ERC S-1554-2 was generated from the retrofit of 31 Internal Combustion Engines with pre-combustion chambers. ERC S-1543-2 was generated from the addition of oxygen (O_2) controllers to steam generators.

AIR QUALITY Table 26
NO_x Offsets Available for the PEFE

Offset Source Location	Credit Number	Date of Reduction	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
Section 16, Township 27S, Range 28E, Heavy Oil Central Stationary Source	S-1554-2	Pre-1990	109,935	121,484	127,922	117,272
Elk Hills Gas Plant, Kern County	S-1543-2	12/05/1990	10,354	8,381	11,018	11,467
Total ERCs Provided	---	---	120,289	129,865	138,940	128,739
Total Required @ 1.5:1	---	---	59,726	60,389	61,053	61,053
Balance Remaining (S-1554-2)	---	---	60,563	69,476	77,887	67,686

Source: (PEFE 2005h, DR28).
Note(s):
* A zero balance means full mitigation, a negative balance indicates an offsets deficit, and a positive balance indicates offsets are available in excess of required offset levels. Please note that the offset balance is not the same as the ERC balance.

The project's offset proposal is in compliance with the District's NO_x offset requirements and is providing ERCs at a total offset ratio of 1.5:1 for the PEFE project, which meets staff's CEQA significant impact mitigation threshold that all non-attainment pollutants and their precursors be fully offset (i.e. minimum offset ratio of 1:1).

VOC Emission Offsets

AIR QUALITY Table 27 provides a summary of the total project VOC emissions and identifies the project offset sources. ERC N-444-1 was generated from the shutdown of an emissions unit. ERC S-1666-1 was generated from the shutdown of a cotton gin.

AIR QUALITY Table 27
VOC Offsets Available for the PEFE

Offset Source Location	Credit Number	Date of Reduction	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
757 11th Street, Tracy	N-444-1	1/31/1998	47,635	37,534	40,666	32,156
526 Mettler Frontage Rd. East	S-1666-1	Post-1990	0	0	0	9
Total ERCs Provided	---	---	47,635	37,534	40,666	32,165
Total Required @ 1.5:1	---	---	10,996	11,118	11,241	11,232
Balance Remaining	---	---	36,639	26,416	29,425	20,924

Source: (PEFE 2005h, DR 28).
Note(s):
* A zero balance means full mitigation, a negative balance indicates an offsets deficit, and a positive balance indicates offsets are available in excess of required offset levels. Please note that the offset balance is not the same as the ERC balance.

The applicant is in compliance with the District's VOC offset requirements and is providing ERCs at a total offset ratio of 1.5:1 for the PEFE project, which meets staff's CEQA significant impact mitigation threshold that all non-attainment pollutants and their precursors be fully offset (i.e. minimum offset ratio of 1:1).

PM10 Emission Offsets

The applicant has proposed the use of NO_x for PM10 interpollutant offsets. The interpollutant ratio proposed by the applicant (2.22:1) is the same as that accepted by the District for the PEF case, which was originally accepted for the La Paloma case in 1999. The District has since revised its approved calculation methods for the determination of appropriate interpollutant offset ratios. The applicant calculated a somewhat lower interpollutant offset ratio of 2.16:1 using the District's revised calculation procedure (PEFE 2005j DR 29), but maintained the higher 2.22:1 ratio proposal. The District, which approves interpollutant offsets on a case by case basis, reviewed the revised calculations and has provided a preliminary approval of the applicant's proposed 2.22:1 interpollutant offset ratio for this case (SJVAPCD 2005c).

AIR QUALITY Table 28 provides a summary of the total project PM10 emissions and identifies the project offset sources. NO_x ERC S-1554-2, discussed above, has been proposed to offset PM10 emissions.

AIR QUALITY Table 28
PM10 Offsets Available for the PEFE

Offset Source Location	Credit Number	Date of Reduction	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
Section 16, Township 27S, Range 28E, Heavy Oil Central Stationary Source	S-1554-2	Pre-1990	60,563	69,476	77,887	67,686
Total Required @ 2.72:1 [a]	---	---	52,877	53,464	54,052	54,052
ERC NO_x Balance Remaining *	---	---	7,686	16,012	23,835	13,634

From AFC (PEFE 2005a), Appendix F, Tables F-1 and F-2.
Note(s):
a. The District approved NO_x: PM10 ratio for PEF of 2.72:1, which includes the interpollutant ratio of 2.22:1 and the distance ratio of 1.5:1.
* A zero balance means full mitigation, a negative balance indicates an offsets deficit, and a positive balance indicates offsets are available in excess of required offset levels. Please note that the offset balance is not the same as the ERC balance.

The project's offset proposal is in compliance with the District's PM10 offset requirements and is providing ERCs at a total offset ratio of 2.72:1 for the PEFE project, which meets staff's CEQA significant impact mitigation threshold that all non-attainment pollutants and their precursors be fully offset (i.e. minimum offset ratio of 1:1).

PM2.5 Mitigation

The District's regulations do not currently require offsetting PM2.5 emissions. The project's particulate emissions are assumed to be both PM10 and PM2.5. Staff believes that the offsets being proposed for PM10 would fully offset the project's PM2.5 emissions. The use of the proposed NO_x for PM10 interpollutant offsets are based on reductions in secondary particulate formation. Secondary particulate are very fine particulate, which are assumed to be PM2.5. Therefore, for this case the proposed PM10 mitigation is considered to be equivalent to the same amount of PM2.5 mitigation.

SO_2 Emission Offsets

AIR QUALITY Table 29 provides a summary of the total project SO_2 emissions and identifies the project offset sources. ERC S-1344-5 was generated from the conversion of a steam generator to natural gas firing.

AIR QUALITY Table 29
SO_2 Offsets Available for the PEFE

Offset Source Location	Credit Number	Date of Reduction	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
Midway Premier Lease Section 32, Township 27S, Range 27E	S-1344-5	Post-1990	25,521	30,054	14,242	12,127
Total Required @ 1.5:1	---	---	11,324	11,450	11,575	11,575
Balance Remaining	---	---	14,197	18,604	2,667	552

From AFC (PEFE 2005a), Appendix F, Tables F-1 and F-2.
Note(s):
* A zero balance means full mitigation, a negative balance indicates an offsets deficit, and a positive balance indicates offsets are available in excess of required offset levels. Please note that the offset balance is not the same as the ERC balance.

The applicant is in compliance with the District's SO_2 offset requirements and is providing ERCs at a total offset ratio of 1.5:1 for the PEFE project, which meets staff's CEQA significant impact mitigation threshold that all non-attainment pollutants and their precursors be fully offset (i.e. minimum offset ratio of 1:1).

Adequacy of Proposed Mitigation

Staff concurs with the District's determination that the project's proposed emission controls/emission levels meets BACT requirements and that the proposed emission levels are reduced to the lowest technically feasible levels. Staff has determined that the proposed emission controls and emission levels, along with the proposed emission offset package, mitigate all project impacts to less than significant.

Staff concurs with the District's BACT emission limits of 2.5 ppm for NO_x and 6.0 ppm for CO. These emission limits are consistent with or lower than previous BACT determination made by the District for simple cycle projects. The PEFE project is a first

of a kind combination of turbine size, configuration, and control technology. To staff's knowledge there are no other 7F frame turbines operating in simple cycle configuration with SCR NOx controls. Due to the expected highly variable operations of a simple cycle turbine, among other design and operating factors, simple cycle turbines are typically permitted with somewhat higher short-term NOx concentration levels and CO concentration levels than are permitted for turbines in combined cycle operation. The PEFE turbine is proposing emission levels that are generally the same as or below those proposed for other recent California simple cycle gas turbine projects. Staff reviewed a number of other recent siting cases and found that the proposed emission limits for the PEFE turbine are as low as or lower than most of these other cases. A comparison of the PEFE proposed emission limits and those of ten other recent cases are presented in **AIR QUALITY Table 30**.

AIR QUALITY Table 30
Recent California Simple Cycle Project Emission Limit Comparison

Project	CTG Type	CTG MW	Year Licensed	Local Jurisdiction	NOx Limit	CO Limit	VOC Limit	NH3 Limit
PEFE (proposed)	GE 7F	160	2006 (est.)	SJVAPCD	2.5 ppm[1]	6.0 ppm[1]	1.3 ppm[1]	10 ppm[2]
Riverside	LM6000	48	2004	SCAQMD	2.5 ppm	6.0 ppm	1.5 ppm (est)	5 ppm
MID Ripon	LM6000	47.5	2004	SJVAPCD	2.5 ppm[1]	6.0 ppm[1]	2.0 ppm[1]	10 ppm[2]
Kings River	LM6000	48.5	2004	SJVAPCD	2.5 ppm[1]	6.0 ppm[1]	2.0 ppm[1]	10 ppm[2]
Tracy	GE 7E	84.4	2002	SJVAPCD	5.0 ppm[1]	6.0 ppm[1]	2.0 ppm[1]	10 ppm[2]
Los Esteros	LM6000	45	2002	BAAQMD	5.0 ppm[1]	4.0 ppm[1]	2.0 ppm[1]	10 ppm[1]
Henrietta	LM6000	46.9	2002	SJVAPCD	3.6 ppm[1]	6.0 ppm[1]	2.0 ppm[1]	10 ppm[2]
Gilroy *	LM6000	45	2001	BAAQMD	5.0 ppm[1]	6.0 ppm[1]	2.0 ppm[1]	10 ppm[1]
United Golden Gate	LM6000	51	2001	BAAQMD	3.0 ppm[1]	6.0 ppm[1]	2.0 ppm[1]	10 ppm[2]
Indigo *	LM6000	45	2001	SCAQMD	5.0 ppm	6.0 ppm[1]	2.0 ppm	5 ppm
Alliance Century *	GE10B1	10	2001	SCAQMD	5.0 ppm	6.0 ppm	n/a	5 ppm

Sources: Riverside (CEC 2004c), MID Ripon (CEC 2004a), Kings River (CEC 2004b); Tracy (CEC 2002a); Los Esteros (CEC 2002c); Henrietta (CEC 2002b); Gilroy (BAAQMD 2001), United Golden Gate (CEC 2001); Indigo (SCAQMD 2001a), and Alliance Century (SCAQMD 2001b).
SCAQMD – South Coast Air Quality Management District, BAAQMD – Bay Area Air Quality Management District, n/a – not available
* - Licensed under the emergency peaker program
1 – Three-hour rolling average
2 - Twenty-four hour rolling average

As **AIR QUALITY Table 30** shows, the proposed PEFE emission limits for NOx and VOC are as low as or lower than any of the other simple cycle projects recently licensed by the Energy Commission. The Tracy Peaker Project (similar to PEFE in having a higher exhaust temperature turbine - 7E frame turbine that needs a dilution air system), originally permitted by the District in 2001, had approved BACT limits of 5.0 ppm for NOx and 6.0 ppm for CO (CEC 2002a). The more recent MID Ripon and Kings River simple cycle cases, both permitted by the District in 2004, had identical BACT limits of 2.5 ppm for NOx and 6.0 ppm for CO (CEC 2004a, 2004b). To staff's knowledge the proposed BACT NOx emission limits are as low as or lower than all other simple cycle project BACT determinations by the District, and as low or lower than BACT limits approved by any other air district within California for large simple cycle projects. Additionally, staff considers the District's determination not to require an oxidation catalyst to be reasonable since; the District is in attainment of the CO AAQS, the project was found to have CO impacts well below those necessary to cause any new violations of the CO AAQS; and the project (located in a sparsely populated area) was not found to have significant impacts from the CTGs hazardous air pollutant emissions.

It should be also noted that the BACT limits required in California are more stringent than those required in other states for large simple cycle turbines. Staff's review of USEPA's BACT/LAER clearinghouse (USEPA 2005d) indicates that the most stringent simple cycle turbine NOx emission limits outside of California are generally no more stringent than 9 ppm, with the NOx emission limits as high as 42 ppm allowed in some states.

The District has consistently required an ammonia slip limit of 10 ppm for all large gas turbine projects, whether they are simple cycle or combined cycle. For combined-cycle projects, staff believes an ammonia slip level of 5 ppm should be required. However, for simple cycle projects, such as PEFE, staff agrees that a 10 ppm ammonia slip level is adequate. Staff has not found any existing 7F simple cycle turbine performance data to indicate that this project, which to staff's knowledge is a first-of-a-kind commercial 7F simple cycle turbine/control technology configuration within the United States, should have a lower ammonia slip level. Therefore, staff believes that 10 ppm is the reasonable technically feasible ammonia slip level for this project. Additionally, the District's approved PM10 attainment plan does not currently target ammonia emission reductions (SJVAPCD 2003). The District currently believes that the ammonia rich central valley would not see significant benefits from reducing ammonia emissions, so the District is focusing on emission reductions from primary sources of PM10 (primarily fugitive dust). Thus, staff agrees with the District's PDOC permitted ammonia slip level of 10 ppm.

Staff has made a preliminary determination that the applicant's offset proposal meets both District requirements, and meets CEQA mitigation requirements since all non-attainment pollutants and their precursors are offset at an offset ratio greater than 1:1. However, there is the potential for USEPA to continue to comment on the interpollutant offset calculation methodology (see Federal LORS compliance section); and the District's latest "Annual Demonstration Report for Equivalency of Offsets" report is scheduled to released on November 18th, 2005. Staff will provide additional information to supplement this analysis should either of these two issues potentially impact the current Pastoria offset package findings.

Staff's current acceptance of this offset package was determined solely based on the merits of this case, including the District offset requirements, the project's emission limits, the specific ERCs proposed, and ambient air quality considerations of the region, and does not in any way provide a precedence or obligation for the acceptance of offset proposals for any other current or future licensing cases.

Staff Proposed Mitigation

Staff is proposing conditions of certification (**AQ-SC6** through **AQ-SC8**) that would ensure ongoing compliance and ensure that the license is amended as necessary to incorporate changes to the air quality permits and any proposed changes to the offset proposal.

Greenhouse Gas Emissions 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. Such reporting would be done in accordance with accepted reporting protocol as specified.

The calculations specified in Condition of Certification **AQ-SC9** are based on standard protocols developed by the Intergovernmental Panel on Climate Change, 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 Intergovernmental Panel on Climate Change-approved methodology for calculating the greenhouse gas emissions in an inventory is particular to the type of fossil fuel burned. The oxidation factors, fuel-based emission factors and global warming potential factors are established by the Intergovernmental Panel on Climate Change in their Revised 1996 IPCC Guide lines for National Greenhouse Gas Inventories: Reference Manual.

CUMULATIVE IMPACTS

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

This analysis is 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 ambient air quality conditions presented describe the current air quality background in the southern San Joaquin Valley. The construction and operating impact analysis include those background concentrations in the impact determinations. Additionally, the operating impact analysis included analyzing the cumulative facility impacts of the existing PEF and proposed PEFE facilities (see **AIR QUALITY Tables 21** and **23**). This section includes three additional analyses:

- a summary of projections for the air district's programmatic efforts to abate such pollution;
- a description of the project's "localized cumulative impacts"-- direct emissions locally when combined with other local major emission sources, including a discussion of the cumulative impacts of the existing PEF facility and the proposed PEFE; and
- a discussion of secondary pollution impacts, particularly ozone and PM10.

SJVAPCD Attainment Planning

The SJVAPCD is the lead agency for managing air quality and coordinating planning efforts for the portion of Kern County within the SJVAB, so that the ozone and PM10 standards are attained in a timely fashion. The District is responsible for developing those portions of the State Implementation Plan (SIP) and the Air Quality Management Plan (AQMP), that deal with certain stationary and area source controls and, in cooperation with the transportation planning agencies (TPAs), the development of transportation control measures (TCMs). The California Air Resources Board (CARB) is responsible for submitting the SIP to USEPA.

The District submitted the Extreme Ozone Attainment Demonstration Plan to EPA on November 15, 2004 (SJVAPCD 2004). The Plan is currently in review at EPA. This plan targets NO_x and VOC emission reductions in a multitude of sources, such as wineries, feedlots, small combustion sources (including small <10 MW turbines), and various solvent/coating sources. However, the plan does not target additional emission reductions from large gas-fired turbines that are already required to meet stringent BACT emission limits. While there is no approved attainment plan for the project to conflict or comply with, the project will be required to comply with all District rules and regulations. The SJVAPCD rules and regulations specify the emissions control and offset requirements for new sources such as the PEFE. PEFE will use BACT to control the project's emissions. In addition, the operational emissions of NO_x and VOC are proposed by the applicant to be mitigated by the use of emissions offset credits (ERCs) obtained by the applicant.

The District prepared a PM10 Attainment Plan in 2003 which provides for attainment of the PM10 standards by 2010 (SJVAPCD 2003). This plan was approved by the USEPA in 2004. Measures outlined in the Proposed 2003 PM10 Plan to reduce emissions during construction include amendments to Regulation VIII that have been implemented. No other specific measures contained in the plan would appear applicable

to the project emission sources. The applicant would be expected to comply with any additional applicable revisions to the Regulation VIII rules that would be implemented prior to the end of the project construction. SJVAPCD rules and regulations specify the emissions control and offset requirements for new sources, such as the PEFE. BACT would be implemented, and PM10 ERCs, which would be obtained by the applicant and approved and certified by the SJVAPCD, comply with District rules, so that the project would be consistent with the strategies and future emissions anticipated under the PM10 AQMP.

Since the project will comply with all existing emission control regulations and will fully offset all nonattainment pollutant and precursor emissions, staff believes that the project will not conflict with the District attainment plans.

Localized Cumulative Impacts

No known urban development is presently planned within six miles of the plant site (SJVAPCD 2005b), and the area surrounding the PEF/PEFE plant site is undeveloped and vegetated with non-native grassland used for cattle grazing (PEFE 2005a, p. 5.2-60).

To ensure that potential cumulative impacts were adequately considered, the applicant included an evaluation of the operation of the PEFE combined with the existing PEF. The PEF combined cycle turbine/HRGSs and the PEFE simple cycle turbine have significantly different exhaust conditions, with the PEFE turbine having a much hotter (approximately 800°F vs. 200°F) and more buoyant exhaust. The PEFE turbine also has a somewhat higher mass flow rate than the PEF turbines due to the dilution air that is added to cool the simple cycle exhaust from approximately 1100°F to 800°F, as necessary for the operation of the SCR NOx control system. This significant difference in plume buoyancy means the PEF and PEFE plumes rise at different rates and to different final heights, so the maximum impacts from each occur in different locations in the elevated terrain south/southeast of the site. Therefore, the maximum cumulative impacts of PEF and PEFE are predicted to be just marginally greater than the predicted maximum impacts of the existing PEF.

The results of the PEF and PEFE facility cumulative modeling analysis are summarized in **AIR QUALITY Tables 21** and **23**. The combined impacts of the PEF/PEFE site would not create any new exceedances of any criteria pollutant standard and the PEF and PEFE facility nonattainment pollutant and precursor emissions are all offset at a ratio of greater than 1:1; therefore, staff believes that the cumulative impacts of the combined PEF/PEFE facility have been mitigated to a level of less than significant.

Secondary Pollutant Impacts

The project's gaseous emissions of NO_x, SO_2, VOC and ammonia can contribute to the formation of secondary pollutants, ozone and PM10. 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. No regulatory agency models are approved for assessing single source ozone impacts. However, because of the known relationship of NO_x and VOC emissions to ozone formation, it can be said that the emissions of NO_x and VOC

from the PEFE do have the potential (if left unmitigated) to contribute to higher ozone levels in the region.

Secondary PM10 formation is the process of conversion from gaseous reactants to particulate products. The process of gas-to-particulate conversion is complex and depends on many factors, including local humidity and the presence of other compounds. Currently, there are no agency (USEPA or CARB) recommended models or procedures for estimating nitrate or sulfate formation. Nitrogen oxides first react to form nitric acid, which then reacts reversibly with ammonia to form ammonium nitrate. Sulfur oxides first react to form sulfuric acid, which then react irreversibly to form ammonium bisulfate and ammonium sulfate. Because of the known relationship of NO_x and SO_2 emissions to secondary PM10 formation, these emissions, if left unmitigated, will to contribute to higher PM10 levels in the region.

The ammonia emissions from the project would come from the SCR system, which controls the NO_x emissions, as unreacted ammonia, or "ammonia slip," remains in the exhaust after passing through the SCR catalyst system. The San Joaquin Valley, as a result of agricultural ammonia emissions, is noted to be generally ammonia rich, meaning that ammonia is not the limiting reactant for secondary PM10 formation (i.e. the emission inventory indicates that there is more ammonia available in the ambient air than the acid gas reactants, such as nitric acid from NO_x and sulfuric acid from SO_x needed to react with ammonia to form secondary particulate). However, increases in ammonia may cause some increase in secondary particulate formation; therefore, the ammonia emissions should be limited to the extent reasonable and feasible for this source.

The applicant is proposing to mitigate the project's NO_x, VOC, SO_2, and PM10 emissions through the use of emission offsets and limit the ammonia slip emissions to 10 ppm. The NO_x, VOC, SO_2, and PM10 offsets, even considering the District's offset thresholds and exempt emission sources, would be provided at greater than a 1:1 ratio. Additionally, the project is providing a continuous operating year's worth of offsets for a simple-cycle turbine that will likely operate only a fraction of the year. With the proposed emission offsets, it is staff's belief that the project will not cause significant secondary pollutant impacts.

COMPLIANCE WITH LORS

The applicant submitted a permit application to the San Joaquin Valley Air Pollution District (District) in April 2005 (PEFE 2005d) and the District deemed the application complete on May 19, 2005 (SJVAPCD 2005a). The San Joaquin Valley Air Pollution Control District submitted a Preliminary Determination of Compliance (PDOC) for the PEFE project on August 31, 2005 (SJVAPCD 2005c) and a Final Determination of Compliance on November 9, 2005 (SJVAPCD 2005e). The District responded to comments from USEPA, the applicant and staff in the FDOC, and revised certain conditions (34, 35, 38, 45, 51, and 66) to respond to these comments. Compliance with all District Rules and Regulations was demonstrated to the District's satisfaction in the FDOC. The District's FDOC conditions are presented in the Conditions of Certification.

FEDERAL

The District is responsible for issuing the Federal New Source Review (NSR) permit. This project in combination with the PEF will require a PSD permit. The applicant has provided the PSD permit applicant to the USEPA (PEFE 2005c), which was deemed administratively complete on June 6, 2005 (USEPA 2005a). The PSD permit will most likely be completed subsequent to the completion of this licensing case.

The USEPA provided several comments to the District regarding the PDOC. USEPA is satisfied with most of the District's responses to their comments. However, one of these comments regarded the interpollutant offset ratio and distance offset ratio calculation. USEPA noted that these two offset ratios should be multiplied rather than added, which would require an additional 24.1 tons of NOx offsets to offset the PM10 emissions from the project. The District responded to this comment in the FDOC noting that their methodology ensures adequate offsets and that this method has been consistently applied in the past (SJVAPCD 2005e, Attachment H). The USEPA has not completed their review of this particular comment response; therefore, there is a potential that this offset ratio LORS interpretation issue may be continued by the USEPA. Staff will evaluate any further comments from USEPA on this issue if they are received prior to the Evidentiary Hearings for this case.

Staff provided the District an additional PDOC comment regarding the interpollutant offset calculation methodology. This comment concerned the use of a single worst-case event basis rather than or in combination with longer term average conditions to determine the NOx to nitrate particulate conversion. The District responded that they believe using the worst-case event data is preferable for their attainment planning purposes (SJVAPCD 2005e, Attachment H). Additionally, USEPA has indicated that they believe the NOx to particulate conversion calculation methods for this case are supportable and consistent with the SIP.

STATE

Staff believes that the operation of the project, after the implementation of staff's recommended mitigation measures, and the District's recommended conditions specified in the PDOC (**AQ-1** to **66**), would comply with all applicable state LORS.

LOCAL

The District has issued an FDOC, which states that the proposed project is expected to comply with all applicable District rules and regulations, and that offsets will be provided prior to initial operation.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

No public or agency comments have been provided to the Energy Commission regarding the Air Quality section of the Preliminary Staff Assessment.

CONCLUSIONS

With the following proposed Conditions of Certifications and appropriate ERCs, the project is not expected to have any significant air quality impacts. Staff is proposing conditions of certification (**AQ-SC1** through **AQ-SC5**) that would mitigate the potential construction impacts. Staff is proposing conditions of certification (**AQ-SC6** through **AQ-SC8**) that would ensure ongoing compliance and ensure that the license is amended as necessary to incorporate changes to the air quality permits and any proposed changes to the offset proposal. Finally, staff is proposing condition of certification **AQ-SC9** to ensure that the facility provides greenhouse gas emissions data.

Staff recommends the following conditions of certification to address the impacts associated with the construction and operation of the PEFE. The conditions and/or verifications of the conditions presented in the PSA have been revised by staff, or the District, as necessary to address agency and applicant comments (PEFE 2005i), or to clarify compliance requirements.

CONDITIONS OF CERTIFICATION

STAFF CONDITIONS

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.

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 controlling fugitive dust emissions. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

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

B. No vehicle shall exceed 10 miles per hour within the construction site.

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

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

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

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

G. All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the 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 washed or swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.

J. At least the first 500 feet of any public roadway exiting from the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff from the construction site is visible on the public roadways.

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

L. All vehicles that are used to transport solid bulk material on public roadways and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and

loaded onto the trucks in a manner to provide at least one foot of freeboard.

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

Verification: The 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 Monthly Compliance Report (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 District or U.S. EPA, and any revised permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any 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 shall surrender the emission offset credits listed in Appendix A or a modified list, as allowed by this condition, at the time that surrender is required by condition **AQ-43**. The project owner shall request CPM approval for any substitutions or modification of credits listed in Appendix A. 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) clearly will not cause the project to result in a significant environmental impact, and each requested change is consistent with applicable federal and state laws and regulations.

Verification: The project owner shall submit to the CPM a list of ERCs to be surrendered to the District at least 60 days prior to initial startup. If the CPM, in consultation with the District, approves a substitution or modification, the CPM shall file a statement of the approval with the commission docket and mail a copy of the statement to every person on the post-certification mailing list. The CPM shall maintain an updated list of approved ERCs for the project.

AQ-SC8 The project owner shall comply with all staff (AQ-SC) and district (AQ) Conditions of Certification. The CPM, in consultation with the District, may

approve as an insignificant change, any change to an air quality Condition of Certification, provided that: (1) the project remains in compliance with all applicable laws, ordinances, regulations, and standards, (2) the requested change clearly will not cause the project to result in a significant environmental impact, (3) no additional mitigation or offsets will be required as a result of the change, (4) no existing daily, quarterly, or annual permit limit will be exceeded as a result of the change, and (5) no increase in any daily, quarterly, or annual permit limit will be necessary as a result of the change.

Verification: The project owner shall notify the CPM in writing of any proposed change to a condition of certification pursuant to this condition and shall provide the CPM with any additional information the CPM requests to substantiate the basis for approval.

AQ-SC9 If the project owner does not participate in the voluntary California Climate Action Registry, then the project owner shall report on a quarterly basis to the CPM the quantity of greenhouse gases (GHG) emitted as a direct result of facility electricity production as follows:

The project owner shall maintain a record of fuel use in units of million-Btus (mmBtus) for all fuels burned on site for the purpose of power production. These fuels shall include but are not limited to: (1) all fuel burned in the combustion turbines, (2) HRSGs (if applicable) or auxiliary boiler (if applicable), and (3) all fuels used in any capacity for the purpose of turbine 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 GHG 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 (VOC 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 following IPCC Global Warming Potentials

(GWP): 310 for N_2O (1 pound of N_2O is equivalent to 310 pounds of CO_2) and 21 for CH_4.

The project owner shall maintain a record of all SF_6 that is used for replenishing on-site transformers. 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 of 23,900 for SF_6.

On a quarterly 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 and SF_6.

Verification: GHG emissions that are not reported to the California Climate action Registry shall be reported to the CPM as part of the Quarterly Air Quality Reports required by Condition of Certification AQ-65.

DISTRICT PRELIMINARY DETERMINATION OF COMPLIANCE CONDITIONS (SJVAPCD 2005b)

SJVAPCD Permit No. Unit S-3636-14 (Unit #4): 160 MW Nominally Rated Simple-Cycle Power Generating System Consisting of a General Electric 7FA Natural Gas-Fired Combustion Turbine Generator With Dry Low NO_x Combustors.

AQ-1 No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

Verification: The project owner will document any complaints that it has received from the public in the Quarterly Operational Report (**AQ-65**). The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission.

AQ-2 The project owner shall not begin actual onsite construction of the equipment until the lead agency satisfies the requirements of the California Environmental Quality Act (CEQA). [California Environmental Quality Act]

Verification: The project owner shall keep proof of the project's District air permit and CEC certification including copies of all permit conditions and Conditions of Certification onsite starting at the commencement of construction through the final decommissioning of the project. The project owner shall make the District's permit conditions and Conditions of Certification available at the project site to representatives of the District, California Air Resource Board (CARB) and the Energy Commission for inspection.

AQ-3 The project owner shall notify the District of the date of initiation of construction no later than 30 days after such date, the date of anticipated startup not more than 60 days nor less than 30 days prior to such date, and the date of actual startup within 15 days after such date. [District Rule 4001]

Verification: The project owner shall notify the CPM and the District of the date of initiation of construction no later than 30 days after such date, the date of anticipated startup, defined here as first turbine fire, not more than 60 days or less than 30 days prior to such date, and the date of actual startup within fifteen (15) days after such date.

AQ-4 Selective catalytic reduction (SCR) system shall serve the gas turbine engine (GTE). Project owner shall submit SCR catalyst design details to the District at least 30 days prior to commencement of construction. [District Rule 2201]

Verification: The project owner shall submit SCR and oxidation catalyst design details that demonstrate compliance with this condition to the APCO and the CPM 30 days prior to commencement of construction.

AQ-5 Project owner shall submit continuous emission monitor design, installation, and operational details to the District at least 30 days prior to commencement of construction. [District Rule 2201]

Verification: The project owner shall provide copies of drawings of the continuous emissions monitor design, installation, and operations details to the CPM and the District at least 30 days prior to construction of permanent foundations.

AQ-6 Project owner shall minimize the emissions from GTE to the maximum extent possible during the commissioning period. Conditions **AQ-6** through **AQ-16** shall apply only during the commissioning period as defined below. Unless otherwise indicated, Conditions **AQ-17** through **AQ-66** shall only apply after the commissioning period has ended. [District Rule 2201]

Verification: The project owner shall provide in the monthly commissioning status report (see the verification for Condition **AQ-11**) information regarding the types and effectiveness of methods used to minimize commissioning period emissions.

AQ-7 Commissioning activities are defined as, but not limited to, all testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the construction contractor to insure safe and reliable steady state operation of the GTE and all ancillary equipment. [District Rule 2201]

Verification: The project owner shall provide written notification to the APCO and the CPM of the expected date of first turbine roll at least 15 days before the first turbine roll.

AQ-8 Commissioning period shall commence when all mechanical, electrical, and control systems are installed and individual system startup has been completed, or when the GTE is first fired, whichever occurs first. The commissioning period shall terminate when the GTE has successfully completed initial performance testing and is available for commercial operation. [District Rule 2201]

Verification: The project owner shall provide written notification to the APCO and the CPM of the expected date of first turbine roll at least 15 days before the first turbine roll. The project owner shall provide written notification to the APCO within 5 day after the turbines are available for commercial operation.

AQ-9 At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturer and the construction contractor, the combustors of this unit shall be tuned to minimize emissions. [District Rule 2201]

Verification: The project owner shall provide combustor tuning information to demonstrate compliance with this condition, and that information shall be submitted to the Energy Commission CPM as part of the monthly commissioning status report noted in the verification of Condition **AQ-11**.

AQ-10 At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturer and the construction contractor, the Selective Catalytic Reduction (SCR) system shall be installed, adjusted, and operated to minimize emissions from this unit. [District Rule 2201]

Verification: The project owner shall provide emission abatement system information (such as dates of catalyst installation and ammonia grid initial operation) to demonstrate compliance with this condition, and that information shall be submitted to the Energy Commission CPM as part of the monthly commissioning status report noted in the verification of Condition **AQ-11**.

AQ-11 The project owner shall submit a plan to the District at least four weeks prior to the first firing of this unit, describing the procedures to be followed during the commissioning period. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not limited to, the tuning of the combustors, the installation and operation of the SCR systems, the installation, calibration, and testing of the NO_x and CO continuous emissions monitors, and any activities requiring the firing of this unit without full abatement by the SCR system. [District Rule 2201]

Verification: The project owner shall submit a single commissioning plan to the District and the CPM at least four weeks prior to the first firing of the combustion turbine, describing in detail the procedures to be followed for the turbine. 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 the commissioning plan and demonstrates compliance with all other substantive requirements listed in Conditions **AQ-6** through **AQ-17**. The monthly commissioning status report shall be submitted to the CPM monthly within ten (10) days of the numeric calendar day of turbine first fire date.

AQ-12 Emission rates from this unit during the commissioning period shall not exceed any of the following: NO_x (as NO_2) 308 lb/hr or 3,200 lb/day; VOC (as methane) 273 lb/hr or 355 lb/day; CO 2,527 lb/hr or 10,824 lb/day; PM10 216 lb/day; or SO_x (as SO_2) 84 lb/day. [District Rule 2201]

Verification: The project owner shall provide emissions data to demonstrate compliance with this condition, and that data shall be submitted to the CEC CPM as part of the monthly commissioning status report noted in the verification of Condition **AQ-11**.

AQ-13 During the commissioning period, the project owner shall demonstrate compliance with conditions **AQ-12** through the use of properly operated and maintained continuous emissions monitors and recorders as specified in these permit conditions. The monitored parameters for this unit shall be

recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation). [District Rule 2201]

Verification: The project owner shall provide CEM data to demonstrate compliance with conditions **AQ-12**, and that data shall be submitted to the CEC CPM as part of the monthly commissioning phase status report noted in the verification of Condition **AQ-11**.

AQ-14 The continuous emissions monitors specified in these permit conditions shall be installed, calibrated, and operational prior to the first firing of the unit. After first firing, the detection range of the CEMS shall be adjusted as necessary to accurately measure the resulting range of NO_x and CO emission concentrations. [District Rule 2201]

Verification: The project owner shall provide notification to the District and the CPM of the anticipated dates for installation, calibration and testing for the CEMS at least ten (10) days prior to installation. The project owner shall provide a report to the District and CPM for approval demonstrating compliance with CEMS calibration requirements prior to turbine first fire. The project owner shall provide ongoing calibration data in the monthly commissioning status reports (see verification of Condition **AQ-11**).

AQ-15 Firing of GTE without abatement of emissions by the SCR system shall be minimized to the extent possible. Such operation of this unit without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system catalyst in place. [District Rule 2201]

Verification: The project owner shall provide to the District and the CPM a reporting of the number of firing hours without abatement for the turbine in the monthly commissioning status reports (see verification of Condition **AQ-11**).

AQ-16 The total mass emissions of NO_x, CO, VOC, PM10, and SO_x that are emitted during the commissioning period shall accrue towards the consecutive twelve month emission limits specified in condition **AQ-39**. [District Rule 2201]

Verification: The project owner shall provide emissions data to demonstrate compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-17 The project owner shall submit to the District information correlating the NO_x control system operating parameters to the associated measured NO_x output. The information must be sufficient to allow the District to determine compliance with the NO_x emission limits of this permit during times that the CEMS is not functioning properly. [District Rule 4703]

Verification: The project owner shall compile the required NO_x control system and emissions data and submit the information to the CPM and the APCO in the Quarterly Operational Reports (**AQ-65**).

AQ-18 GTE and electrical generator lube oil vents shall be equipped with mist eliminators. Visible emissions from lube oil vents shall not exhibit opacity of 5% or greater, except for up to three minutes in any hour. [District Rules 2201 and 4101]

Verification: The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission to verify the installation and proper operation of the lube oil vent mist eliminators.

AQ-19 GTE exhaust design shall provide space for additional selective catalytic reduction catalyst if required to meet NO_x emission limit. [District Rule 2201]

Verification: The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission to verify the exhaust design.

AQ-20 The GTE shall be equipped with a continuous monitoring system to measure and record fuel consumption. [District Rules 2201 and 4001]

Verification: The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission to verify the continuous monitoring system is properly installed and operational.

AQ-21 Exhaust duct downstream of the SCR unit shall be equipped with continuously recording emissions monitors (CEMS) for NO_x, CO, and O_2. All CEMS shall be dedicated to this unit. NO_x and O_2 CEMS shall meet the requirements of 40 CFR Part 75 and CO CEMS shall meet the requirements of 40 CFR Part 60. CEMS shall be capable of monitoring emissions during normal operating conditions and during startups and shutdowns. If, as determined by District source test staff, the accuracy of CEMS during startup events is not demonstrated, CEMS results during startup and shutdown events shall be replaced with startup emission rates obtained during source testing to determine compliance with emission limits in conditions **AQ-36**, **AQ-38** and **AQ-39**. [District Rule 2201]

Verification: The project owner shall make the site available for inspection by representatives of the District, CARB and the Commission to verify the continuous monitoring system is properly installed and operational.

AQ-22 Exhaust duct shall be equipped with a continuously recording emission monitor upstream of the SCR unit for measuring the NO_x concentration for the purposes of calculating ammonia slip. Project owner shall check, record, and quantify the calibration drift (CD) at two concentration values at least once daily (approximately 24 hours). The calibration shall be adjusted whenever the daily zero or high-level CD exceeds 5%. If either the zero or high-level CD exceeds 5% for five consecutive daily periods, the analyzer shall be deemed out-of-control. If either the zero or high-level CD exceeds 10% during any CD check, analyzer shall be deemed out-of-control. If the analyzer is out-of-control, the project owner shall take appropriate corrective action and then repeat the CD check. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO calibration drift data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-23 The facility shall install and maintain equipment, facilities and systems compatible with the District's CEM data polling software system and shall

make CEM data available to the District's automated polling system on a daily basis. [District Rule 1080]

Verification: The project owner shall provide a Continuous Emission Monitoring System (CEMS) protocol for approval by the CPM and the APCO at least 60 days prior to installation of the CEMS. The project owner shall make the site available for inspection of the CEMS by representatives of the District, CARB and the Commission.

AQ-24 Upon notice by the District that the facility's CEM system is not providing polling data, the facility may continue to operate without providing automated data for a maximum of 30 days per calendar year provided the CEM data is sent to the District by a District-approved alternative method. [District Rule 1080]

Verification: The project owner shall provide required non-polled CEM data to the District by a District-approved alternative method.

AQ-25 The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NO_x, CO, and O_2 analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]

Verification: Prior to construction of the turbine stacks the project owner shall provide to the CPM for approval detailed plan drawings of the turbine stacks that show the sampling ports and demonstrate compliance with the requirements of this condition. The project owner shall make the site available for inspection of the turbine stacks by representatives of the District, CARB and the Commission.

AQ-26 Ammonia injection grid shall be equipped with operational ammonia flow meter and injection pressure indicator. [District Rules 2201 and 4351]

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

AQ-27 Project owner shall monitor and record exhaust gas temperature at selective catalytic reduction catalyst inlet. [District Rules 2201 and 4351]

Verification: The project owner shall compile the required exhaust gas temperature data and submit the information to the CPM and the APCO in the Quarterly Operational Reports (**AQ-65**).

AQ-28 GTE shall be fired exclusively on natural gas, consisting primarily of methane and ethane, with a sulfur content of no greater than 0.75 grains of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201]

Verification: The project owner shall compile the required data on the sulfur content of the natural gas and submit the information to the CPM and the APCO in the Quarterly Operational Reports (**AQ-65**).

AQ-29 Startup is defined as the period beginning with GTE initial firing until the unit meets the lb/hr and ppmv emission limits in condition **AQ-31**. Shutdown is defined as the period beginning with initiation of GTE shutdown sequence and ending with cessation of firing of the GTE. Startup and shutdown durations shall not exceed one hour per occurrence. [District Rule 2201 and 4001]

Verification: The project owner shall submit to the CPM and APCO the GTE startup and shutdown event duration data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-30 Ammonia shall be injected when the selective catalytic reduction system catalyst temperature exceeds the minimum operating temperature recommended by the SCR manufacturer. Project owner shall monitor and record catalyst temperature during periods of startup. [District Rule 2201]

Verification: The project owner shall compile the required catalyst temperature data and submit the information to the CPM and APCO as part of the Quarterly Operational Report (**AQ-65**).

AQ-31 Emission rates from GTE, except during startup and/or shutdown, shall not exceed any of the following: NO_x (as NO_2) 16.25 lb/hr and 2.5 ppmvd @ 15% O_2; VOC 2.95 lb/hr and 1.3 ppmvd @ 15% O_2; CO 23.75 lb/hr and 6 ppmvd @ 15% O_2 or ammonia 10 ppmvd @15% O_2. NO_x (as NO_2) emission limit is a one-hour average. Ammonia emission limit is a twenty-four hour rolling average. All other emission limits are three-hour rolling averages. [District Rules 2201, 4001, and 4703]

Verification: The project owner shall submit to the CPM and APCO GTE emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-32 Compliance with NO_x emission limitations specified in condition **AQ-31** shall not be required during short-term excursions limited to a cumulative total of 10 hours per rolling 12-month period. Short-term excursions are defined as 15-minute periods designated by the owner/operator (and approved by the APCO) that are the direct result of transient load conditions, not to exceed four consecutive 15-minute periods, when the 15-minute average NO_x concentration exceeds 2.5 ppmvd @ 15% O_2. The maximum 1-hour average NO_x concentration for periods that include short-term excursions shall not exceed 30 ppmvd @ 15% O_2. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO turbine emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-33 Examples of transient load conditions include, but are not limited to the following: (1) initiation/shutdown of GTE inlet air cooling and (2) rapid GTE load changes. All emissions during short-term excursions shall accrue towards the hourly, daily, and annual emissions limitations of this permit and shall be included in all calculations of hourly, daily, and annual mass emission rates as required by this permit. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO GTE emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-34 Compliance with NOx, CO and VOC emissions limitations specified in condition #31 shall not be required during combustor tuning activities. Combustor tuning activities are defined as any testing, adjustment, tuning, or calibration activities necessary to insure safe and reliable steady state operation of the GTE following replacement of the combustor components, during seasonal tuning events, when recommended by the turbine manufacturer, or as necessary to maintain low emissions performance. This includes, but is not limited to, adjusting the amount of fuel distributed between the combustion turbine's staged fuel systems to simultaneously minimize NOx and CO production while minimizing combustor dynamics and ensuring combustor stability. The exemption for combustor tuning activities shall be limited to 6 hours per calendar year. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO GTE emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-35 Emission rates from GTE during combustor tuning shall not exceed any of the following: NO_x (as NO_2) 300 lb/hr and 600 lb/period; VOC 48 lb/hr and 96 lb/period; and CO 2,514 lb/hr and 2,514 lb/period. Hourly emissions are on a one-hour average basis. [District Rules 2201]

Verification: The project owner shall submit to the CPM and APCO turbine emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-36 Emission rates from the GTE shall not exceed either of the following: PM10 9.0 lb/hr and SO_x (as SO_2) 3.495 lb/hr. Emission limits are three-hour rolling averages. [District Rules 2201 and 4001]

Verification: The project owner shall submit to the CPM and APCO GTE emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-37 During startup or shutdown GTE exhaust emissions shall not exceed any of the following: NO_x (as NO_2) 80 lb; VOC 16 lb; or CO 902 lb in any one hour. [California Environmental Quality Act and District Rule 4102]

Verification: The project owner shall submit to the CPM and APCO GTE emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-38 On any day when a startup or shutdown occurs, emission rates from GTE shall not exceed any of the following: PM10 216 lb/day; SO_x (as SO_2) 84 lb/day; NO_x (as NO_2) 450 lb/day; VOC 96.9 lb/day; or CO 2,113 lb/day. On any day when combustor tuning occurs, emissions from GTE shall not exceed

any of the following: PM10 216 lb/day; SO_x (as SO_2) 84 lb/day; NO_x (as NO_2) 957.5 lb/day; VOC 160.9 lb/day or CO 3036.5 lb/day. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO GTE emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-39 Annual emissions from GTE, calculated on a twelve consecutive month rolling basis, shall not exceed any of the following: PM10 78,840 lb/year; SO_x (as SO_2) 30,616 lb/year; NO_x (as NO_2) 161,480 lb/year; VOC 29,730 lb/year; or CO 471,492 lb/year. [District Rule 2201]

Verification: The project owner shall submit to the CPM and APCO GTE emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-40 Combined annual emissions of all hazardous air pollutants (HAPs) from GTE, calculated on a twelve consecutive month rolling basis, shall not exceed 6 tons/year. Combined annual emissions of any single HAP from GTE, calculated on a twelve consecutive month rolling basis, shall not exceed 2.5 tons/year. [District Rule 4002]

Verification: The project owner shall submit to the CPM and APCO GTE emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-41 Each one-hour period shall commence on the hour. Each one-hour period in a three-hour rolling average will commence on the hour. The three-hour average will be compiled from the three most recent one-hour periods. Each one-hour period in a twenty-four-hour average for ammonia slip will commence on the hour. The twenty-four-hour average will be calculated starting and ending at twelve-midnight. [District Rule 2201]

Verification: The project owner shall compile required data and submit the information to the CPM and the APCO as part of the Quarterly Operational Report (**AQ-65**).

AQ-42 Daily emissions will be compiled for a twenty-four hour period starting and ending at twelve-midnight. Each month in the twelve-consecutive-month rolling average emissions shall commence at the beginning of the first day of the month. The twelve-consecutive-month rolling average emissions to determine compliance with annual emissions limitations shall be compiled from the twelve most recent calendar months. [District Rule 2201]

Verification: The project owner shall compile required data and submit the information to the CPM and the APCO as part of the Quarterly Operational Report (**AQ-65**).

AQ-43 Prior to initial operation, project owner shall provide emission reduction credits to offset the calendar quarter emissions increases set forth below, at the distance offset ratio specified in Rule 2201 (4/20/05 version) Table 4.2 and the interpollutant offset ratio specified in this permit, PM10 - Q1: 19,440

lb, Q2: 19,656 lb, Q3: 19,872 lb and Q4: 19,872 lb; SO_x (as SO_2) - Q1: 7,549 lb, Q2: 7,633 lb, Q3: 7,717 lb and Q4: 7,717 lb; NO_x (as NO_2) - Q1: 39,817 lb, Q2: 40,260 lb, Q3: 40,702 lb, and Q4: 40,702 lb; and VOC - Q1: 7,331 lb, Q2: 7,412 lb, Q3: 7,494 lb and Q4: 7,494 lb. [District Rule 2201]

Verification: At least 60 days prior to commencing GTE first fire, the project owner shall surrender ERC certificates in the amounts shown to the District and provide documentation of that surrender to the CPM.

AQ-44 ERC Certificate Numbers S-1554-2 and S-1543-2 (or certificates split from these certificates) shall be used to supply the required NO_x and PM10 offsets, ERC Certificate Number S-444-1 and S-1666-1(or a certificates split from these certificates) shall be used to supply the required VOC offsets and ERC Certificate Number S-1334-5 (or a certificate split from this certificate) shall be used to supply the required SO_x, unless a revised offsetting proposal is received and approved by the District, upon which this Determination of Compliance shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Determination of Compliance. [District Rule 2201]

Verification: At least 60 days prior to commencing GTE first fire, the project owner shall surrender the identified ERC certificates and in the amounts shown in **AQ-43** to the District and provide documentation of that surrender to the CPM. Changes to the offsetting proposal must be provided to the District and CPM for review, public noticing, and approval.

AQ-45 NO_x ERCs may be used to offset PM10 emission increases at a ratio of 2.22 lb NO_x : 1 lb PM10 for reductions occurring within 15 miles of this facility, and at 2.72 lb NO_x: 1 lb PM10 for reductions occurring greater than 15 miles from this facility [District Rule 2201]

Verification: At least 60 days prior to commencing GTE first fire, the project owner shall surrender ERC certificates to the District and provide documentation of that surrender to the CPM, which confirms that the interpollutant offset ratios prescribed in **AQ-45** have been met.

AQ-46 Compliance with ammonia slip limit of 10 ppmvd @ 15% O_2 shall be demonstrated utilizing the following calculation procedure: ammonia slip ppmvd @ 15% O_2 = ((a-(bxc/1,000,000)) x (1,000,000 / b) x d), where a = ammonia injection rate (lb/hr) / (17 lb/lb mol), b = dry exhaust flow rate (lb/hr) / (29 lb/lb mol), c = change in measured NO_x concentration ppmv @ 15% O_2 across catalyst, and d = correction factor. The correction factor shall be derived annually during compliance testing by comparing the measured and calculated ammonia slip. Alternatively, the project owner may utilize a continuous in-stack ammonia monitor, acceptable to the District, to monitor compliance. At least 60 days prior to using a NH_3 CEM, the project owner shall submit a monitoring plan for District review and approval. [District Rule 4102]

Verification: The project owner shall compile required data and submit the information to the CPM and the APCO as part of the Quarterly Operational Report (**AQ-65**).

AQ-47 Compliance with NO_x, CO and VOC short term emission limits (ppmv @ 15% O_2 and lb/hr) shall be demonstrated within 90 days of initial operation of GTE and once every twelve months thereafter by District witnessed in situ sampling of exhaust gases by a qualified independent source test firm at full load conditions. [District Rule 2201]

Verification: The project owner shall provide NO_x, CO, and VOC short-term emissions to the CPM and the APCO within 90 days of initial operation of GTE and once every 12 months thereafter as part of the Quarterly Operational Report (**AQ-65**).

AQ-48 Compliance with PM10 (lb/hr) and ammonia (10 ppmvd @ 15% O_2) emissions rates shall be demonstrated within 90 days of initial operation of GTE and at least once every 12 months thereafter. [District Rule 2201]

Verification: The project owner shall provide PM10 and ammonia emissions to the CPM and the APCO within 90 days of initial operation of GTE and once every twelve months thereafter as part of the Quarterly Operational Report (**AQ-65**).

AQ-49 Source testing to measure startup NO_x, CO, and VOC mass emission rates for this GTE shall be demonstrated upon initial operation and at least every seven years thereafter by District witnessed in situ sampling of exhaust gases by a qualified independent source test firm. CEMS shall be operated during startup source testing. District source test staff shall evaluate CEMS results with source test results to assess the accuracy of CEMS during startups events. If, in the judgment of the District source staff, the reliability of CEMS results has not been demonstrated during startup testing for NO_x and CO, more frequent source testing to measure startup NO_x and CO mass emissions rates may be required. [District Rule 1081]

Verification: The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing. Testing shall be conducted for the GTE upon initial operation, and at least once every seven years.

AQ-50 Initial and annual compliance with the HAPS emissions limit (6 tpy all HAPS or 2.5 tpy any single HAP) shall be by the VOC emissions rate for GTE determined during initial and annual compliance source testing and the correlation between VOC emissions and HAP(S). [District Rule 4002]

Verification: The project owner shall submit to the CPM and APCO GTE emissions data demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-51 The sulfur content of each fuel source shall be: (i) documented in a valid purchase contract, a supplier certification, a tariff sheet or transportation contract or (ii) monitored weekly using ASTM Methods D4084, D5504, D6228, or Gas Processors Association Standard 2377. If sulfur content is less than 1.0 gr/100 scf for 8 consecutive weeks, then the monitoring frequency

shall be every six (6) months. If any six (6) month monitoring shows an exceedance, weekly monitoring shall resume. [District Rules 1081, 2540, and 4001]

Verification: The documentation of the sulfur content of each fuel source, using the methods and procedures prescribed in AQ-51, shall be submitted to the CPM as part of the Quarterly Operational Report (**AQ-65**).

AQ-52 The District must be notified 30 days prior to any compliance source test, and a source test plan must be submitted for approval 15 days prior to testing. Official test results and field data collected by source tests required by conditions on this permit shall be submitted to the District within 60 days of testing. [District Rule 1081]

Verification: The project owner shall notify the CPM and the District 30 days prior to any compliance source test. The project owner shall provide a source test plan to the CPM and District for approval 15 days prior to testing. The results and field data collected during source tests shall be submitted to the CPM and the District within 60 days of testing.

AQ-53 The following test methods shall be used: PM10 EPA method 5 (front half and back half); NO_x EPA Method 7E or 20; CO EPA method 10 or 10B; O_2 EPA Method 3, 3A, or 20; VOC EPA method 18 or 25; ammonia BAAQMD ST-1B; and fuel gas sulfur content ASTM D3246. EPA approved alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081, 4001, and 4703]

Verification: The project owner shall notify the CPM and the District 30 days prior to any compliance source test. The project owner shall provide a source test plan to the CPM and District for the CPM and District approval 15 days prior to testing.

AQ-54 The project owner shall maintain hourly records of NO_x, CO, and ammonia emission concentrations (ppmv @ 15% O_2), and hourly, daily, and twelve month rolling average records of NO_x and CO mass emissions rates. Using annual and startup VOC source test results, project owner shall maintain hourly, daily and twelve month rolling average records of VOC mass emission rates. [District Rule 2201]

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

AQ-55 The project owner shall maintain records of SO_x lb/hr, lb/day, and lb/twelve month rolling average emissions. SO_x emissions shall be based on fuel use records, natural gas sulfur content, and mass balance calculations. [District Rule 2201]

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

AQ-56 Project owner shall maintain the following records for the GTE: occurrence, duration, and type of any startup, shutdown, short term excursion, combustor tuning event, or malfunction; performance testing; emission measurements;

total daily and rolling twelve month average hours of operation; hourly quantity of fuel used and gross three hour average operating load. [District Rules 2201 & 4703]

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

AQ-57 Project owner shall maintain the following records for the continuous emissions monitoring system (CEMS): performance testing, evaluations, calibrations, checks, maintenance, adjustments, and any period during which a CEMS was inoperative. [District Rules 2201 & 4703]

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

AQ-58 Project owner shall provide notification and record keeping as required under 40 CFR, Part 60, Subpart A, 60.7. [District Rule 4001]

Verification: The project owner shall comply with the notification and record keeping requirements specified under 40 CFR, Part 60, Subpart A, 60.7. The project owner shall make records available for inspection by representatives of the District, CARB and the Commission upon request.

AQ-59 All records required to be maintained by this permit shall be maintained for a period of five years and shall be made readily available for District inspection upon request. [District Rule 2201]

Verification: The project owner shall make records available for inspection by representatives of the District, CARB and the Commission upon request.

AQ-60 Results of continuous emissions monitoring shall be reduced according to the procedure established in 40 CFR, Part 51, Appendix P, paragraphs 5.0 through 5.3. 3, or by other methods deemed equivalent by mutual agreement with the District, the ARB, and the EPA. [District Rule 1080]

Verification: The project owner shall provide a Continuous Emission Monitoring System (CEMS) protocol for approval by the CPM and the APCO at least 60 days prior to installation of the CEMS.

AQ-61 The project owner shall notify the District of any breakdown condition as soon as reasonably possible, but no later than one hour after its detection, unless the owner or operator demonstrates to the District's satisfaction that the longer reporting period was necessary. [District Rule 1100]

Verification: The project owner shall comply with the notification requirements of the District and submit written copies of these notification reports to the CPM and the APCO as part of the Quarterly Operational Report (**AQ-65**).

AQ-62 The District shall be notified in writing within ten days following the correction of any breakdown condition. The breakdown notification shall include a description of the equipment malfunction or failure, the date and cause of the

initial failure, the estimated emissions in excess of those allowed, and the methods utilized to restore normal operations. [District Rule 1100]

Verification: The project owner shall comply with the notification requirements of the District and submit written copies of these notification reports to the CPM and the APCO as part of the Quarterly Operational Report (**AQ-65**).

AQ-63 Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and total accuracy testing is performed, in accordance with EPA guidelines. The District shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the District. [District Rule 1080]

Verification: The project owner shall submit to the CPM and APCO the CEMS audits demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-64 The project owner shall comply with the applicable requirements for quality assurance testing and maintenance of the continuous emission monitor equipment in accordance with the procedures and guidance specified in 40 CFR Part 60, Appendix F . [District Rule 1080]

Verification: The project owner shall submit to the CPM and APCO the CEMS audits demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-65 The project owner shall submit a written report to the CPM and APCO for each calendar quarter, within 30 days of the end of the quarter, including: time intervals, data and magnitude of excess emissions, nature and cause of excess (if known), corrective actions taken and preventive measures adopted; averaging period used for data reporting shall correspond to the averaging period for each respective emission standard; applicable time and date of each period during which the CEM was inoperative (except for zero and span checks) and the nature of system repairs and adjustments; and a negative declaration when no excess emissions occurred . [District Rule 1080]

Verification: The project owner shall submit to the CPM and APCO the CEMS audits demonstrating compliance with this condition as part of the Quarterly Operational Report (**AQ-65**).

AQ-66 The project owner of an affected source and each affected unit at the source shall submit the reports and compliance certifications required under the Acid Rain Program, including those under 40 CFR Part 75 Subpart. [District Rule 2540 and 40 CFR Part 75]

Verification: The project owner shall submit to the CPM copies of the reports and compliance certifications required under the Acid Rain Program in the first Quarterly Compliance Report (**AQ-65**) that is due after those reports and compliance certifications have been provided to the SJVAPCD.

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APPENDIX A

Emissions Reduction Credit requirement.

Condition of Certification AQ-SC7
Required Emission Reduction Credits [a]

Offset Source Location	Credit Number	Date of Reduction	Total Q1 (lb)	Total Q2 (lb)	Total Q3 (lb)	Total Q4 (lb)
NO_x Emission Reduction Credits						
Section 16, Township 27S, Range 28E, Heavy Oil Central Stationary Source	S-1554-2	Pre-1990	49,372	52,008	50,035	49,586
Elk Hills Gas Plant, Kern County	S-1543-2	12/05/1990	10,354	8,381	11,018	11,467
VOC Emission Reduction Credits						
757 11th Street, Tracy	N-444-1	1/31/1998	10,996	11,118	11,241	11,232
526 Mettler Frontage Rd. East	S-1666-1	Post-1990	0	0	0	9
PM10 Emission Reduction Credits (NO_x for PM10)						
Section 16, Township 27S, Range 28E, Heavy Oil Central Stationary Source	S-1554-2	Pre-1990	52,877	53,464	54,052	54,052
SO_2 Emission Reduction Credits						
Midway Premier Lease Section 32, Township 27S, Range 27E	S-1344-5	Post-1990	11,324	11,450	11,575	11,575

Source: (PEFE 2005a); (PEFE 2005h, DR 28)
Note(s):
a. The quantities listed are the required quantities for offsetting, some of the ERC certificates include more credits than those shown and those remaining credits will be maintained by the applicant after surrendering the amounts required as shown above. ERC requirements include all appropriate distance and interpollutant trading ratios.

BIOLOGICAL RESOURCES

Testimony of Susan D. Sanders

SUMMARY OF CONCLUSIONS

Construction of the Pastoria Energy Facility Expansion would not have any significant direct impacts to sensitive biological resources, and would not significantly increase operational impacts of the existing project. Construction would occur entirely within the existing Pastoria Energy Facility site boundary, and would not result in any additional habitat loss or impacts to special status species. The net effect of the project on biological resources is to extend the existing impacts due to construction at the existing site for an additional 12 months, the anticipated duration of construction. Staff is proposing continuation of some of the current Conditions of Certification to prevent potential impacts to special status species due to extended construction activities. With the recommended conditions of certification, the project would be in compliance with current laws, ordinances, regulations, and standards.

INTRODUCTION

In this analysis, staff describes potential impacts to biological resources from constructing and operating an additional turbine unit within the newly constructed Pastoria Energy Facility (PEF) project. We also assessed the applicant's impact analysis, the need for mitigation, the adequacy of mitigation proposed by the applicant, and where necessary, specific additional mitigation measures to reduce identified impacts to less than significant levels. In this analysis, we also determined the degree of compliance with laws, ordinances, regulations, and standards (LORS), and recommend conditions of certification.

This analysis is based upon information provided in the Application for Certification (AFC) for the Pastoria Energy Facility 160 MW Expansion (Calpine 2005a, Section 5.6.1, Calpine 2005b, Sections 5.6.2-3, Attachment E), the Biological Resources Mitigation and Implementation and Monitoring Plan (Calpine 2004), Kokx (2004 and 2005), and the federal Biological Opinions for the PEF (USFWS 2000, 2001).

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Biological Resources Table 1, below, identifies the LORS that are applicable to the Pastoria PEFE analysis.

BIOLOGICAL RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
FEDERAL	
Federal Endangered Species Act (1973) Title 16, U. S. Code section 1531	Projects that could adversely impact a federally listed species must consult with the U. S. Fish and Wildlife Service and mitigate potential impacts.
Migratory Bird Treaty Act Title 16, U. S. Code sections 703 to 712	Protects all migratory birds, including their nests and eggs.
Bald and Golden Eagle Protection Act Title 16, U. S. Code section 668	Protects bald and golden eagles from harm or trade in parts.
STATE	
State Endangered Species Act (1984) Fish and Game Code, section 2050 et seq.	For species that are protected (listed) by the state, these species can not be 'taken' or harmed w/out a 'take' permit provided by the California Department of Fish & Game.
Fully Protected Species Fish and Game Code, sections 3511, 4700, 5050 and 5515	Prohibits take of species that are classified as Fully Protected.
Nests and Eggs – Take, Possess or Destroy, Fish and Game Code, sections 3503 and 3503.5	Protects birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Also, specifically protects birds of prey and their eggs.
Migratory Birds Fish and Game Code, section 3513	Protects California's migratory birds by making it unlawful to take or possess any migratory non-game bird as designated by the Migratory Bird Treaty Act.
Native Plant Protection Act (1977) Fish and Game Code, section 1900 et seq.	Designates and protects rare, threatened, and endangered California plants.
LOCAL	
Land Use/ Conservation/Open Space, Element of Kern County General Plan, 2004	Kern County Planning Department determines if proposed projects are compatible with protection of threatened or endangered species and their habitat.

SETTING

The Pastoria Energy Facility Expansion (PEFE) project site is approximately 30 miles south of Bakersfield, California, and approximately 6.5 miles east of Grapevine, California, on property owned by the Tejon Ranch Corp. The PEF is approximately 1.5 miles northwest of the Department of Water Resources Edmonston Pumping Plant and approximately 1 mile north of the California Aqueduct. Adjacent land uses include agriculture (orchards, vineyards, and grazing) and gravel mining. No urban development occurs within five miles of the site.

The existing PEF plant site is located at the southern end of the San Joaquin Valley at the foot of the Tehachapi Mountains. The site is relatively flat, with a gently sloping northwest aspect, at an elevation of approximately 1,070 feet. The PEF site is within the Pastoria Creek watershed, an intermittent, north-flowing stream located approximately 1,000 feet to the west. The banks of Pastoria Creek support a narrow corridor of

freshwater marsh and riparian scrub habitats. The rights-of-way for linear facilities of the existing PEF include native and non-native habitats including grasslands, agriculture, and weedy (ruderal) areas.

The proposed PEFE two-acre site is located between the western cooling tower and Unit One within the fenced, 31-acre plant facility. The project site, currently covered with gravel and barren of vegetation, is subject to disturbance due to on-going construction activities. Prior to construction of the PEF, the site was characterized by non-native grassland and used for cattle ranching. Other land uses near the PEF site include active agriculture (vineyards) to the north, and an active gravel mining operation to the southwest. Access to the PEF site is from Edmonston Pumping Plant Road via an approximately 0.85-mile Plant Access Road constructed for the PEF.

Listed species with potential to occur in the immediate vicinity of the PEF plant and along the access road include the San Joaquin kit fox (*Vulpes macrotis mutica*) and blunt-nosed leopard lizard (*Gambelia sila*). The leopard lizard is listed as Endangered under both the federal and state Endangered Species Acts, and the kit fox is listed as state Threatened and federal Endangered.

San Joaquin kit fox were not detected at or near the PEF plant or access road during project surveys, and the likelihood of kit fox occurrence near the project area is relatively low, given the lack of kit fox records even after intensive survey efforts. However, the PEF project area is within the current and historical range of San Joaquin kit fox, and the areas surrounding the project site could provide marginal denning and foraging habitat. Kit fox have also been recorded in urban, disturbed settings, scavenging food from parking lots and dumpsters (USFWS 1998). Therefore, the high level of disturbance, lack of high quality habitat in the project area, and absence of records does not necessarily preclude the possibility of San Joaquin kit fox occurring near the PEF project site and access road.

The blunt-nosed leopard lizard could also occur near the project area; in October 2003 this species was recorded approximately 1.5 miles east/northeast of the PEF plant site along the natural gas pipeline right-of-way during surveys conducted for the PEF. During monitoring activities for the PEF, biologists also observed a blunt-nosed leopard lizard in May 2004, approximately 1.5 miles southeast of the PEF plant, on an access road to Tejon Ranch, 0.8 miles north/northwest of the Edmonston Pumping Plant.

No state or federal listed species are likely to occur in the PEF project area; however, one special status species has been recorded within the project site. Western spadefoot toads (*Scaphiopus hammondii*), a Department of Fish and Game and U. S. Fish and Wildlife Service Species of Special Concern, were recorded breeding in the Pastoria Water Retention Pond north of the PEF expansion area in 2005 (Kokx 2005).

A comprehensive list of sensitive plant and animal species that occur in the project region is not included in this analysis, but is available in Table 5.61 of the Application for Certification (Calpine 2005b, Attachment E, pages 5.6-22 to 5.6-23, and Kokx 2005, pages 3-4). Staff concurs that the applicant's list is complete.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Significant biological resources impacts would occur if state or federal listed species, Fully Protected species, candidates for state or federal listing and/or Species of Concern were likely to be impacted. Interruption of species migration, reduction of fish, wildlife and plant habitat, and disturbance of wetlands, marshes, riparian areas or other wildlife habitat would also be considered significant impacts.

DIRECT AND INDIRECT IMPACTS AND MITIGATION

Direct impacts occur because of the project and at the same time and place. *Indirect* impacts occur because of the project and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect impacts may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Direct and indirect construction impacts and mitigation measures of PEF construction were described in the original AFC for the PEF project. The applicant's discussion of potential impacts to biological resource due to PEFE construction (Calpine 2005a) relies on the findings described in that 1999 analysis (included as Calpine 2005b). This Final Staff Assessment (FSA) focuses largely on those impact assessments and mitigation measures that are still applicable to the proposed PEFE project. For example, the mitigation measures that require a Designated Biologist (Conditions of Certification **BIO-1**, **BIO-2**, **BIO-3**, and **BIO-4**) to monitor biological resource compliance efforts is appropriate for PEFE construction and is discussed in this analysis. This FSA therefore focuses on impacts and mitigation measures relevant to construction-associated activities on the two-acre PEFE site, the construction laydown area, and the Plant Access Road.

Construction Impacts and Mitigation

PEFE Project Site

The PEFE project would occupy approximately two acres within the existing 31-acre PEF site, and would share common facilities and identical footprints of disturbance with the existing PEF. The PEFE project requires no modification to the existing PEF offsite linear facilities (e.g., electric transmission line, fuel gas supply line, or water supply line), and will use the existing PEF administration, warehouse, shop, and water treatment buildings. Site access and onsite roadways are common with the existing PEF. The PEFE site is within an area currently permitted for permanent disturbance and not proposed for reclamation. No new site disturbances are expected as a result of the PEFE project, which would include foundation construction, erection of major equipment and structures, installation of piping, electrical systems, control systems, and start-up testing.

No additional habitat loss would occur due to PEFE construction because is it already graveled and disturbed. No listed species or their habitat were found within the PEFE project site during biological resources surveys conducted in 1999 (Calpine 2005b), or

during May 2005 field surveys (Kokx 2005). This area is fenced, barren of vegetation, subject to human disturbance, and is unlikely to attract listed wildlife species.

To verify the absence of sensitive species within the PEFE project site prior to construction, the USFWS recommends that surveys for the blunt-nosed leopard lizard, San Joaquin kit fox, and other special concern species (including western spadefoot toads), be conducted 14 to 30 days prior to onset of PEFE project construction (Holbrook 2005). Staff proposes that pre-construction surveys at the PEFE project site be identified in the project's revised Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP, Condition of Certification **BIO-6**) and completed as prescribed by the USFWS.

Laydown Area

According to the project description provided in the AFC Volume 1 (Calpine 2005a), the PEFE construction would use a 12-acre portion of the same 25-acre construction laydown area identified for the PEF site. The laydown area, as described on page 3.8-5 of the AFC Volume 2 (Calpine 2005b), includes a fenced, patrolled area for parking vehicles of construction personnel, parking and maintenance areas for construction equipment, a site for fabrication of piping and miscellaneous structural items, and an enclosed large warehouse space for storage of small tools, electrical panels, instruments, turbine crate, and other items requiring inside storage.

No sensitive species or their habitat were found at the proposed laydown site during biological resources surveys conducted in 1999 (Calpine 2005b), or during the recent May 2005 surveys (Kokx 2005). This area is fenced, barren of vegetation, and subject to human disturbance, and therefore is unlikely to attract special status wildlife species. Staff does not propose mitigation for biological resources impacts associated with the construction activities within the PEF laydown area as their no impacts expected.

To verify the absence of sensitive species within the laydown area prior to construction, the USFWS recommends that surveys for blunt-nosed leopard lizard, San Joaquin kit fox, and western spadefoot toads be conducted 14 to 30 days prior to onset of PEFE construction (Holbrook 2005). As with the PEFE site, this pre-construction surveys requirement for the laydown area needs to be included in the project's revised BRMIMP and completed as prescribed by the USFWS.

The laydown area is a temporary construction facility, and would be removed upon completion of PEFE construction. Following construction, the laydown area would be revegetated with an appropriate seed mix, in accordance with PEF Condition of Certification **LAND USE-2**.

Plant Access Road

A 0.85-mile Plant Access Road was constructed to provide vehicle access to the PEF site from Edmonston Pumping Plant Road. Road construction occurred in non-native grassland habitat, but also required the addition of a culvert in a Pastoria Creek tributary, affecting 0.03 acres of freshwater marsh. Compensatory mitigation has already been provided for habitat loss associated with this road construction, but construction traffic on the road may still pose a potential threat to special status wildlife.

Construction activities associated with the PEFE project will last approximately 12 months, and will require approximately 146 vehicle trips per day on average, with approximately 225 vehicle trips per day during the peak construction period (Calpine 2005a).

Construction traffic along the Plant Access Road could result in the direct take of San Joaquin kit fox and of blunt-nosed leopard lizards. Traffic-related mortality has been identified as one of the threats to the survival of both San Joaquin kit fox and blunt-nosed leopard lizards (USFWS 1998). Blunt-nosed leopard lizards are of particular concern because of the recent, nearby records for this species within 1.5 miles of the Plant Access Road. The USFWS, in their 2004 amended Section 7 Biological Opinion (included in Calpine 2004, February 13, 2004 letter to Mr. Gerardo Rios, Environmental Protection Agency, from Mr. Ken Sanchez, USFWS), noted that noise and vibration from vehicles, repair activities, and work crews could disrupt normal behavior of the blunt-nosed leopard lizard, including foraging, reproduction, and their ability to detect or avoid predators. They also note that increased levels of vehicle traffic could lead to an increased mortality level for blunt- nosed leopard lizards. Construction related mortality of a San Joaquin kit fox or blunt-nosed leopard lizard would be considered a significant impact. Staff recommends implementation of various mitigation measures identified in Biological Resources Conditions of Certification **BIO-1** through **BIO-6** to avoid these potential impacts.

Operation Impacts and Mitigation

Noise

Power plant and other industrial noises can have significant impacts on local wildlife if loud noises occur during the breeding or nesting season or if the noise affects a species' ability to find prey or avoid predators. Construction-related noise during the PEFE project construction will not differ substantially from the existing levels of construction noise during PEF construction, an impact determined to be less than significant. After completion of the PEFE, the overall noise levels from the existing PEF project would be increased by less than one decibel because of the additional PEFE noise. This increase is considered less than significant, and no mitigation measures are proposed.

CUMULATIVE IMPACTS AND MITIGATION

Cumulative impacts refers to two or more individual and similar effects which, when considered together, are considerable or which compound or increase other environmental impacts. The applicant has concluded that the PEFE would not have significant cumulative impacts to biological resources because the PEFE project will be confined to the footprint of the existing PEF plant site, and no additional habitat losses or sensitive biological resources impacts will occur. Staff concurs with this assessment if the project abides by impact avoidance measures during project construction.

COMPLIANCE WITH LORS

The USFWS administers the federal Endangered Species Act, which provides for protection and management of federally listed species and their designated critical

habitat. As part of a formal Section 7 consultation with the U.S. Environmental Protection Agency for the PEF project, the USFWS established reasonable and prudent measures to protect listed species that could potentially be impacted by construction of the PEF. These measures were part of the Biological Opinion (USFWS 2000) and subsequent amendment (USFWS 2001) for the PEF project, and were eventually incorporated as elements of the original Conditions of Certification for the PEF. Many of these same Conditions of Certification, originating with the USFWS measures, are again included to extend the mitigation measures needed for PEFE construction activities. The Conditions of Certification in this FSA also reflect informal coordination with USFWS regarding additional measures needed to ensure protection of listed species (Holbrook 2005).

Appendix G of the California Environmental Quality Act (CEQA, Public Resources Code 21000 et seq.) includes a list of impacts that are likely to be determined to be *significant* if they occur. Regarding biological resources impacts, CEQA considers impacts to state or federal listed species, interference with fish and wildlife migration and loss of habitat to be *significant* if one or more of these impacts is likely to occur. With implementation of mitigation measures described in the Conditions of Certification, the proposed project will comply with all federal, state, and local LORS regarding impacts to listed species, and migratory birds and their habitats.

RESPONSE TO COMMENTS

The only comments received by the Energy Commission on the Biological Resources section of the PSA were from the applicant, who submitted proposed changes to the PSA on October 21, 2005 (Scholl 2005). Appendix A of that submittal included recommendations for changes to **BIO-5, BIO-6**, and **BIO-7**. These changes clarified that the Biological Resources Mitigation Implementation and Monitoring Plan (BMRIMP), Worker Environmental Awareness Program (WEAP), and the Facility Closure Plan originally written for the PEF would be revised as needed to reflect the PEFE project, and that the Conditions of Certification for the PEFE require compliance with these revised documents. Staff agrees that the applicant's proposed wording changes are appropriate, and have made those changes.

CONCLUSIONS

Construction of the PEFE project would not have any significant direct impacts to sensitive biological resources, and would not significantly increase operational impacts of the project to wildlife. PEFE construction would occur entirely within the existing PEF site boundary, and within a portion of the 25-acre construction laydown site. No impacts are expected to special status species within these sites because these fenced, barren, and disturbed areas do not support or attract special status species. In addition, pre-construction surveys are recommended to verify the presence/absence of special status species within the PEFE project area and laydown site so that impacts to special status species can be avoided during project construction.

The net effect of the PEFE on biological resources is to extend the existing impacts due to construction traffic for an additional 12 months, the anticipated duration of PEFE

construction. The San Joaquin kit fox, blunt-nosed leopard lizard, and western spadefoot toad are the only sensitive species with potential to occur outside the fenced PEF site and construction laydown area. Staff is proposing the continuation of some of the current PEF Conditions of Certification to prevent potential impacts to these special status species during the PEFE project construction.

PROPOSED CONDITIONS OF CERTIFICATION

DESIGNATED BIOLOGIST SELECTION

BIO-1 The project owner shall submit the resume of the proposed Designated Biologist, with at least three references and contact information, to the Compliance Project Manager (CPM) for approval.

The Designated Biologist must at least meet the following minimum qualifications:

1. Bachelor's Degree in biological sciences, zoology, botany, ecology, or a closely related field; and

2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society; and

3. At least one year of field experience with biological resources found in or near the project area.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

Verification: The project owner shall submit the specified information at least 90 days prior to the start of any site (or related facilities) mobilization. No site or related facility activities shall commence until an approved Designated Biologist is available to be on site.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least ten working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.

DESIGNATED BIOLOGIST DUTIES

BIO-2 The project owner shall ensure that the Designated Biologist performs the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist may be assisted by the approved Biological Monitor(s),

but remains the contact for the project owner and CPM. The Designated Biologist will:

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, to be submitted by the project owner;

3. Be available to supervise, conduct and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as wetlands and special status species or their habitat;

4. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;

5. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (i.e. parking lots) for animals in harms 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 Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), Worker Environmental Awareness Program (WEAP) training and all permits.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to the CPM copies of all written reports and summaries that document biological resources activities. If actions may affect biological resources during operation a Designated Biologist shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless their duties are ceased as approved by the CPM.

BIOLOGICAL MONITOR QUALIFICATIONS

BIO-3 The project owner's CPM approved Designated Biologist shall submit the resume, at least three references and contact information, of the proposed Biological Monitors to the CPM for approval. The resume shall demonstrate to

the satisfaction of the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks.

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the Conditions of Certification and the BRMIMP, WEAP and all permits.

Verification: The project owner shall submit the specified information to the CPM for approval at least 30 days prior to the start of any site (or related facilities) mobilization. The Designated Biologist shall submit a written statement to the CPM confirming that individual Biological Monitor(s) have been trained including the date when training was completed. If additional biological monitors are needed during construction the specified information shall be submitted to the CPM for approval ten days prior to their first day monitoring activities.

DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY

BIO-4 The project owner's Construction/Operation Manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources Conditions of Certification.

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

The Designated Biologist shall:

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

2. Inform the project owner and the Construction/Operation Manager when to resume activities; and

3. Notify the CPM if there is a halt of any activities, and advise the CPM of any corrective actions that have been taken, or will be instituted, as a result of the work stoppage.

If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

Verification: The project owner shall ensure that the Designated Biologist or Biological Monitor notifies the CPM immediately (and no later than the following morning of the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure will be made by the CPM within five working days after receipt of notice that

corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made.

WORKER ENVIRONMENTAL AWARENESS PROGRAM

BIO-5 The project owner shall revise the CPM approved Worker Environmental Awareness Program (WEAP) for the existing PEF, as appropriate, 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 revised WEAP must:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material and electronic media is made available to all participants;

2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas;

3. Present the reasons for protecting these resources;

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

5. Identify whom to contact if there are further comments and questions about the material discussed in the program; and

6. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

A competent individual acceptable to the Designated Biologist can administer the specific program.

The WEAP previously approved for the PEF shall be presented for the PEFE. The WEAP may be presented in the form of a video or power point presentation in lieu of in-person training.

Verification: At least 60 days prior to the start of any site (or related facilities) mobilization, the project owner shall provide to the CPM two copies of the proposed revised WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program. The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. At least ten days prior to site and related facilities mobilization submit two copies of the CPM approved materials.

The signed training acknowledgement forms from 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 active project 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 submit two copies of the proposed BRMIMP to the CPM (for review and approval) and to the USFWS (for review and comment) and shall implement the measures identified in the approved revised BRMIMP.

The revised 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 resources mitigation, monitoring, and compliance measures required by staff and the USFWS;
4. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation and closure;
5. All required mitigation measures for each sensitive biological resource;
6. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;
7. All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;
8. Duration for each type of monitoring and a description of monitoring methodologies and frequency;
9. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;
10. All remedial measures to be implemented if performance standards are not met;
11. A preliminary discussion of biological resources related facility closure measures;

12. Restoration and revegetation plan for the laydown area; and

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

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 will determine the revised BRMIMP's acceptability within 45 days of receipt. 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 revised BRMIMP to obtain CPM approval. Any changes to the approved BRMIMP must also be approved by the CPM in consultation with the USFWS and 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 thirty (30) days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction closure report identifying which items of the BRMIMP have been completed, a summary of all modifications to mitigation measures made during the project's site mobilization, ground disturbance, grading, and construction phases, and which mitigation and monitoring items are still outstanding.

CLOSURE PLAN MEASURES

BIO-7 The project owner shall append, as necessary, to the permanent or unexpected permanent closure plan required for the existing PEF and the revised BRMIMP, measures that address the local biological resources.

The planned permanent or unexpected permanent closure plan shall address the following biological resources related mitigation measures (typical measures are):

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

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

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

4. Revegetation of the plant site and other disturbed areas utilizing appropriate seed mixture.

Verification: Any revisions to the draft permanent or unexpected closure measures for the existing PEF shall be made part of the revised BRMIMP. At least 12 months prior to commencement of closure activities, the project owner shall address all biological resources related issues associated with facility closure, and provide final measures as

part of the Biological Resources Element of the Facility Closure Plan for the existing PEF. The Biological Resources Element shall be incorporated into the Facility Closure Plan and include a complete discussion of the local biological resources and proposed facility closure mitigation measures.

REFERENCES

Calpine 2005a. Pastoria Energy Facility, LLC, and Calpine Corporation. Volume I. Application for Certification for the Pastoria Energy Facility 160 MW Expansion. Submitted to Energy Commission Dockets on April 28, 2005.

Calpine 2005b. Pastoria Energy Facility, LLC and Calpine Corporation. Volume II. Reference Materials for Pastoria Energy Facility 160 MW Expansion. Submitted to Energy Commission Dockets on April 28, 2005.

Calpine 2004. Biological Resources Mitigation and Implementation and Monitoring Plan for Pastoria Energy Facility. March 2004.

Holbrook, Shannon. 2005. Personal communication. Telephone conversation, Susan Sanders and Shannon Holbrook, USFWS, Endangered Species Branch, Sacramento. July 14, 2005.

Kokx 2005. Memo from Russell Kokx, Energy Commission-approved Designated Biologist, to Jennifer Scholl, URS Corporation, dated May 13, 2005, describing results of a May 4, 2005 site visit to PEF proposed expansion areas.

Kokx 2004. Pastoria Energy Facility-Post Construction Report for the Natural Gas Pipeline (2004). Prepared by Russell Kokx for Pastoria Energy Facility.

Scholl 2005. Letter from Jennifer Scholl, Project Manager, URS Corporation, to Dr. James Reede, Project Manager, dated October 21, 2005, re: Pastoria Energy Facility 160 MW Expansion Project (05-AFC-1) Applicant's Response to Preliminary Staff Assessment.

USFWS 2001. Amendment to Formal Section 7 Consultation on the Pastoria Energy Facility, Kern County, California. Letter to Gerardo Rios, EPA, from Cay Goude, USFWS. June 29, 2001.

USFWS 2000. Formal Section 7 Consultation on Proposed Pastoria Energy Facility, Kern County, California. Letter to Gerardo Rios, EPA, from Cay Goude, USFWS. January 23, 2000.

USFWS 1999. Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or during Ground Disturbance. Prepared by the Sacramento Fish and Wildlife Office. June 1999.

USFWS 1998. Recovery Plan For Upland Species Of The San Joaquin Valley, California. Region 1, Portland, OR. 319 pp.

CULTURAL RESOURCES

Testimony of Dorothy Torres

SUMMARY OF CONCLUSIONS

The proposed Pastoria Energy Facility Expansion project would not impact any known cultural resources and so would have no significant effect on cultural resources. If staff's proposed conditions of certification are properly implemented, the project would result in a less than significant impact on newly found cultural resources or on those known resources that may be impacted in an unanticipated manner. The project would thus be in compliance with applicable laws, ordinances, regulations, and standards.

INTRODUCTION

This cultural resources assessment identifies the potential impacts of Pastoria Energy Facility Expansion (PEFE) to cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, and historic districts. Three categories of cultural resources are considered in this assessment: prehistoric, historical, and ethnographic.

Prehistoric archaeological resources are those materials relating to prehistoric human occupation and use of an area. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In California, the prehistoric period began over 10,000 years ago and extended through the eighteenth century to the time when the first Euro-American explorers settled in California.

Historical 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, structures, traveled ways, artifacts, or other evidence of human activity. Under federal and state requirements, historical cultural resources must be greater than fifty years old to be considered of potential historic importance. In response to guidance from the California Office of Historic Preservation staff considers cultural resources 45 years old for potential eligibility to the California Register of Historic Resources (CRHR).

Ethnographic resources are those materials important to the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, or Asian immigrants. They may include traditional resource collecting areas, ceremonial sites, topographic features, cemeteries, shrines, or ethnic neighborhoods and structures.

For this project, staff provides an overview of the environmental setting and history of the project area, identifies cultural resources within the project area, and an analysis of the potential impacts from the proposed project using criteria from the California Environmental Quality Act (CEQA). The primary concern is to ensure that all potential impacts are identified and that conditions are set forth that ensure that impacts are mitigated below the level of significance under CEQA.

If cultural resources are identified, staff determines whether there may be a project-related impact to them. If the cultural resources cannot be avoided, staff determines whether any of the impacted resources is eligible for the CRHR. If the impacted resources are eligible for the Register, staff recommends mitigation measures that ensure that impacts to the identified cultural resources are reduced to a less than significant level.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Cultural resources are indirectly protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, Section 431 et seq.) and subsequent related legislation, policies, and enacting responsibilities, e.g., federal agency regulations and guidelines for implementation of the Antiquities Act. Projects licensed by the Energy Commission are reviewed to ensure compliance with these and all other pertinent laws.

CULTURAL RESOURCES Table 1

State	
Public Resources Code (California Environmental Quality Act or CEQA), Section 21083.2	This section states that the lead agency determines whether a project may have a significant effect on "unique" archaeological resources. If a potential for damage to unique archaeological resources can be demonstrated, the lead agency may require reasonable steps to preserve the resource in place. Otherwise, the project applicant is required to fund mitigation measures to the extent prescribed in this section. This section also allows a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, which may require the project applicant to fund mitigation and delay construction in the area of the find.
California Code of Regulations, Title 14, Division 6, Chapter 3 (CEQA Guidelines), Section 15064.5, Subsections (d), (e), and (f)	Subsection (d) allows the project applicant to develop an agreement with Native Americans on a plan for the disposition of remains from known Native American burials impacted by the project. Subsection (e) requires the landowner [possibly the project applicant] to rebury Native American remains elsewhere on the property if other disposition cannot be negotiated within 24 hours of accidental discovery and required construction stoppage. Subsection (f) directs the lead agency to make provisions for historical or unique archeological resources that are accidentally discovered during construction, which may require the project applicant to fund mitigation and delay construction in the area of the find.
California Code of Regulations, Title 14, Division 6, Chapter 3 (CEQA Guidelines), Section 15126.4(b)	This section describes options for the lead agency and for the applicant to arrive at appropriate, reasonable, enforceable mitigation measures for minimizing significant adverse impacts from a project. It prescribes the manner of maintenance, repair, stabilization, restoration, conservation, or reconstruction as mitigation of a project's impact on a historical resource; discusses documentation as a mitigation measure; and advises mitigation through avoidance of damaging effects on historical resources of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan.
Penal Code, Section 622 1/2	This states that anyone who willfully damages an object or thing of archaeological or historical interest is guilty of a misdemeanor.
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	
Kern County General Plan, Policy	The Kern County General Plan promotes the preservation of cultural and historic resources which constitute a heritage value to residences and visitors (Kern 2004, p. 66-67)

SETTING

REGIONAL SETTING

The Cuyama Valley is at the southern end of the San Joaquin Valley, which in turn comprises the southern two-thirds of the greater Great Valley province (PEF 1999a, p. 5.3-1). The San Joaquin Valley in general is a northwest-trending structural basin filled with deep sediments laid down during the Late Cretaceous and Cenozoic time. Laced with active and potentially active geologic faults, the underlying rock units are largely of marine origin. The topography of the valley floor is generally flat, lying at the base of the Tehachapi Mountains. The hills are in the rain shadow of the Coast Ranges and receive little precipitation.

PROJECT, SITE, AND VICINITY DESCRIPTION

The proposed project site is located 6.5 miles east of Interstate 5 (I-5) Grapevine, California, and 30 miles south of Bakersfield. It is approached from I-5 on the Edmonston Pumping Plant Road. It is on a north-dipping surface of the alluvial fan of Pastoria Creek, which flows north-northwestward within 1000 feet west of the plant site (PEFE 2005a, p. 5.3-2).The project is proposed to be located on the existing 30 acre site of Calpine's existing Pastoria Energy Facility (PEF) at the Tejon Ranch in Kern County. The project would install one additional natural gas fired, F-class combustion turbine generator. There will not be any changes to fuel, water or transmission lines (PEFE 2005a, p.1-2 to 1-5).

The project area and vicinity has been used for cattle ranching, gravel mining, agriculture and oil production. There has been construction disturbance caused by the building of the California Aqueduct, PEF, and other power related construction (PEFE 2005a p. 5.7-2). The proposed single combustion turbine generator (CTG) would be part of a new power block within the existing PEFE (PEFE 2005a p. 3-2).

Prehistoric Setting

Archaeological data for the PEFE and general vicinity are scarce because the proposed facility is on the private property of the Tejon Ranch and few investigations have been done. The overview presented is derived largely from what is known from prior research centered on resources at Buena Vista and Tulare Lakes, and from newer studies conducted in support of the Elk Hills Power Project (Jackson et al. 1997, 1998).

There is scattered evidence of Early Holocene Paleoindian (~12,000-8000 before present) presence in the southern San Joaquin Valley, particularly around the relict shorelines of the ancient lakes. Such evidence consists of fluted projectile points, flaked stone crescents, choppers, and other typologically early stone tools. Renewed excavation of CA-KER-116 at Buena Vista has demonstrated the potential for deeply buried cultural material, and comparable early materials have been encountered at the Witt site at Lake Tulare (PEFE 20005d, p.8).

The types of tools recovered from the earliest sites suggest that the Paleoindian culture was based on the hunting and butchering of large game animals. A middle period is characterized by a shift from a hunting to a plant-based economy, while the third

archaeological period representing the Yokuts Indians and their antecedents revealed a further shift into a more diversified subsistence pattern based on more intensive exploitation of a variety of environments (Wallace 1978, p. 449).

Ethnographic Background

When the Spanish explorers arrived, the project area was occupied by the Southern Yokuts. The environment supported a varied diet including fish, waterfowl, plants such as tule roots, seeds, shellfish, rabbits, and to a lesser degree than elsewhere in California, acorns from foothills of the Tehachapi Mountains. The Yokuts in the project area were known variously as the Yauelmani, Tejoneños, or Talinin. The most southern village, *Tinliu*, was on Paseo Creek near the Tejon Ranch House. The Tejon Rancheria was abandoned in 1859, and the population was relocated to the Tule River where a reservation was established in 1873. The reservation population numbered 154 in 1905, and approximately 325 Yokuts in 1970.

Cultural and geographic boundaries between the Yokuts and the Chumash overlap in the southern San Joaquin Valley. The Kitanemuk (or, Alliklik) group of Chumash were said to have ranged widely across the Tejon Ranch property from Castac Lake through the upper reaches of Pastoria and Tunas Creeks, with occupation at the foot of Grapevine Canyon and possibly also with the Yokuts at *Tinliu* (PEFE 2005a, Appendix F, p.5.7-10 to 5.7-11).

Historic Setting

The first Spanish explorers encountered the Southern Yokuts, whose homeland included Tulare, Buena Vista, and Kern lakes, their connecting sloughs, and lower portions of the contributing rivers (PEFE 2005, Appendix F, p 5.7-9). The Spanish did not undertake settlement or found missions in the interior valleys, and the subsequent Mexican government made only a few grants in the Valley during the 1830s. One of the earliest, and the largest in the San Joaquin Valley with 97,616 acres, was the Rancho Tejon established in 1843. General Edward Fitzgerald Beale, then Superintendent of Indian Affairs, established the Sebastian Indian Reservation (also called Tejon Reservation) on the rancho in 1853. Fort Tejon in Grapevine Canyon at what is now I-5 was maintained by the U. S. Army from 1854 to 1864, to oversee the Native Americans living on the reservation, and also to protect both the Euroamerican settlers and Native Americans from other marauding tribes (PEFE 2005a, Appendix F, p. 5.7-8, 5.7-9).

After the reservation was closed in 1865, Beale purchased the ranch from the original grantees, Ignacio del Valle and Juan Temple. His original stone and adobe buildings on Arroyo del Paso were used as rancho headquarters until the Tehachapi earthquake of 1852; new headquarters were later built on the site of old Fort Tejon. The Tejon Ranch Company now covers nearly 270,000 acres and operates real estate, livestock, farming, and resource management divisions (PEFE 2005a, Appendix F, p. 5.7-9, 5.7-10). Remains of oil fields and power lines suggest the pattern of early developments.

Industrial Development

The Tejon Ranch area reflects the general development of Kern County. Mineral commodities have been important, particularly petroleum. Cattle, sheep ranching and agriculture are also important. The Tejon Ranch Company, incorporated in 1936, is a

publicly traded company covering 270,000 acres. It generates revenue from real estate, livestock, farming, and resource management divisions (PEFE p 5.7-9, 5.7-10)

Resources Inventory

Literature/Records Search and Native American Contacts

Prior to preparation of the AFC, the applicant's consultant conducted a literature search at the Southern San Joaquin Valley Information Center of the California Historical Resources Information System (CHRIS) to compile existing culture resource data. Within 0.5 mile radius of project facilities, 12 studies and nine archaeological sites were on file at the CHRIS. Of the known sites, four were milling stone (food processing) complexes, two were burial locations, and one was possibly the ethnographic village of *Cheut Pahbe* (PEFE 2005a, p. 5.7-12 to 5.7-13). None had been formally evaluated according to criteria for eligibility to the National Register of Historic Places. A single historical site was within the project footprint; P-15-003544 is an historic road dating back to the mid-1800s, used primarily for herding sheep and intercepting Jack's Camp, named after a Basque shepherd. The recorder in 1993 felt that this was not a significant site. Designated state landmarks outside of the project footprint include Fort Tejon State Historic Park (No. 129), and the Sebastian Indian Reservation (No. 133).

Field Surveys

Prior to preparation of the AFC for the PEF, the applicant conducted a field survey from July 26 to August 4, 1999, covering the plant site, laydown area, and Routes 1, 2A, and 5 as a block, 100 feet on each side of the proposed centerline of linear facilities, and certain "localized geographic nuances" such as drainage areas (PEF/Ray 1999a, pp. J16-17). The transect interval was 20 meters. Ten newly observed archaeological sites and 10 isolates were recorded.

Four of the new sites, either within or adjacent to the APE of the proposed project or project linears were recommended for testing to evaluate their significance. A *Cultural Resources Test Plan* was submitted in March 2000 (PEF/Hatoff 2000d). The final results of the test program were submitted in May 2000 (PEF/Hatoff 2000x).

Ethnographic Resources

During the PEF construction, the original Native American respondents were asked to recommend appropriate alternate monitors if they could not participate. Native American monitors were on-site during all sub-surface activities. A rotation system was used to allow all concerned and interested Native Americans to observe. Three Native American monitors were on site a total of nine days during the testing. Procedures were in place for the proper treatment of Native American remains pursuant to Public Resources Code 5097.98, but no remains were found (PEF/Thompson 2000i, p.3).

The proposed PEFE project sent contact letters on June 2, 2005 to Native American groups identified by the Native American Heritage Commission (NAHC). They received one response from the Tejon Indian Tribe. The letter asked that the tribe be kept informed regarding the progress of the project. The tribe expressed concern regarding the unearthing of human remains and/or burial artifacts and included information regarding federal laws concerning Native American Burials. They also specified that if

any burials were unearthed that the NAHC should be contacted as well as the Kern County Coroner (PEFE 2005h).

October 14, and 19, 2005, staff telephoned Native American groups and individuals listed by the NAHC as contacts in Kern County. Staff left voice mail messages for several people and will provide information about the project to two people who requested information. The people who requested information did not recall receiving previous information about the project.

October 14, 2005, staff spoke with Tejon Indian Tribe Chairperson, Kathey Morgan. She stated that the tribe was interested in both monitoring and information regarding the progress of the project. She also said that the tribe had received information regarding the Energy Commission site visit (Morgan 2005).

October 19, 2005, staff sent letters regarding the project to the groups and individuals listed by the NAHC for Kern County. At present only the Tejon Indian Tribe has expressed concern about this project.

Prehistoric and Historical Archaeological Resources

The PEFE plant site is located on 31 acres, and the laydown area covers an adjacent 25 acres to the south. Both had a grassy cover during the survey which limited visibility to less than 15 percent. The terrain slopes gently toward the north, and the soils appear to be podsols and sandy Pleistocene alluvium associated with the Pastoria Creek drainage. The survey was negative for cultural resources, the closest resource being an isolated bedrock milling feature (ISO 4) within Pastoria Creek, outside of the project footprint south of the laydown area.

Seven shovel test pits (STPs) 35 cm in diameter were excavated at TR 3 to an average depth of about 60 cm. Subsoils revealed rootlet intrusion, bioturbation, and flecks of charcoal interrupted as the result of grassfires. A single retouched quartz flake recovered in one STP in the 20-30 cm level represented the only cultural material. The goal of the testing at TR3 was to determine whether subsurface cultural resources were present within a 200 ft corridor necessary for construction. The field team concluded that if the 200 ft corridor is maintained for construction activities there will be no effect on the resources (PEF/Thompson 2000x, p.2-2 to 2-3. No formal evaluation of significance was stated in the preliminary report of testing, but because of the site's proximity to Pastoria Creek and the presence of the milling features on the surface, the consultant recommended monitoring in this area (PEF/Thompson 2000d, p.4).

During surveys for route revisions for the 14.01 mile gas line route proposed for the original project, additional sites were identified. Two potentially significant sites appeared to be located within the proposed right-of-way. One site was avoided entirely. The second site was shovel tested to determine the route of least impact for the pipeline that could not be rerouted at that location (PEFE 2005a p. 5). These sites, identified along the gas pipeline route are miles away from the plant site, where ground disturbance for the proposed expansion will occur.

Historic Standing Structures

Structural remains included oil extraction sites, insulators on an alignment suggestive of an old power line, and four houses which were not subject to historical research or architectural documentation. No historic standing structures will be impacted by this project.

Ethnographic Resources

Native Americans who consider the Tejon Ranch area part of their ancestral territory have previously participated in the PEF project. Native American monitors have provided information regarding prehistoric artifacts discovered by the project. The Tejon Indian Tribe has asked to be kept informed regarding the project.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

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 nearby. The co-existence of new structures amid old 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.

Indirect impacts to archaeological resources are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource materials due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project construction creates improved accessibility and vandalism or weather exposure becomes possible.

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

The CEQA Guidelines explicitly require the lead agency to make a determination of whether a proposed project will affect significant “historical resources.” The 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, Division 6, Chapter 3, 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)).

The CEQA guidelines list the four criteria for determining if a historical resource is a significant historical resource. These criteria are the eligibility criteria for the CRHR and are essentially the same as the eligibility criteria for the NRHP. The qualities that a resource must possess to be eligible for the CRHR include the following: is associated with events that have made a significant contribution to the broad patterns of our history (Criterion 1); or, is associated with the lives of persons significant in our past (Criterion 2); or, that embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values (Criterion 3); or, that has yielded, or may be likely to yield, information important to history or prehistory (Criterion 4) (Public Resources Code, Section 5024.1). In addition, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (California Code of Regulations, Title 14, Division 3, Chapter 11.5, Section 4852(c)).

For all resources that are not currently listed in the CRHR, including previously unknown archaeological resources unexpectedly found during construction, CEQA directs the lead agency to make a determination as to whether the resources are historically significant (meet one or more of the four criteria listed above) and retain sufficient integrity (still possess the characteristics which express their significance) to be recognizable and convey the reasons for their significance. If a historical resource is determined eligible for the CRHR, CEQA requires that the lead agency evaluate whether the proposed project will cause a "substantial adverse change in the significance of the historical resource," which the regulations define as a significant effect on the environment.

If the newly found resources are eligible for the CRHR, the direct impacts from construction will materially impair the resources. Appropriate mitigation measures, such as avoidance or assessment and data recovery, must be implemented to reduce that impact to less than significant. In recognition of this possibility, CEQA directs a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, and the project owner may be required to fund mitigation and delay construction in the area of the find (Public Resources Code, Section 21083.2; Section 21084.1; California Code of Regulations, Title 14, Division 6, Chapter 3, Section 15064.5(f); Section 15126.4(b)). Staff provides for this eventuality, by requiring that construction workers be trained to recognize archaeological resources and that all ground disturbance be monitored by a qualified archaeologist and halted if archaeological resources are encountered, that finds be evaluated for significance and data recovery be carried out if the impact cannot be avoided.

IMPACTS AND MITIGATION

Construction Impacts and Mitigation

No potentially significant cultural resources were observed within the area covered by the block survey. Three isolated milling stations were recorded outside of the footprint, west and south of the main facility; these do not ordinarily merit further consideration and no impacts are predicted unless unanticipated sites are observed during project development.

There is always a potential for impacts to subsurface cultural resources. Given the presence of the many milling complexes - some recorded as sites and smaller localities called isolates - the possibility exists that project construction could encounter additional, potentially significant cultural resources not presently visible from the surface. The discovery of cultural material during ground disturbance for construction of the PEF makes discovery of additional material likely during ground disturbance for the PEFE.

Archaeological Resources

Prior to ground disturbance for the original PEF project, numerous artifacts and sites were identified during surveys of the project footprint and adjacent soil. Only one isolated flake, (small, flat, thin layer or stone chip often generated as a by product of tool making) was identified adjacent to the plant site.

During the period of ground disturbance, two bedrock mortor sites and, CA-KER-6622 and CA-KER-6623 were detected during monitoring near the laydown area and access road. The sites were tested for subsurface components, but nothing was found. Both site locations were fenced and avoided during construction. A granite bowl was also discovered during monitor of ground disturbance at the plant site, as well as two flakes (PEF 2005 p. 6-4).

Flakes and the bedrock mortar sites were previously discovered during the cultural resources monitoring as a result of ground disturbance activities at the original PEF plant site. The 2 acres of ground disturbance for the proposed expansion will be within the boundaries of the plant site. To ensure that any cultural resources encountered during ground disturbance are recognized and treated appropriately, staff recommends full-time cultural resources monitoring by both a cultural resources and Native American monitor.

The existing conditions require that a qualified cultural resources specialist be retained. In addition they require that a training program for workers that instructs them to be able to identify cultural resources. The conditions also require monitoring of areas deemed sensitive for cultural resources and that compliance project manager be contacted if there is a discovery to discuss possible necessary mitigation. All cultural resources collect as a result of the project will be curated. The applicant proposes that conditions of certification that were adopted for the PEF project be applied to the PEFE. Staff agrees to this suggestion. Determinations of the significance of finds and mitigation measures will be developed in consultation with the Compliance Project Manager (CPM).

Historic Standing Structures

No historic standing structures will be affected by this project.

Ethnographic Resources

During the original PEF project several Native Americans expressed concern regarding cultural resources within the project vicinity. There was frequent Native American monitoring during ground disturbance to address these concerns. The Tejon Indian Tribe asserted that the project area was part of their historical territory and requested that they be involved full-time during construction of the alternate route for the gas line. The project owner agreed to their request. The Tejon Tribe has expressed concern that during construction of the PEFE that there might be impacts to Native American burials or grave related artifacts (PEFE 2005h).

The participation of Native Americans during the ground disturbing portions of the project should serve to mitigate impacts to ethnographic resources. Native Americans should be provided an opportunity to comment on the significance and importance of any discoveries to their culture. Strict adherence to requirements in the Health and Safety and Public Resources Codes that require particular procedures be followed if there are discoveries of Native American burials.

Indirect Impacts

At times, traffic and improved access are a result of development. These can result in easier access to cultural resources. Since Tejon Ranch is private property and access to area surrounding the project is limited, no indirect impacts have been identified for this project.

Operation Impacts and Mitigation

If operation involves ground disturbance, there may be impacts to cultural resources. If cultural resources are discovered during operation, the cultural resources specialist should be called and the conditions of certification should be followed.

Cumulative Impacts and Mitigation

The Kern County Planning Commission approved an application for a zoning change by the Tejon Industrial Complex, for 341 acres located on the west side of Interstate 5 at Laval Road. The zoning change was from light industrial to a medium industrial classification. The 341 acres will be developed for industrial and commercial uses. The first phase started in late September of 2000 and subsequent phases will continue throughout the coming years. The initial phase for roads and utilities will not require a large workforce. All development for this project will occur on the west side of I-5. This project and the proposed PEFE will not cause a cumulative impact.

Construction of other projects in the same vicinity as the proposed project could affect unknown subsurface archaeological deposits, most likely prehistoric. Project proponents for future projects can mitigate impacts to as yet undiscovered subsurface archaeological deposits to less than significant by implementing mitigation measures 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).

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments from agencies or the public were received. However, staff received comments from the applicant regarding authors of two references cited in the PSA. Staff has changed the references to reflect the correct author.

The applicant also commented on Conditions of Certification **CUL-1** through **CUL-15**. Staff has revised conditions **CUL-1** through **CUL-6** and **CUL-8** through **CUL-15**, deleting **CUL-9** and -**10** and renumbering conditions as appropriate.

COMPLIANCE WITH APPLICABLE LORS

Kern County provides guidance regarding the preservation of heritage resources. The General Plan advises compliance with CEQA as a method to implement its preservation policy. If the following conditions of certification are properly implemented, the project would result in a less than significant impact on newly found cultural resources or on those known resources that may be impacted in an unanticipated manner. The project would therefore be in compliance with CEQA and all other applicable laws, ordinances, regulations, and standards.

CONCLUSIONS

The PEFE project would have no impact on significant historic standing structures or identified archaeological sites. If Native Americans are provided the opportunity to monitor ground disturbance and the law is followed regarding the discovery of Native American burials, impacts to ethnographic resources would be mitigated to less than significant.

Staff recommends that the Commission adopt the following 13 conditions of certification. These conditions are intended to facilitate the identification and assessment of previously unknown archaeological resources encountered during construction, and to mitigate any significant impacts from the project on newly found resources assessed as significant. To accomplish this, the conditions provide for the archaeological monitoring of ground-disturbing construction activities, for the recovery of significant data from discovered archaeological deposits, for the writing of a technical report on monitoring activities and findings, and for the curation of recovered artifacts and other data.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of construction-related vegetation clearance, or earth-disturbing activities or project site preparation; or the movement or parking of heavy equipment onto or over the project surface, the project owner shall provide the California Energy Commission (Energy Commission) Compliance

Project Manager (CPM) with the name and statement of qualifications for its designated cultural resource specialist and alternate cultural resource specialist, if an alternate is proposed, who will be responsible for implementation of all cultural resources conditions of certification. No ground disturbance shall occur prior to CPM approval of the CRS, unless specifically approved by the CPM.

The statement of qualifications for the designated cultural resource specialist and alternate shall include all information needed to demonstrate that the specialist meets at least the minimum qualifications specified by the National Park Service, Heritage Preservation Services. Alternatively, the archaeologist shall be qualified by the Register of Professional Archaeologists (RPA). The minimum qualifications include the following:

A. a graduate degree in archaeology, cultural resource management, or a comparable field;

B. at least three years of archaeological resource evaluation, management, impact mitigation and field experience in California; and

C. at least one year's experience in each of the following areas:

    1. leading archaeological resource field surveys;

    2. leading site and artifact mapping, recording, and recovery operations;

    3. marshaling and use of equipment necessary for cultural resource recovery and testing;

    4. preparing recovered materials for analysis and identification;

    5. determining the need for appropriate sampling and/or testing in the field and in the laboratory;

    6. directing the analyses of mapped and recovered artifacts of both Native American and historical origin;

    7. completing the identification and inventory of recovered cultural resource materials; and

    8. preparing appropriate reports to be filed with the receiving curation repository, the State Historic Preservation Officer (SHPO), and all appropriate regional information center(s) CHRIS.

The statement of qualifications for the designated cultural resource specialist shall include:

A. a list of specific projects the specialist has previously directed;

B. the role and responsibilities of the specialist for each project listed; and

C. the names and phone numbers of contacts familiar with the specialist's work on these referenced projects.

If the designated specialist does not intend to personally supervise all surveys, studies, monitoring, or excavations, the principal shall designate the name and qualifications of a comparably qualified alternate cultural resource specialist. The specialist shall also provide the names and qualifications of any potential consultants such as historian or architectural historian who may participate.

Verification: At least 60 days prior to the start of construction-related vegetation clearance, or earth-disturbing activities or project site preparation, or the movement or parking of heavy equipment onto or over the project surface, the project owner shall submit the name and statement of qualifications of its designated cultural resource specialist and alternate cultural resource specialist, if an alternate is proposed, to the CPM for review and approval.

At least ten (10) days but no more than thirty (30) days prior to the start of any ground-disturbing action, the project owner shall confirm in writing to the CPM that the approved designated cultural resource specialist will be available at the start of earth-disturbing activities and is prepared to implement the cultural resources conditions of certification.

At least ten (10) days prior to the termination or release of a designated cultural resource specialist or field director, the project owner shall obtain CPM approval of the replacement professionals by submitting to the CPM the name and resume of the proposed new designated individuals.

CUL-2 Prior to the start of any construction-related vegetation clearance, or earth-disturbing activities or project site preparation, or the movement or parking of heavy equipment onto or over the project surface, the project owner shall provide the designated cultural resources specialist and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps provided will include the USGS 7.5 minute topographic quadrangle map and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting individual artifacts. If the designated cultural resource specialist requests enlargements or strip maps for linear facility routes, the project owner shall provide them. In addition, the project owner shall provide a set of these maps to the CPM at the same time that they are provided to the specialist. If the footprint of the power plant or linear facilities changes, the project owner shall provide maps and drawings reflecting these changes, to the cultural resources specialist and the CPM within five days. Maps shall show the location of all areas where surface disturbance may be associated with project related access roads and any other project components. Maps and drawings may be limited to the boundaries of the PEFE project.

Verification: At least 25 days prior to the start of construction-related vegetation clearance, or earth-disturbing activities or project site preparation on the project, or the movement or parking of heavy equipment onto or over the project surface, the project owner shall provide the designated cultural resources specialist and the CPM with the maps and drawings. Copies of maps or drawings of the PEFE reflecting changes to the

footprint of the power plant and/or linear facilities shall be submitted to the cultural resources specialist and the CPM within five days of the changes.

CUL-3 Prior to the start of construction-related vegetation clearance or earth-disturbing activities, or project site preparation, or the movement or parking of heavy equipment onto or over the project surface, the designated cultural resources specialist shall prepare, and the project owner shall submit to the CPM for review and written approval, a Cultural Resources Monitoring and Mitigation Plan (CRMMP), identifying general and specific measures to minimize potential impacts to cultural resources within areas subject to project related earth disturbance. Approval of the CRMMP by the CPM shall occur prior to any vegetation clearance or other earth-disturbing activities of construction or site preparation. The Energy Commission approved PEF CRMMP shall be appended to reflect cultural resources activities that will be necessary during the ground disturbance specific to the PEFE. Recommendations for programmatic treatment of designated resources may be included in the appendix. The appendix shall be submitted as a separate document to be appended to the Energy Commission approved PEF CRMMP. No ground disturbance shall occur prior to CPM approval of the PEFE appendix to the PEF CRMMP, unless specifically approved by the CPM.

The Cultural Resources Monitoring and Mitigation Plan shall include, but not be limited to, the following elements and measures for the PEFE project:

A. A proposed research design for both prehistoric and historical archaeology that includes a discussion of questions that may be answered by the mapping, data and artifact recovery conducted during monitoring and mitigation activities, and by the analysis of recovered data and materials. It shall provide details of the data needed to address the research issues and the methods proposed to obtain such data.

B. Identification of the person(s) expected to perform each of the tasks, a description of each team member's qualifications (please provide resumes) and responsibilities, the structure of the mitigation team, and the reporting relationships between project construction management and the monitoring and mitigation team. The cultural resources team shall include one member professionally qualified in historical or industrial archaeology;

C. A discussion of the inclusion of Native American observers or monitors, the procedures to be used to select them, the areas where they will be needed, and their role and responsibilities;

D. A discussion of measures such as flagging or fencing, to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during pre-construction, construction and/or operation, and identification of areas where these measures are to be implemented. The discussion shall address how these measures will be implemented prior to

the start of earth-disturbing activities and how long they will be needed to protect the resources from project-related effects;

E. A discussion of the requirement that all cultural resources encountered will be recorded and mapped (may include photos) and all cultural resources as identified in the research design will be collected for analysis and eventual curation into a retrievable storage collection in a public repository or museum that meets the State of California Guidelines for the Curation of Archaeological Collections.

F. A discussion of the availability and the designated specialist's access to equipment and supplies necessary for site mapping, photographing, and recovering any cultural resource materials encountered during earth-disturbing activities or construction; and

G. Identification of the public institution that has agreed to receive any data and cultural resources recovered during project-related monitoring and mitigation work. Discussion of the requirements, specifications, or funding needed for the materials to be delivered for curation and how they will be met. Also include the name and phone number of the contact person at the institution.

Verification: At least 25 days prior to the start any construction-related vegetation clearance or earth-disturbing activities or project site preparation or the movement or parking of heavy equipment onto or over the project surface, the project owner shall provide the PEFE appendix to the PEF Cultural Resources Monitoring and Mitigation Plan, prepared by the designated cultural resource specialist, to the CPM for review and approval.

CUL-4 Prior to the start of any construction-related vegetation clearance, or earth-disturbing activities or project site preparation or the movement or parking of heavy equipment onto or over the project surface, the designated cultural resources specialist shall prepare an employee training program. The project owner shall submit the cultural resources training program to the CPM for review and approval.

The training program shall discuss the potential to encounter cultural resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources. The program shall include the set of resource reporting procedures and work curtailment procedures that workers are to follow if previously unknown cultural resources are encountered during project activities. The training program shall be presented by the designated cultural resource specialist or qualified individual(s) approved by the CPM, and may be combined with other training programs prepared for biological resources, paleontologic resources, hazardous materials, or any other areas of interest or concern. The training program previously approved for the PEF shall be presented for the PEFE. It may be presented in the form of a video.

Verification: At least 25 days prior to the start of construction-related vegetation clearance or earth-disturbing activities or project site preparation, or the movement or parking of heavy equipment onto or over the project surface, the project owner shall submit to the CPM for review and approval, the proposed employee training program, the set of reporting procedures, and the work curtailment procedures that the workers are to follow if previously unknown cultural resources are encountered during earth-disturbing activities or construction. The project owner shall provide the name and "resume" of the individual(s) performing the training.

CUL-5 Prior to the start of construction-related vegetation clearance, or earth-disturbing activities or project site preparation or the movement or parking of heavy equipment onto or over the project surface and throughout ground disturbance as needed for all new employees, the project owner shall ensure that the designated cultural resource trainer(s) provide(s) the CPM-approved cultural resources training to all project managers, construction supervisors, and workers during ground disturbance. The project owner shall ensure that the designated trainer provides the workers with the CPM-approved set of procedures for reporting any sensitive resources that may be discovered during project-related ground disturbance and the work curtailment procedures that the workers are to follow if previously unknown cultural resources are encountered during earth-disturbing activities or construction.

Verification: Within seven (7) days of the start of construction-related vegetation clearance, or earth-disturbing activities or project site preparation or the movement or parking of heavy equipment onto or over the project surface, the project owner shall provide the CPM with documentation that the designated cultural resources trainer(s) has/have provided the CPM-approved cultural resources training and the set of reporting and work curtailment procedures to all project managers, construction supervisors, and workers hired before the start of earth-disturbing activities.

In each Monthly Compliance Report after the start of earth-disturbing or earth moving activities, the project owner shall provide the CPM with documentation that the designated cultural resource trainer(s) has/have provided to all project managers hired in the month to which the report applies the CPM-approved cultural resources training and the set of reporting and work curtailment procedures.

CUL-6 The designated cultural resource specialist, alternate cultural resource specialist or the specialist's delegated monitor(s) shall have the authority to halt or redirect earth-disturbing activities or construction, if previously unknown cultural resource sites or materials are encountered or if an unforeseen impact to an identified cultural resource is recognized during project-related land clearing, grading, augering, excavation or other earth-disturbing activities. Cultural resources monitors shall be members of the cultural resources team with a background and experience appropriate to the project area being monitored.

If such resources are found or an unforeseen impact is recognized, the halting or redirection of earth-disturbing activities or construction shall remain in effect until:

A. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday, 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.

B. The CRS and the project owner have consulted with the CPM and the CPM has concurred with the recommended eligibility of the discovery and proposed data recovery or other mitigation; and

C. any needed data recovery and mitigation has been completed.

The designated cultural resources specialist, the project owner, and the CPM shall confer within five working days of the notification of the CPM to determine what, if any, data recovery or other mitigation is needed.

If data recovery or other mitigation measures are required, the designated cultural resource specialist and team members shall monitor earth-disturbing and construction activities and implement the agreed upon data recovery and mitigation measures, as needed.

All required data recovery and mitigation shall be completed expeditiously unless all parties agree to additional time.

Verification: Thirty (30) days prior to the start of construction-related vegetation clearance, or earth-disturbing activities or project site preparation or the movement or parking of heavy equipment onto or over the project surface, the project owner shall provide the CPM with a letter confirming that the designated cultural resources specialist, and/or alternate cultural resource specialist and delegated monitor(s) have the authority to halt earth-disturbing or construction activities in the vicinity of a cultural resource find.

CUL-7 Prior to the start of any construction-related vegetation clearance, or earth-disturbing activities or project site preparation or the movement or parking of heavy equipment onto or over the project surface, and each week throughout the project construction period, the project owner shall provide the designated cultural resource specialist with a current schedule of anticipated project activity in the following month. The schedule shall include a map indicating the area(s) where ground disturbing or construction activities will occur or where other specialists may be conducting mitigation measures. The designated cultural resources specialist shall consult weekly with the project superintendent or construction field manager to confirm the area(s) to be worked on the next day(s).

Verification: At least 10 days prior to the start of project construction-related vegetation clearance, earth-disturbing activities or project site preparation or the movement or parking of heavy equipment onto or over the project surface, and in each Monthly Compliance Report thereafter, the project owner shall provide the CPM with a copy of the weekly schedule of the construction activities. The project owner shall notify the CPM when all ground disturbing activities, including landscaping, are completed.

CUL-8 The project owner shall ensure that the CRS, alternate CRS, or CRMs shall monitor ground disturbance (including grading and landscaping) full-time in the vicinity of the project site and linears, and ground disturbance at laydown areas 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. In the event that the CRS determines that full-time monitoring is not necessary in certain locations, a letter or e-mail providing a detailed justification for the decision to reduce the level of monitoring shall be provided to the CPM for review and approval prior to any reduction in monitoring.

Throughout the monitoring and mitigation phases of the project, the designated cultural resources specialist and/or alternate cultural resource specialist and delegated monitor(s) shall keep a daily log of any resource finds, and the progress or status of the resource monitoring, collections, mitigation, preparation, identification, and analytical work being conducted for the project. The daily logs shall indicate by tenths of a post mile, where and when monitoring has taken place, where monitoring has been deemed unnecessary, and where cultural resources were found.

The designated specialist shall prepare a weekly summary of the daily logs on the progress or status of cultural resource-related activities.

The designated resource specialist and delegated monitor(s) may informally discuss the cultural resource monitoring and mitigation activities with Commission technical staff.

Verification: Throughout any construction-related vegetation clearance, or earth-disturbing activity or project site preparation or the movement or parking of heavy equipment onto or over the project surface, and the project construction period, the project owner shall ensure that the daily logs prepared by the designated cultural resource specialist and delegated monitor(s) are available for periodic audit by the CPM.

Requests for a reduction in the level of cultural resources monitoring shall be submitted to the CPM for review and approval at least 24 hours prior to the date of planned reduction.

CUL-9 The project owner shall ensure that the designated cultural resource specialist performs the supervision, recovery, preparation for analysis, analysis, preparation for curation, and delivery for curation of all cultural materials encountered and collected during surveys, monitoring, testing, data

recovery, mapping, and mitigation activities related to the project as identified in the research design.

Verification: The project owner shall maintain in its compliance files, copies of signed contracts or agreements with the museum, university, or other appropriate research specialists responsible for cultural resource services. The project owner shall maintain these files for the life of the project, and the files shall be available for periodic audit by the CPM. The specific locations of sensitive cultural resource sites shall be kept confidential and accessible only to qualified cultural resource specialists.

CUL-10 The project owner shall ensure that the designated cultural resources specialist prepares a Cultural Resources Report. The project owner shall submit the report to the CPM for review and approval.

The Cultural Resources Report shall include (but not be limited to) the following:

A. For all projects:

1. a description of pre-project literature search, surveys, and any testing activities;

2. maps showing areas surveyed or tested;

3. description of any monitoring activities;

4. maps depicting areas monitored and site locations on 7.5 minute USGS topographic base; and

5. conclusions and recommendations.

B. For projects in which cultural resources were encountered, include the items above and also provide:

1. records and maps for sites and isolates;

2. description of any testing and determinations of significance, and potential eligibility

3. discussion of research questions raised or addressed by data from the project.

C. For projects for which cultural resource data were recovered, include a. and b. above, plus the following:

1. description of the methods used in the field and laboratory;

2. verbal description and graphic illustration of recovered cultural materials;

3. results and findings of any special analyses conducted on recovered cultural materials;

4. catalogue of recovered cultural materials; interpretation of the site(s0 with regard to the research design; and

5. the name and location of the qualified public repository receiving the recovered cultural resources for curation.

The cultural resources report for PEFE shall be appended to the cultural resources report for PEF.

Verification: The project owner shall ensure that the designated cultural resource specialist completes the PEFE appendix Cultural Resources Report within ninety (90) days following completion of the collections analysis. Within seven (7) days after completion of the report, the project owner shall submit the Cultural Resources Report to the CPM for review and approval.

CUL-11 The project owner shall submit an original copy, an original-quality copy, and a computer disc copy (or other electronic format required by the repository) of the CPM-approved Cultural Resource Report to the public repository to receive the recovered data and materials for curation, with copies to the State Historic Preservation Officer (SHPO) and to the appropriate regional archaeological information center(s). Any disc files must meet SHPO requirements for format and content.

The copies of the Cultural Resource Report to be sent to the curating repository, the SHPO, and the regional information center shall include the following:

A. originals or original-quality copies of all text;

B. originals of any topographic maps showing survey, site, and monitored resource locations;

C. originals or original-quality copies of drawings of significant or diagnostic materials found during survey, monitoring, testing or mitigation, and subject to analysis and evaluation; and

D. photographs of the cultural resource site(s) and the various cultural resource materials recovered during project monitoring and mitigation and subjected to post-recovery analysis and evaluation. The project owner shall provide the curating repository with a set of negatives for all of the photographs.

Verification: Within thirty (30) days after receiving approval of the Cultural Resources Report, the project owner shall provide to the CPM documentation that the report has been sent to the public repository receiving the recovered data and materials for curation, the SHPO, and the appropriate archaeological information center.

For the life of the project, the project owner shall maintain in its compliance files copies of all documentation related to the filing of the CPM-approved Cultural Resources Report with the public repository receiving the recovered data and materials for curation, the SHPO, and the appropriate CHRIS information center.

CUL-12 Except for those materials subject to PRC 5097.99, following the filing of the CPM-approved Cultural Resource Report with the appropriate entities specified in CUL-13 above, the project owner shall ensure that all cultural resource materials, maps and data collected during survey, testing, and data recovery and mitigation for the project as identified in the research design are delivered to a public repository that meets the State of California Guidelines for the Curation of Archeological Collections for the curation of cultural resources. The project owner shall pay any fees for curation required by the repository. Collections and documents will be prepared to satisfy the requirements of the designated repository.

Verification: The project owner shall ensure that all recovered cultural resource materials are delivered for curation within thirty (30) days after providing the CPM-approved Cultural Resource Report to the entities specified in Cul-13.

For the life of the project, the project owner shall maintain in its compliance files, copies of signed contracts or agreements with the public repository to which the project owner has delivered for curation all cultural resource materials collected during cultural resource services for the project, except for materials subject to PRC 5097.99.

CUL-13 Prior to the start of any vegetation clearing or other earth-disturbing activity related to site preparation, construction, or site testing, a Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts may be discovered. Informational 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.

Verification: One week prior to ground disturbance in areas where there is a potential to discover Native American artifacts, the project owner shall send notification to the CPM identifying the person(s) retained to conduct Native American monitoring. The project owner shall also provide a plan identifying the proposed monitoring schedule and information explaining how Native Americans who wish to provide comments will be allowed to comment. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall inform the CPM one week prior to ground disturbance. The CPM will either identify potential monitors or will allow ground disturbance to proceed without a Native American monitor. Native American monitoring may resume when a monitor becomes available. Copies of monthly summaries mailed or e-mailed to the Tejon Indian Tribe shall be provided to the CPM.

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PEFE (Pastoria Energy Facility Expansion) 2005a – Application for Certification. Submitted to the California Energy Commission on April 29, 2005.

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HAZARDOUS MATERIALS MANAGEMENT

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

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed Pastoria Energy Facility Expansion project (with staff's proposed mitigation measures) indicates that hazardous materials use 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., the applicant already has an existing Risk Management Plan and its provisions are applicable to the proposed project. Proposed Conditions of Certification address safety at the anhydrous ammonia tanker truck transfer pad, hazardous materials transportation, hazardous materials emergency response, and the implementation of required site security measures.

INTRODUCTION

The purpose of this Hazardous Materials Management analysis is to determine if the proposed Pastoria Energy Facility Expansion (PEFE) project has the potential to cause significant impacts on the public as a result of the use, handling, storage, or transportation of hazardous materials. 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 impacts to the extent feasible.

This analysis does not address potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and provide employees 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 the requirements applicable to the protection of workers from such risks.

Anhydrous ammonia is the only acutely hazardous material currently used or stored at the Pastoria Energy Facility (PEF) site in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j) (PEFE 2005a Tables 3.4.10-1 and 3.4.10-2). Anhydrous ammonia is used at the existing PEF for controlling oxides of nitrogen (NO_x) emissions through selective catalytic reduction. The PEFE will also require the use of anhydrous ammonia for the same purpose, however, the storage facilities and amounts stored on site would not change due to the Expansion (PEFE 2005a Table 3.4.10-2 and Section 5.15). The use of anhydrous ammonia, which is stored as a liquid gas at elevated pressure, presents a risk of off-site impacts. The high internal energy associated with this form of ammonia can act as a driving force in an accidental release, which would rapidly introduce large quantities of the material to the ambient air and result in high down-wind concentrations.

Other hazardous materials, such as mineral and lubricating oils, corrosion inhibitors and water conditioners, will be present at the proposed facility. Hazardous materials used during the construction phase include gasoline, diesel fuel, motor oil, hydraulic fluid,

welding gases, lubricants, solvents, paint, and paint thinner. No acutely toxic hazardous materials will be used for the construction of the PEFE. 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. Although no natural gas is stored, the Expansion project will also involve the handling of large amounts of natural gas that would be delivered through an existing 13.49-mile 20-inch diameter pipeline (PEFE 2005a Section 5.15.2.2.1). Natural gas possesses some risk of both fire and explosion. The PEF project also transports anhydrous ammonia to the facility, and the Expansion project would require approximately two additional deliveries per year (PEFE 2005b Response to DR #39). This document addresses all potential impacts associated with the use and handling of hazardous materials, including necessary protections against un-authorized intrusion into the power plant facility by vandals, saboteurs, criminals, and foreign or domestic terrorists.

LAWS, ORDINANCES, REGULATION, AND STANDARDS (LORS)

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

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

Applicable Law	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III)
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Established a nationwide emergency planning and response program and imposed reporting requirements for businesses which store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on Risk Management Plans (42 USC §112(r))	Requires the states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 CFR 172.800	U.S. Department of Transportation (DOT) requirement that suppliers of hazardous materials prepare and implement security plans.
49 CFR Part 1572, Subparts A and B	Requires suppliers of hazardous materials to ensure that all their hazardous materials drivers are in compliance with personnel background security checks.
State	
The California Health and Safety Code, section 25534	Directs facility owners, storing or handling acutely hazardous materials in reportable quantities, to develop a Risk Management Plan (RMP) and submit it to appropriate local authorities, the United States Environmental Protection Agency (EPA), and the designated local administering agency for review and approval. The plan must include an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any preexisting evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This new, recently developed program supersedes the California Risk Management and Prevention Plan (RMPP).
Title 8, California Code of Regulations, Section 5189	Requires facility owners to develop and implement effective safety management plans to insure 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 RMP process.
Title 8, California Code of Regulations, Section 458 and Sections 500 to 515	Set forth requirements for 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 for Material Engineering (ASME) Pressure Vessel Code, the American National Standards Institute (ANSI) K61.1 and the National Boiler and Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia storage facilities.
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 to be discharged into sources of drinking water.
Local or Locally Enforced	
Uniform Fire Code	Contains requirements for fire protection and neutralization systems for emergency venting compressed gases. Enforced by the Kern County Fire Dept. (KCFD).

The Certified Unified Program Authority (CUPA) with responsibility to review Risk Management Plan (RMP) and Hazardous Materials Business Plans is the Kern County Environmental Health Services Department (KCEHSD). In regards to seismic safety issues, the site is located in Seismic Risk Zone 4. Construction and design of all structures will meet the seismic requirements of California Code Seismic Zone 4 (PEFE 2005a Section 4.1.1.2). The hazardous materials storage facilities, including the anhydrous ammonia tanks, are already constructed as part of the original PEF project. No additional hazardous materials storage structures would be required by the PEFE.

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 to 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 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 the associated health risks. When wind speeds are low and the atmosphere is stable, dispersion is severely reduced and can lead to increased localized public exposure.

Recorded wind speeds and ambient air temperatures are described in the Air Quality section (5.2.1.2) and in the Air Quality Technical Report Appendix B of the AFC (PEFE 2005a). Staff agrees with the applicant that use of F stability (stagnated air, very little mixing), wind speed of 1.5 meters per second, and a temperature of 77 °F is appropriate for conducting the Offsite Consequence Analysis. Staff believes these parameters represent a reasonably conservative scenario and thus reflect worst case atmospheric conditions.

TERRAIN CHARACTERISTICS

The location of elevated terrain is often an important factor to be considered in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The general elevation of the PEF site is about 1,070 feet above mean sea level. Topography slopes to the north-northwest from the nearby foothills at an approximate 3-percent grade. Terrain above stack (1200 feet including grade elevation) in the project vicinity exists to the south, east, and west of the site (PEFE 2005a Figure 5.16-1).

LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. As described in section 5.16.1 of the PEFE AFC, no sensitive receptors exist within a 10-mile radius from the PEF site. No residences or sites planned for urban development exist within a 5-mile radius of the PEF site (PEFE 2005a Section 5.15.1 and 5.16.1).

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 potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them more sensitive to the adverse effects of hazardous materials. In order to accomplish this goal, staff utilizes the most current acceptable public health exposure levels (both acute and chronic) set to protect the public from the effects of an accidental chemical release.

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

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

Staff reviewed and evaluated the applicant's proposed use of hazardous materials as described by the applicant (PEFE 2005a, Section 5.15 and Tables 3.4.10-1 and 3.4.10-2). 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 Tables 3.4.10-1 and 3.4.10-2 of 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 there is virtually no chance that a spill would migrate off the site and impact the public, were removed from further assessment.
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included engineering controls such as automatic shut-off valves and different size transfer-hose couplings and administrative controls such as worker training and safety management programs.
- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.
- Step 5: Staff analyzed the theoretical impacts on the public of a worst-case spill of hazardous materials even with the mitigation measures proposed by the applicant. When mitigation methods proposed by the applicant are sufficient, no further mitigation is recommended. If the proposed mitigation is not sufficient to reduce the potential for adverse impacts to an insignificant level, staff will propose additional prevention and response controls until the potential for causing harm to the public is reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small Quantity Hazardous Materials

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

During the construction phase of the project, the only hazardous materials proposed for use includes paint, paint thinner, cleaners, solvents, adhesives, gasoline, diesel fuel, motor oil, lubricants, and welding gases. Any impact of spills or other releases of these materials will be limited to the site due to the small quantities involved, the infrequent use and hence reduced chances of release, and the implementation of an emergency response training program and procedures. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuel are all of very low volatility and represent limited off-site hazard even in larger quantities.

The existing PEF facility currently stores and uses acutely hazardous chemicals used for water treatment such as sodium hydroxide, sulfuric acid (93%), disodium phosphate, trisodium phosphate, and other various chemicals. These chemicals are used and stored in relatively small amounts and represent limited off-site hazard due to their small quantities, low volatility, and/or low toxicity. The applicant has stated that the quantities of these water treatment chemicals will not change due to the PEFE (PEFE 2005a Table 3.4.10-1), and therefore staff concludes that the use and handling of these chemicals has already been assessed and may be removed from further analysis.

The only hazardous materials that would be used and/or stored at the PEF site in larger amounts due to the PEFE are lubricating oil, insulating oil, carbon dioxide, hydrogen, and various detergents (PEFE 2005a Table 3.4.10-2). With the exception of hydrogen, none of these chemicals represent a risk of off-site hazard due to their relatively small quantities, low volatility, and/or low toxicity. Hydrogen gas would be used by the PEFE as a generator coolant, and poses a risk of both fire and explosion. A portion of the hydrogen will be stored within the generator cooling system and piping, while the remainder will be contained in cylinders or an above ground tank. Initial fill of the PEFE generator will require about 2,800 cubic feet of hydrogen, and up to 10,000 cubic feet will be present at the site at any time. The storage structure of the hydrogen gas and its location will be selected to protect from potential ignition sources and minimize vehicular impact (PEFE 2005a Section 5.15.2.2.1). Staff concludes that due to the relatively small amount of hydrogen stored on-site and the training requirements for personnel handling such materials, the use and storage of hydrogen pose a minimal risk of impacts from fire and/or explosion.

Other gasses such as acetylene, argon, carbon monoxide, nitric oxide, nitrogen, and oxygen, used for welding and equipment calibration may also be present on-site. These gassed will be present in small quantities and stored separately in DOT-approved cylinders that will minimize the risks of fire and/or explosion (PEFE 2005a Section 5.15.2.2.1).

After removing from consideration those chemicals that pose no risk of off-site impact in Steps 1 and 2, staff continued with Steps 3, 4, and 5 to review the remaining hazardous materials: natural gas and anhydrous ammonia.

Large Quantity Hazardous Materials

Natural Gas

Natural gas poses a fire and/or possible explosion risk as a result of its flammability. Natural gas is composed of mostly methane, but also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, and tasteless and is lighter than air. Natural gas can cause asphyxiation when methane is ninety 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 were to occur under certain specific conditions. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1998), natural gas is less likely to cause explosions than many other fuel gases, such as propane or liquefied petroleum gas, but it will explode under certain conditions (as demonstrated recently in July 2004 in Belgium).

While natural gas will be used in significant quantities, it will not be stored on-site. The risk of a fire and/or explosion on-site can be reduced to insignificant levels through adherence to applicable codes and development and implementation of effective safety management practices. In particular, gas explosions can occur in the heat recovery steam generator (HRSG) and during start-up. The National Fire Protection Association (NFPA 85A) requires 1) the use of double block and bleed valves for gas shut-off; 2) automated combustion controls; and 3) burner management systems. These measures

will significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures would require air purging of the gas turbines prior to start-up, thus precluding the presence of an explosive mixture.

The safety management plan proposed by the applicant would address the handling and use of natural gas and significantly reduce the potential for equipment failure due to improper maintenance or human error. The proposed PEFE would connect to the existing gas pipeline and therefore would not require the installation of a new gas pipeline (PEFE 2005a Section 5.15).

Anhydrous Ammonia

Based on staff's analysis, as described above, anhydrous ammonia is the only hazardous material that may pose a risk of off-site impacts. The use of anhydrous ammonia can result in the formation and release of toxic gases in the event of a spill even without interaction with other chemicals. This is a result of its volatile nature and the large amounts of anhydrous ammonia that will be used and stored on-site. A discussion of the health affects associated with exposure to ammonia gas is presented in **Hazardous Materials Appendix B** and a discussion of exposure criteria considered by staff and their applicability to different populations and exposure-specific conditions is provided in **Hazardous Materials Appendix A**.

Anhydrous ammonia will be used in controlling the emission of oxides of nitrogen (NO_x) from the combustion of natural gas in the Expansion CTG, however, information provided in the PEFE AFC indicates that the storage facilities and amounts of anhydrous ammonia stored on site would not change due to the expansion (PEFE 2005a Section 5.15.2.2.2). Two 30,000-gallon capacity above-ground storage tanks are currently used to store the anhydrous ammonia (PEFE 2005a Section 5.15.2.3.1). The accidental release of anhydrous ammonia without proper mitigation can result in very high down-wind concentrations of ammonia gas. Although the quantity of anhydrous ammonia stored on site would not change due to the proposed PEFE, the applicant provided an analysis of the potential impacts associated with an accidental release of anhydrous ammonia. This analysis is described below.

Section 5.15.2.3.1 of the AFC (PEFE 2005a) describes the modeling parameters for the worst case and alternative accidental release scenarios of anhydrous ammonia used in the applicant's Offsite Consequence Analysis (OCA). The modeling was conducted by Det Norske Veritas, who used the Process Hazard Analysis Software Tool (PHAST) Version 6.4 in combination with the Det Norske Veritas' Unified Dispersion Model (UDM) to model both the worst case and alternative release scenarios. The worst case scenario assumed the complete release of the contents of one anhydrous ammonia storage tank in 10 minutes. Due to the expansion of anhydrous ammonia, the storage tanks can not be filled to capacity, and therefore the worst case assumed that the tank was 80% full. The alternative scenario assumed that a 3-inch vapor line from one of the ammonia tanks failed, releasing anhydrous ammonia for two hours before it would be controlled. Both scenarios assumed wind speeds of 1.5 meters per second, ambient temperature of 77°F, and category F stability. The spilled ammonia was assumed to be a horizontal release at an elevation of one meter, and concentrations of ammonia at the

toxic end point of 200 PPM were calculated at one meter elevation (PEFE 2005a Sections 5.15.2.3.1 and 5.15.2.3.3).

The results indicated that concentrations exceeding 200 PPM in the worst-case scenario would extend about 0.83 miles from the storage tank at a height of 1.0 meter above ground level. This distance extends beyond the facility fenceline in all directions, however, no sensitive receptors or residences are located in this area. For the alternative scenario, concentrations exceeding 200 PPM would exist up to 0.24 miles from the tank, which extends beyond the facility's northern, eastern, and southern fence lines (PEFE 2005a Section 5.15.2.3.4 and Figure 5.15-1).

Staff reviewed the applicant's anhydrous ammonia release modeling calculations and determined that they were consistent with other such analyses reviewed by staff. These analyses showed that staff's level of concern of 75 ppm would be exceeded at distances up to three miles, a radius inside which no homes and no sensitive receptors exist but includes workers at the nearby active gravel pit (approximately 200 yards to the southeast) and at the Department of Water Resources Edmonston Pumping Plant (approximately 1.5 miles to the southeast). A release of anhydrous ammonia could also impact traffic on the access road from I-5 (Edmonston Pumping Plant road), although this road is very lightly traveled. Although the storage facility for anhydrous ammonia already exists at the PEF site and the quantities of anhydrous ammonia stored on site would not increase with the proposed PEFE, the PEFE will require up to two extra deliveries of a fully-loaded tanker truck of anhydrous ammonia to the site per year. Staff had previously reviewed and approved the Risk Management Plan (RMP) for the PEF project. The RMP addresses anhydrous ammonia. Because no additional anhydrous ammonia will be stored at the PEF site due to the proposed Expansion, no revision to the current RMP would be required.

Mitigation

The potential for accidents resulting in the release of hazardous materials is greatly reduced by the implementation of a safety management program, which includes the use of both engineering and administrative controls. Elements of facility controls and the safety management plan are summarized below.

Engineering Controls

Engineering controls help to prevent accidents and releases (spills) from moving off-site and impacting the community by incorporating engineering safety design criteria into the design of the facility. The engineered safety features proposed by the applicant for use at this facility include:

- secondary containment areas surrounding each of the hazardous materials storage areas and feed areas designed to contain accidental releases that might happen during storage, delivery, or transfer;
- physical separation of stored chemicals in isolated containment areas separated by a nonflammable and non-corrosive material in order to prevent accidental mixing of incompatible materials which may result in the evolution and release of toxic gases or fumes; and

- process protective systems including a fire detection and protection system, hazardous materials safety systems, and natural gas and chemical safety systems.

A review of the anhydrous ammonia containment area shows that it is equipped with a water-spray system that will serve to control any accidental release from the two 30,000 gallon capacity ammonia storage tanks. However, the water spray system is not aimed at and thus does not cover the ammonia tanker truck transfer pad. Staff has consistently determined that the greatest chance of an accidental release or spill comes not from a tank or pipeline rupture but from the transfer process from tanker truck to storage tank. Transfer lines and attachments can fail and the ability of a water spray system to reduce on-site and off-site migration of an anhydrous ammonia cloud would greatly reduce risks to workers. Therefore, staff proposes Condition of Certification **HAZ-5** that would require the water spray system be extended to cover the tanker truck transfer pad.

Administrative Controls

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

A worker health and safety program will be prepared by the applicant and will include (but is not limited to) the following elements:

- 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 operation and maintenance of systems utilizing hazardous materials;
- an anhydrous ammonia Safety management Plan;
- fire safety and prevention; and
- emergency response actions including facility evacuation, hazardous material spill cleanup, and fire prevention.

At the facility, the project owner will be required to designate an individual who has the responsibility and authority to ensure a safe and healthful workplace. The project health and safety official will oversee the health and safety program and will have the authority to halt any action or modify any work practice in order to protect the workers, facility, and the surrounding community in the event that the health and safety program is violated.

The existing Hazardous Materials Business Plan (HMBP), which incorporates state requirements for the handling of hazardous materials, will be revised by the applicant to include the PEFE (PEFE 2005a Section 3.4.10.1) and staff proposes Condition of Certification **HAZ-2** to require timely revision, updating, submittal, and approval by the CPM. Staff has also reviewed the current PEF RMP and Anhydrous Ammonia Safety Management Plan and believes that they are adequate to address the Expansion.

On-site Spill Response

In order to address the issue of spill response, the PEF facility prepared and implemented an Emergency Response Plan which includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, prevention equipment and capabilities, etc. Emergency procedures that were established include evacuation, spill cleanup, hazard prevention, and emergency response. Staff has reviewed and approved this plan and concludes that it is adequate to address the proposed Expansion.

The KCFD Landco Station 66, located approximately 30 miles north of the project site with a response time of about 30 minutes, is considered the first responder for HazMat incidents (CEC 2000 Page 80). Staff believes that the hazardous materials response time is acceptable and that the KCFD HazMat Response Team is adequately trained but not adequately equipped to respond in a timely manner to an incident at PEFE. In discussions with the Kern County Fire Department (KCFD), Deputy Chief Scott stated that the Hazardous Materials Response Team located 30 minutes away at the KCFD Landco Station 66 and the nearest fire station at Tejon Ranch do not currently have hand-held ammonia detectors (KCFD 2005). Staff has determined that these hand-held ammonia detectors have been useful to check airborne levels of ammonia during a release at other power plants that use anhydrous or aqueous ammonia and the Kern County Fire Department has requested that they be provided to their first responders at the Tejon Station and the HazMat Response Team at Station 66. Staff therefore proposes Condition of Certification HAZ-8 to require the provision of these detectors to the KCFD. Staff believes that impacts associated with the use and handling of anhydrous ammonia at the PEFE site can be mitigated by providing these detectors to the fire department. Additional mitigating factors include engineering and administrative controls implemented by the applicant for the existing PEF facility and the nature of the surrounding area which is sparsely populated. Therefore, staff concludes that the use, storage, and handling of anhydrous ammonia proposed for this project will not represent a significant risk to the public if the negotiations described in the **WORKER SAFETY FIRE PREVENTION** section are successful.

Transportation of Hazardous Materials

Hazardous materials, including anhydrous ammonia, sulfuric acid, and cleaning chemicals, will be transported to the facility via tanker truck. While many types of hazardous materials will be transported to the site, staff believes that transport of anhydrous ammonia poses the predominant risk associated with hazardous materials transport. The hazardous materials transportation route that was previously approved for the PEF travels through Interstate 5 to the Grapevine exit, and then uses Edmonston Pumping Plant Road to the plant site (PEFE 2005a Attachment J and CEC 2000 Page 174). The Commission staff will approve any future revisions to the route per Condition of Certification **HAZ-4**.

Ammonia can be released during a transportation accident and the extent of impact in the event of such a release would depend on the location of the accident and on the

rate of dispersion of ammonia vapor from the tanker truck. The likelihood of an accidental release during transport is dependent on three factors:

- the skill of the tanker truck driver,
- the type of vehicle used for transport, and
- accident rates.

To address this concern, staff evaluated the risk of an accidental transportation release in the project area. Staff's analysis focused on the project area after the delivery vehicle leaves the main highway (I-5). Staff believes that it is appropriate to rely on the extensive regulatory program that applies to shipment of hazardous materials on California Highways to ensure safe handling in general transportation (see The Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, The US Department of Transportation Regulations 49 CFR Subpart H, §172-700, and California DMV Regulations on Hazardous Cargo). These regulations also address the issue of driver competence.

To address the issue of tanker truck safety, anhydrous ammonia will be delivered to the proposed facility in Department of Transportation (DOT) certified vehicles with design capacity of 8,000 gallons. These vehicles will be designed to DOT Code MC-307. These are high integrity vehicles designed for hauling of caustic materials such as ammonia. Staff has, therefore, proposed Condition of Certification **HAZ-3** to ensure that regardless of which vendor supplies the anhydrous ammonia, delivery will be made in a tanker, which 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 risks of a hazardous materials transportation accident.

Staff used the data from the Davies and Lees (1992) article which references the 1990 Harwood et al. study, to determine that the frequency of release for transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per million miles traveled on well designed roads and highways. The existing PEF facility requires up to 24 tanker truck deliveries of anhydrous ammonia per year, each delivering about 8,000 gallons. The maximum usage of anhydrous ammonia during operation of the proposed PEFE project will require about two additional deliveries per year (PEFE 2005b Response to DR #39). Staff concludes that the distance traveled by two deliveries per year represents an insignificant risk. 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 one million.

Staff therefore believes the risk of exposure to significant concentrations of anhydrous ammonia during transportation to the facility are insignificant because of the remote possibility of accidental release of a sufficient quantity to present a danger to the public. The transportation of similar volumes of hazardous materials on the nation's highways is not unique nor an infrequent occurrence. Staff's analysis of the transportation of

anhydrous ammonia to the proposed facility (along with data from the U.S. DOT) demonstrates that the risk of accident and exposure is less than significant.

Based on the environmental mobility, toxicity, quantities present at the site and frequency of delivery, it is staff's opinion that anhydrous ammonia poses the predominate risk associated with hazardous materials transportation and use at the proposed facility. Based on this, staff concludes that the risk associated with transportation of other hazardous materials to the proposed facility does not significantly increase the risk of impact beyond that associated with ammonia transportation, and is therefore insignificant as well.

Seismic Issues

The possibility exists that an earthquake would cause the failure of a hazardous materials storage tank. The quake could also cause the failure of the secondary containment system (berms and dikes) as well as electrically controlled valves and pumps. The failure of all these preventive control measures might then result in a vapor cloud of hazardous materials moving off-site and impacting the residents and workers in the surrounding community. The effects of the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan, in January 1995, heighten the concern regarding earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused to several large storage tanks and smaller tanks associated with the water treatment system of a cogeneration facility. Those 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, which should be followed in adequately 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 similar seismic design codes as California. No hazardous materials storage tanks were impacted by this quake. Referring to the sections on **Geologic Resources and Hazards** and **Facility Design** in the AFC, staff notes that the proposed facility will be designed and constructed to the applicable standards for California Code Seismic Zone 4 (PEFE 2005a Section 4.1.1.1). 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

This facility proposes to use hazardous materials that have been identified by the US EPA as materials where special site security measures should be developed and implemented to ensure that unauthorized access is prevented. The EPA published a Chemical Accident Prevention Alert regarding Site Security (EPA 2000a), the US Department of Justice published a special report on Chemical Facility Vulnerability Assessment Methodology (US 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 published a draft Vulnerability Assessment methodology for Electric Power Infrastructure in 2002 (DOE 2002). The energy

generation sector is one of the thirteen Critical Infrastructures listed by the U.S. Department of Homeland Security. In order to ensure that this facility or a shipment of hazardous material is not the target of unauthorized access, staff's proposed Condition of Certification for Construction and Operations Security Plans (see **HAZ-6 and HAZ-7)** will require the implementation of Site Security measures consistent with the above-referenced documents and CEC guidelines.

The goal of these conditions of certification is to provide for the minimum level of security for power plants to protect California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. Basic site security measures shall be required at all locations in order to protect the infrastructure and electrical power generation within the state. These measures will include perimeter fencing and detectors, guards, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contact in the event of security breach. Site access for vendors shall be strictly controlled.

Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleet and employ only drivers properly licensed and trained. The project owner will be required, through the use of contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. Department of Transportation (DOT) requirements for Hazardous Materials vendors to prepare and implement security plans per 49 CFR 172.800 and to ensure that all hazardous materials drivers are in compliance with personnel background security checks per 49 CFR Part 1572, Subparts A and B.

The CPM may authorize modifications to these measures, or may require additional measures depending on circumstances unique to the facility, and in response to site operator and/or industry-related security concerns.

The applicant has stated that the existing PEF facility (which includes the PEFE area) is surrounded by a fence with an access gate and that perimeter security is maintained 24 hours a day by surveillance devices or personnel (PEFE 2005a Section 4.1.2.1.3). The use of cameras is appropriate but it is unclear how many cameras are on-site and whether or not they can view the entire security perimeter, the entrance to the control room, and critical structures such as the area where the natural gas pipeline daylights inside the facility, any side gates, and the anhydrous ammonia storage tanks and transfer pad. Staff is aware that the main entrance is viewed from the control room via CCTV camera. However, no guards are proposed to be on-site once construction is complete and no perimeter breach detectors are present or planned. Staff believes that although the location of the power plant is remote, the use of anhydrous ammonia requires that the perimeter be secure and that breaches in that security be detected, a position supported by the NERC guidelines. Accordingly, staff proposes Condition of Certification **HAZ-7**.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the operation of the PEFE combined with the existing PEF facility and other facilities in the vicinity to result in cumulative impacts on the

population within the area. Existing or planned projects in the vicinity of PEF are listed in Table 5.18-1 of the AFC and discussed in Section 5.18.2 (PEFE 2005a). None of the facilities reviewed in the project vicinity, except the existing PEF facility, represent a real risk of causing a cumulative hazardous materials impact due to their distance from the PEF site and absence of significant amounts of hazardous materials.

Staff believes that the PEFE, 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 offsite impacts. Furthermore, the proposed PEFE does not significantly increase the usage or storage of hazardous materials at the PEF site but does increase the transportation risk. Therefore, staff concludes that with mitigation, the PEFE would not contribute to a significant cumulative impact.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the PEFE would be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of Hazardous Materials Management.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Two letters (July 25 and November 14, 2005) were received from KCFD Deputy Chief Kevin Scott noting that mitigation measures aimed at minimizing the impacts of the original PEF facility on the Kern County Fire Department had not been completed by the applicant. Deputy Chief Scott stated that the remote location of the PEF project required mitigation measures that would allow the KCFD to adequately respond with, among others, the KCFD HazMat Team to this facility. According to Deputy Chief Scott, this mitigation included a helicopter pad and hanger to be constructed at the new Tejon Station. Staff discussed this matter with the applicant and with Deputy Chief Scott and believes that this is a compliance matter to be addressed by staff and not a matter of mitigation for the expansion project.

CONCLUSIONS

Staff's evaluation of the proposed project (with proposed mitigation measures) indicates that hazardous materials use will pose no significant impacts on the public. Staff's analysis also shows that there will be no significant cumulative impact. With adoption of the proposed Conditions of Certification, the proposed project will comply with all applicable Laws, Ordinances, Regulations and Standards (LORS). In response to Health and Safety Code, section 25531 et seq., the applicant has already prepared an approved RMP. The current Business Plan will have to be revised, updated, and submitted to the Certified Unified Program Authority (CUPA) and the CPM. Other proposed Conditions of Certification address the issue of the transportation vehicle, route of delivery of anhydrous ammonia, anhydrous ammonia safety features, emergency response equipment for the KCFD, and site security.

Staff recommends the Energy Commission impose the proposed Conditions of Certification, presented herein, to ensure that the project is designed, constructed and

operated to comply with applicable LORS and to protect the on-site workers and workers at nearby facilities, as well as the occasional public traveler, from significant risk of exposure to an accidental ammonia release. If all mitigation proposed by the applicant and by staff are required, the use, storage, and transportation of hazardous materials will not present a significant risk.

Staff proposes seven Conditions of Certification. **HAZ-1** ensures that no hazardous material would be used at the facility except those listed in the AFC unless there is prior approval by the Compliance Project Manager (CPM). **HAZ-2** requires that the existing Business Plan be revised and updated to include the PEFE and submitted prior to the commissioning of the proposed expansion. The transportation of hazardous materials is addressed in **HAZ-3** & **4**, the use of an emergency water spray at the anhydrous ammonia tanker truck transfer pad is addressed in **HAZ-5**, and **HAZ-6** and **7** address the security of the site. Finally, HAZ-8 requires the provision of hand-held ammonia detectors to the KCFD.

PROPOSED CONDITIONS OF CERTIFICATION

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

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

HAZ-2 The project owner shall provide a revised and updated Business Plan reflecting the expansion, to the Certified Unified Program Authority – (CUPA) (Kern County Environmental Health Services Department) for information and to the CPM for review and approval.

Verification: At least 60 days prior to commissioning, the project owner shall provide a copy of a final modified Business Plan to the CUPA for information and to the CPM for approval.

HAZ-3 The project owner shall direct all vendors delivering anhydrous ammonia to the site to use only tanker truck transport vehicles which meet or exceed the specifications of DOT Code MC-307.

Verification: At least thirty (30) days prior to commissioning, 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-4 The project owner shall direct all vendors delivering any hazardous material to the site to use only the route approved by the CPM. The project owner shall obtain approval of the CPM if an alternate route is desired.

Verification: At least thirty (30) days prior to commissioning, the project owner shall submit copies of the required transportation route limitation to the CPM for review and approval.

HAZ-5 The project owner shall extend or aim the existing emergency water spray system at the anhydrous ammonia storage tanks to cover the area of the tanker truck transfer pad.

Verification: At least 30 days prior to commissioning, the project owner shall submit evidence to the CPM that the emergency water spray system at the anhydrous ammonia storage tanks has been extended or aimed to cover the tank truck transfer pad.

HAZ-6 At least 30 days prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the CPM for review and approval. The Construction Security Plan shall include the following:

1. Perimeter security consisting of fencing enclosing the construction and laydown areas;
2. Security guards;
3. Site access control consisting of a check-in procedure or tag system for construction personnel and visitors;
4. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on-site or off-site;
5. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
6. Evacuation procedures.

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

HAZ-7 The project owner shall prepare a site-specific Security Plan for the operational phase and shall be made available to the CPM for review and approval. The project owner shall implement site security measures addressing physical site security and hazardous materials storage. The level of security to be implemented shall in no case be less than that described as below (as per NERC 2002).

The Operation Security Plan shall include the following:

1. Permanent full perimeter fence or wall, at least 8 feet high;
2. Main entrance security gate, either hand operable or motorized;
3. Evacuation procedures;
4. Protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;

5. Written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on-site or off-site;

6. A statement (refer to sample, attachment "A") signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to ascertain the accuracy of employee identity and employment history, and shall be conducted in accordance with state and federal law regarding security and privacy;

7. A statement(s) (refer to sample, attachment "B") signed by the contractor or authorized representative(s) for any permanent contractors or other technical contractors (as determined by the CPM after consultation with the project owner) that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractor personnel that visit the project site. Background investigations shall be restricted to ascertain the accuracy of employee identity and employment history, and shall be conducted in accordance with state and federal law regarding security and privacy; Site access controls for employees, contractors, vendors, and visitors;

8. A statement(s) (refer to sample, attachment "C") signed by the owners or authorized representative of hazardous materials transport vendors certifying that they have prepared and implemented security plans in conformity with 49 CFR 172.880, and that they have conducted employee background investigations in accordance with 49 CFR Part 1572, subparts A and B;

9. Closed Circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the control room) capable of viewing, at a minimum, the main entrance gate and the anhydrous ammonia storage tank; and

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

    a. Security guards 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 **all** of the following:

        (1) The CCTV monitoring system required in number 9 above shall include cameras that are able to pan, tilt, and zoom (PTZ), have low-light capability, are recordable, and are able to view 100% of the perimeter fence, the anhydrous ammonia storage tank and transfer pad, the outside entrance to the control room, and the front gate from a monitor in the power plant control room; **and**

(2) Perimeter breach detectors **or** on-site motion detectors.

The Project Owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to the security plans. The CPM may authorize modifications to these measures, or may require additional measures, such as protective barriers for critical power pant components (e.g., transformers, gas lines, compressors, etc.) depending on circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Dept. of Homeland Security, the U.S. Dept. of Energy, or the North American Electrical Reliability Council.

Verification: At least 30 days prior to commissioning the project owner shall notify the CPM that a site-specific Operations Site Security Plan is available for review and approval. In the Annual Compliance Report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed, and updated certification statements are appended to the Operations Security Plan. In the Annual Compliance Report, the project owner shall include a statement that the Operations Security Plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

HAZ-8 The project owner shall provide to the Kern County Fire Department (KCFD) a total of four (4) hand-held ammonia detectors with the ability to detect ammonia from 0-200 ppm or better.

Verification: At least 30 days prior to site mobilization, the project owner shall provide the CPM with documentation that four hand-held ammonia detectors have been provided to the Kern County Fire Department.

SAMPLE CERTIFICATION (Attachment "A")

Affidavit Of Compliance for Project Owners

I,

_____

(Name of person signing affidavit)(Title)

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

_____

(Company Name)

for employment at

_____

(Project name and location)

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

_____

(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

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

SAMPLE CERTIFICATION (Attachment "B")

Affidavit of Compliance for Contractors

I,

_____

(Name of person signing affidavit)(Title)

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

_____

(Company Name)

for contract work at

_____

(Project name and location)

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

_____

(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

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

SAMPLE CERTIFICATION (Attachment "C")

Affidavit of Compliance for Hazardous Materials Transport Vendors

I,

_____

(Name of person signing affidavit)(Title)

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

_____

(Company Name)

for hazardous materials delivery to

_____

(Project name and location)

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

_____

(Signature of Officer or Agent)

Dated this _____ day of _____, 20 _____.

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

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Hazardous Materials
Appendix A

Basis for Staff's Use of 75 PPM Ammonia Exposure Criteria

BASIS FOR STAFF'S USE OF 75 PPM AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 PPM to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this level is not consistent with the 200-ppm level used by EPA and Cal/EPA in evaluating such releases pursuant the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's CEQA analysis. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines (ERPGs) states that "these values have been derived as planning and emergency response guidelines, **not** exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. CEQA requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through changes to the proposed project.

Staff has chosen to use the National Research Council's 30 minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events, and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm STPEL. **Hazardous Materials Appendix B** provides a summary of adverse effects, which might be expected to occur at various airborne concentrations of ammonia.

Hazardous Materials Appendix A Table-1
Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH[2]	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 min.	Exposure above this level requires the use of "highly reliable" respiratory protection and poses the risk of death, serious irreversible injury or impairment of the ability to escape.
IDLH/10[1]	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 min.	Protects nearly all segments of general population from irreversible effects
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 min. 4 times per 8 hr day	No toxicity, including avoidance of irritation
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 min.	Significant irritation but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one time exposure
STPEL[4]	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 min. 30 min. 10 min.	Significant irritation but protects nearly all segments of general population from irreversible acute or late effects. One time accidental exposure
TWA[2]	NIOSH	Adult healthy male workers	25 ppm	8 hr.	No toxicity or irritation on continuous exposure for repeated 8 hr. Work shifts
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 min.	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin)

1) (EPA 1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)

* The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.

** The (NRC 1979) describes a study involving young animals, which suggests greater sensitivity to acute exposure in young animals. The (WHO 1986) warns that the young, elderly, asthmatics, those with bronchitis and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.

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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

Summary of Adverse Health Effects of Ammonia

SUMMARY OF ADVERSE HEALTH EFFECTS OF AMMONIA[1]

638 PPM

WITHIN SECONDS:

- Significant adverse health effects;
- Might interfere with capability to self rescue;
- Reversible effects such as severe eye, nose and throat irritation.

AFTER 30 MINUTES:

- Persistent nose and throat irritation even after exposure stopped;
- irreversible or long-lasting effects possible: lung injury;
- Sensitive people such as the elderly, infants, and those with breathing problems (asthma) experience difficulty in breathing;
- asthmatics will experience a worsening of their condition and a decrease in breathing ability, which might impair their ability to move out of area.

266 PPM

WITHIN SECONDS:

- Adverse health effects;
- Very strong odor of ammonia;
- Reversible moderate eye, nose and throat irritation.

AFTER 30 MINUTES:

- Some decrease in breathing ability but doubtful that any effect would persist after exposure stopped;
- Sensitive persons: experience difficulty in breathing;
- asthmatics: may have a worsening condition and decreased breathing ability, which might impair their ability to move out of the area.

64 PPM

WITHIN SECONDS:

- Most people would notice a strong odor;
- Tearing of the eyes would occur;
- Odor would be very noticeable and uncomfortable;
- Sensitive people could experience more irritation but it would be unlikely that breathing would be impaired to the point of interfering with capability of self rescue;

[1] Source: Alvin Greenberg, Ph.D., QEP

- Mild eye, nose, or throat irritation;
- Eye, ear, & throat irritation in sensitive people;
- asthmatics might have breathing difficulties but would not impair capability of self rescue.

22 or 27 PPM

WITHIN SECONDS:

- Most people would notice an odor;
- No tearing of the eyes would occur;
- Odor might be uncomfortable for some;
- sensitive people may experience some irritation but ability to leave area would not be impaired;
- Slight irritation after 10 minutes in some people.

4.0, 2.2, or 1.6 PPM

- No adverse effects would be expected to occur;
- Doubtful that anyone would notice any ammonia (odor threshold 5 - 20 PPM);
- Some people might experience irritation after 1 hr.

Hazardous Materials
Appendix C

Hazardous Materials Proposed for Use by the PEFE

Hazardous Materials Appendix C Table 1:
Hazardous Materials Proposed for Use by the PEFE[a]

Material	Application	Average amount stored at Existing PEF	Average amount stored at Existing PEF + Expansion[b]
Aluminum Sulfate	Water treatment coagulant	500 gallons	No Change
Ammonium bifluoride	HRSG Cleaning	200 lbs Prior to startup	Not Required
Anhydrous Ammonia	NO_X Emissions Control	30,000 gallons (max amount is 60,000 gallons)	No Change
Bromine biocide and biodispersant	Water treatment	1,500 gallons	No Change
Carbon dioxide	Fire protection, generator purging	12,000 lbs Initial fill	**15,000 lbs** Initial fill
Cleaning chemicals/ Detergents	Combustion turbine cleaning	1,300 lbs Prior to startup	**500 lbs** Prior to startup
Dehalogenation agent – Nalco 1316 or equal	Neutralize oxidant from chlorine and bromine	1,500 gallons	No Change
Diesel fuel	Firewater pump	100 gallons Initial fill	No Change
Disodium phosphate	Boiler pH and scale control	750 lbs	No Change
Hydrochloric acid	HRSG cleaning	10,000 lbs Prior to startup	Not Required
Hydrogen	Generator cooling	11,200 cubic feet Initial fill	**14,000 cubic feet** Initial fill
Insulating Oil	Electric equipment	60,000 gallons Initial fill	**83,000 gallons** Initial fill
Lubricating Oil	Rotating equipment	7,000 gallons Initial fill	**9,000 gallons** Initial fill
Neutralizing amine 20%	Boiler chemical	150 gallons	No Change
Oxygen scavenger 30%	Boiler chemical	100 gallons	No Change
Phosphate 20%	Removal of dissolved hardness ions (water treatment)	100 gallons	No Change
Polymer	Water treatment coagulant	800 gallons	No Change
Scale inhibitors	Scale reduction in cooling water	200 gallons	No Change
Sodium Hydroxide (32 %)	pH control of cooling towers	3,500 gallons	No Change
Sodium Hypochlorite (12.5 %)	Biocide for cooling water	1,500 gallons	No Change
Sulfuric Acid (93 %)	pH control of cooling towers, neutralize excess alkalinity	3,500 gallons	No Change
Trisodium phosphate	Boiler pH and scale control	750 lbs	No Change

a. Source: PEFE 2005a Tables 3.4.10-1 and 3.4.10-2.
b. Amounts that have changed (increased) due to the Expansion are shown in **bold**.

LAND USE

Testimony of Amanda Stennick

SUMMARY OF CONCLUSIONS

The land use analysis by staff has determined that as conditioned, the Pastoria Energy Facility Expansion project is consistent with Kern County's land use plans, land use designations, and zoning for the site. The project would not preclude or restrict existing or planned land uses, disrupt or divide the physical arrangement of an established community, convert Prime Farmland, Farmland of Statewide Importance, or Unique Farmland to non-agricultural use, or prohibit the conduct of agricultural and grazing uses on neighboring properties.

INTRODUCTION

The land use analysis of the Pastoria Energy Facility Expansion (PEFE) focuses on two main issues: the project's consistency with local land use plans, ordinances and policies; and the project's compatibility with existing and planned land uses. In general, an electric generation project and its related facilities may be incompatible with existing and planned land uses if it creates unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts, or when it unduly restricts existing or planned future uses.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

LAND USE Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Responsible Agencies	Description
Federal	There are no federal land use LORS that apply to this project.
State	There are no state land use LORS that apply to this project.
Local	Kern County General Plan and Chapters 19.80, 19.82, and 19.86 of the Kern County Zoning Ordinance.

SETTING

PROJECT SITE AND VICINITY DESCRIPTION

The proposed PEFE is located in western Kern County, about 30 miles south of Bakersfield, California. The site is located about 6.5 miles east of Grapevine, California. The plant site is within an undeveloped area owned by Tejon Ranch Company. There are no residences, parks, recreational, educational, religious, health care facilities, or commercial uses on the site or within a one-mile radius of the site. Surrounding land uses are agriculture and grazing; a gravel mine is southeast of the proposed site. Please refer to the **Project Description** for a map showing the regional location of the project.

The PEFE consists of a nominal 160 MW simple cycle combustion turbine generator. The PEFE area will be approximately two acres located entirely within the existing PEF 31-acre site boundary. The PEFE requires no modification to the existing Pastoria Energy Facility (PEF) offsite linear facilities (e.g., electric transmission line, fuel gas supply line, or water supply line). The PEFE will use the existing PEF administration and control, warehouse and shop, and water treatment buildings.

Because the PEFE is an intensification of the existing use and will be constructed entirely within the existing 31-acre PEF parcel, the land use and zoning designations that applied to the PEF site apply to the PEFE. **LAND USE Table 2** shows the general plan land use designations, zoning, and current land uses for the proposed PEFE. The general plan land use designations and zoning at the site are described under the heading "**COMPLIANCE WITH LORS**."

LAND USE Table 2

Land Use Designation	**Existing Land Uses at Site and Surrounding Area**
Extensive Agricultural / Intensive Agriculture / Mineral & Petroleum / Nonjurisdictional Lands **Zoning** Exclusive Agriculture (A)	• PEF • Undeveloped • Gravel Pit • CA Aqueduct • Agriculture

The Exclusive Agriculture (A) designation is designed to prevent the encroachment of incompatible uses onto agricultural lands and the premature conversion of such lands to non-agricultural uses. Permitted uses in the Exclusive Agriculture District are limited primarily to agriculture and other activities compatible with agriculture, with Kern County considering power plants an acceptable use.

With the exception of the Tejon Industrial Complex, which is described under the heading "**CUMULATIVE IMPACTS**", there are no land use changes proposed in the area of the project site.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

According to Appendix G of the Guidelines to the California Environmental Quality Act (CEQA), a project may have a significant effect on land use if a proposed project would:

- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect;
- disrupt or divide the physical arrangement of an established community; or
- convert Prime Farmland, Farmland of Statewide Importance, or Unique Farmland to non-agricultural use.

A project may also have a significant impact on land use if it would create unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts, or if it precludes or unduly restricts existing or planned future uses.

When determining if a project is in conformance with state, local or regional ordinances or regulations, the Energy Commission typically meets and consults with applicable agencies to determine conformity and, when necessary, "to attempt to correct or eliminate any noncompliance" (§ 25523(d)(1)).

DIRECT/INDIRECT IMPACTS AND MITIGATION

Project Site

Land use in the area consists of agriculture, grazing, and oil and gas development. There are no residences, parks, recreational, educational, religious, health care facilities, or commercial uses on the site or within a one-mile radius of the site. The project site is designated Extensive Agriculture, Intensive Agriculture, Mineral and Petroleum, and Nonjurisdictional lands in the Kern County General Plan; the site is zoned (A) Exclusive Agriculture. Based on policies which permit uses such as power plants in agricultural areas in the Kern County General Plan, the proposed expansion is compatible with the existing land use designations and zoning. The PEF site, that includes PEFE, was previously used for grazing and will continue on the Tejon Ranch property surrounding the site.

In 2000, when the site was licensed for the PEF, all land use issues were analyzed for direct, indirect, and cumulative impacts. At that time, the project was conditioned for compliance with the appropriate Kern County general plan land use policies and Exclusive Agriculture zoning. Because the PEFE is an intensification of the current use, it is subject to LAND-1, adopted in the 2000 PEF siting case.

The PEFE will be located entirely within the existing PEF 31-acre parcel; no off site development will occur. Thus, with adoption of the proposed conditions, staff expects no impacts to existing or planned land uses.

COMPLIANCE WITH LORS

Staff reviewed the project for consistency and conformance with the Kern County General Plan and Zoning Ordinance to determine the extent to which the PEFE is consistent or at variance with each requirement or standard.

KERN COUNTY GENERAL PLAN

The general plan is the legal document that acts as a constitution for land use and development in Kern County. It consists of the seven mandatory elements: land use, circulation, open space, conservation, housing, safety and seismic safety, and noise; and four optional elements: recreation, energy, hazardous waste management, and public services and facilities.

As stated, the project site is designated Extensive Agriculture, Intensive Agriculture, Mineral and Petroleum, and Nonjurisdictional Land in the Kern County General Plan.

Based on staff's review and consultation with Kern County, these general plan designations do not preclude construction and operation of power plants; thus, the PEFE complies with Kern County's General Plan land use designations for the site.

KERN COUNTY ZONING CODE

The site is zoned Exclusive Agriculture (A). The Kern County Zoning Ordinance states that resource extraction and energy development uses in this zone are permitted by right and require no discretionary permits from the county. However, power plants are a conditional use in this zone. To satisfy the applicable sections of the zoning ordinance, the PEFE must comply with the following sections of the Kern County Zoning Ordinance: Section 19.80.30 of Chapter 19.80 (Special Development Standards – Commercial and Industrial Districts); Sections 19.82.030 and 19.82.090 of Chapter 19.82 (Offstreet Parking - Design and Development Standards); and Section 19.86.060 of Chapter 19.86 (Landscaping Standards – Industrial Uses). As such, Energy Commission staff requires PEFE to prepare a site development plan to satisfy the applicable sections of the Kern County Zoning Ordinance and are identified in proposed Condition of Certification **LAND-1**.

CUMULATIVE IMPACTS

Other regional projects include the Tejon Industrial Complex, located on the west side of Interstate 5 (I-5) on Laval Road, about seven miles from the PEF site. The Tejon Industrial Complex consists of 320 acres of industrial and commercial development, primarily to serve the motoring public along I-5. A Final Environmental Impact Report (EIR) for the project was prepared by Impact Sciences for the Kern County Planning Department in February 2000 (SCH# 99061016). Kern County prepared an Initial Study (IS) and circulated it along with a Notice of Preparation (NOP) to receive input from interested public agencies and private parties.

The combined effect of the PEF, the Tejon Industrial Complex, the San Emidio New Town Specific Plan (adopted by Kern County in October 1992) and other commercial, industrial, and residential uses proposed or currently under construction in southern Kern County represents a conversion of about 9,800 acres of land to urban uses. At buildout of all projects, a total of about 20,219 dwelling units, 850 acres of industrial uses, 376 acres of commercial uses, and facilities such as schools and parks would be developed in southern Kern County. As such, each development project is subject to land use controls, zoning, and development standards in effect at the time of project submittal to the appropriate permitting agency.

The PEFE will be located entirely within the existing PEF 31-acre parcel. The land on which the existing PEF is situated has, in the past, been used for grazing rather than cultivation. It is not "prime farmland", "unique farmland", or "farmland of statewide importance" under the Farmland Mapping and Monitoring Program of the California Resources Agency. Rather, it is marginal, uncultivated agricultural land whose agricultural value is further compromised by proximate non-agricultural uses such as the sand and gravel mines, the Edmonston Pumping Plant and the California Aqueduct. Moreover, the proposed expansion is not expected to trigger adjacent development that would cause further agricultural land conversion. In light of these qualifying

circumstances, the cumulative impact of the PEFE on agricultural land is less than significant.

RESPONSE TO PUBLIC AND AGENCY COMMENTS

There were no public or agency comments on this project.

CONCLUSIONS

1. Staff believes that with adoption of the proposed condition, the project is consistent with Kern County's zoning for the site.

2. The project would not preclude or restrict existing or planned land uses, or the conduct of agricultural and grazing uses on neighboring properties.

3. If the PEFE is approved, staff recommends adoption of Condition of Certification **LAND-1**.

PROPOSED CONDITIONS OF CERTIFICATION

LAND USE-1 Prior to the issuance of building or grading permits, the project owner shall submit a site development plan for the project to Kern County for their review and comment, and to the California Energy Commission Compliance Project Manager (CPM) for review and approval. The site development plan shall comply with all applicable provisions of the following sections of the Kern County Zoning Ordinance: Section 19.80.30 of Chapter 19.80 (Special Development Standards – Commercial and Industrial Districts); Sections 19.82.030 and 19.82.090 of Chapter 19.82 (Offstreet Parking - Design and Development Standards); and Section 19.86.060 of Chapter 19.86 (Landscaping Standards – Industrial Uses). The project owner shall provide a letter of comment from the Kern County Planning Director stating that the project is consistent with the provisions of the Kern County General Plan and Zoning Ordinance. The project owner shall submit a letter to the CPM from the Kern County Planning Director stating that the site development plan conforms to Kern County's Zoning Code and is consistent with the General Plan. If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan.

Verification: At least 60 days prior to the start of any ground disturbance related to construction, the project owner shall submit the proposed site development plan and a copy of the letter of comment from the Kern County Planning Director to the CPM for review and approval. The project owner shall submit any required revisions within 30 days of notification by the CPM.

REFERENCES

PEFE (Pastoria Energy Facility Expansion) 2005a – Application for Certification. Submitted to the California Energy Commission on April 29, 2005.

PEFE (Pastoria Energy Facility Expansion) 2005e – Supplement to the Application for Certification. Submitted to the California Energy Commission on June 13, 2005.

Oviatt, Lorelei, Kern County Planning. Personal communication with staff on May 17, 2005, September 15, 2005, and October 24, 2005.

NOISE AND VIBRATION

Testimony of Kevin Robinson and Steve Baker

SUMMARY OF CONCLUSIONS

The Pastoria Energy Facility Expansion, if built and operated in conformance with the proposed Conditions of Certification below, would comply with all applicable noise and vibration laws, ordinances, regulations and standards, and would produce no significant adverse noise impacts, either direct or cumulative. The applicant has proposed appropriate mitigation, in the form of good design practice and inclusion of necessary project equipment, that would avoid any significant adverse impacts.

INTRODUCTION

The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances, and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices, such as blasting or pile driving. The ground-borne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the Pastoria Energy Facility Expansion (PEFE), and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable laws, ordinances, regulations and standards (LORS). For an explanation of technical terms employed in this section, please refer to **NOISE Appendix A** immediately following.

LAWS, ORDINANCES, REGULATION, AND STANDARDS (LORS)

NOISE Table 1
Laws, Ordinances, Regulations and Standards

Applicable Law	Description
Federal (OSHA): 29 C.F.R. § 1910.95	Protects workers from the effects of occupational noise exposure
State (Cal-OSHA): 8 C.C.R. §§ 5095-5099	Protects workers from the effects of occupational noise exposure
Kern County General Plan Noise Element Policies (5)(a) and (5)(b)	Policy (5) prohibits new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated to (a) reduce noise levels in outdoor activity areas to 65 dBA L_{dn} or less, and (b) reduce interior noise levels to 45 dBA L_{dn} or less

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **NOISE Appendix A, Table A4** 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 Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from ground-borne vibration. The FTA measure of the threshold of perception is 65 VdB, which correlates to a peak particle velocity of about 0.002 inches per second (in/sec). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

STATE

California Government Code section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its General Plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure.

The State of California, Office of Noise Control, prepared a Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. The Model also contains a definition of a simple tone, or "pure tone," in terms of one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal components. The Model Community Noise Control Ordinance further recommends that, when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by five dBA.

Other State LORS include the California Occupational Safety and Health Administration (Cal-OSHA) regulations.

Cal-OSHA

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 **NOISE Appendix A, Table A4**).

Local

Kern County General Plan – Noise Element

Two policies enunciated in this noise element (Kern County 2004) impact the construction and operation of a project such as the PEFE. Policy (5) (a) prohibits new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels in outdoor activity areas to 65 dB L_{dn} or less. Policy (5) (b) prohibits new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce interior noise levels within living spaces or other noise sensitive interior spaces to 45 dB L_{dn} or less. It should be noted that there are no current noise ordinances in Kern County.

SETTING

The PEFE area will comprise approximately two acres, located entirely within the existing Pastoria Energy Facility (PEF) 31-acre site boundary. The PEFE will be located in the unincorporated area of Kern County, just north of the Tehachapi Mountains and approximately 6.5 miles east of Grapevine, California. The nearest residential noise receptors are located approximately 4.4 miles northeast of the project site adjacent to Laval Road, and 5.4 miles northeast of the proposed plant site, within an agricultural activity support area for the Tejon Ranch known as Lower Citrus. The Laval Road location has about a dozen residences with industrial/agricultural facilities on either side, while the Lower Citrus area contains a field office, equipment storage and maintenance buildings, with four adjacent units housing twelve permanent occupants (PEFE 2005a, AFC Attachment K). Since 1999, no new noise-sensitive development has been approved or proposed within a 5 or 6-mile radius of the existing plant site (PEFE 2005a, AFC § 5.9.1).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., tit. 14, App. G) sets forth some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;

2. exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;

3. substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

4. substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying item 3) above to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by 5 dBA L_{90} 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 clearly 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 a case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting noise level [1];

2. the duration and frequency of the noise;

3. the number of people affected;

4. the land use designation of the affected receptor sites; and

5. public concern or controversy as demonstrated at workshops or hearings, or by correspondence.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary;
- use of heavy equipment and noisy activities is limited to daytime hours; and
- all industry-standard noise abatement measures are implemented for noise-producing equipment.

Ambient Noise Monitoring

In an effort to evaluate current conditions and assess any potential project noise impacts on the surrounding community, an ambient sound level survey was conducted November 9 and 10, 1999 at the proposed PEF plant site and at selected offsite locations in the vicinity of the project (PEFE 2005a, AFC Attachment K). The PEFE is to

[1] 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.

be constructed at the same location as the PEF, which commenced operation earlier this year. Further, little has changed in the noise regime near the project site, so this survey remains valid. The Applicant's noise survey monitored noise levels at 10 locations. Long-term measurements were taken near residences at Lower Citrus agricultural activity area, and at the intersection of Sebastian Road and Mazzie Road. The monitor at the Lower Citrus area measured hourly average noise levels during a continuous 25-hour time period. The monitor at Sebastian Road at Mazzie Road, east of Rancho Road, provided data during a continuous 24-hour time period. In addition to the long-term measurements, eight short-term (10 minute) measurements were taken at various locations (e.g., site boundary, Laval Road, David Road, and Sebastian Road) throughout the study area (PEFE 2005a, AFC Attachment K). The eight short-term measurements were conducted during random morning, midday, and afternoon hours.

Survey results indicated that the ambient noise level near the proposed PEFE site and throughout the general area is influenced primarily by the mining machinery and transportation activities associated with the nearby gravel mining operation. Other background noise contributions came from motor-vehicle traffic, agricultural operations, and industrial activities in the area. The ambient noise level at the closest receptor along Laval Road (4.4 miles northeast of the proposed site) was 41 dBA L_{eq}. The next closest at the Lower Citrus agricultural activity area (5.4 miles northeast of the PEFE) had a noise level of 40 dBA L_{eq}. Noise levels at residences located along Sebastian Road were 54 dBA L_{eq}. Higher noise levels recorded along Sebastian Road were due to farm machinery and aircraft, transport trucks, school buses, and light-duty trucks/ automobiles. Measured noise levels at each of the four PEF site boundaries were approximately 39 dBA L_{eq} (PEFE 2005a, AFC Attachment K). The PEFE is to be constructed directly adjacent to the existing PEF facility within the boundaries of Calpine's 31-acre property.

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term construction activities, and by normal long-term operation of the power plant.

Construction Impacts and Mitigation

Construction noise is usually considered a temporary phenomenon. Construction of the PEFE is expected to last approximately 12 months (PEFE 2005a, AFC § 3.8).

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. There are no specific LORS limiting construction noise in Kern County.

The applicant has predicted the noise impacts of project construction on the nearest sensitive receptors (PEFE 2005a, AFC Attachment K § 5.12.2.2). If all the equipment in Attachment K Table 5.12-5 of the AFC were to operate simultaneously at maximum power, a total noise level of approximately 89 dBA would occur at a distance of 50 feet from the acoustic center of the construction activity. Noise levels at the nearest

residence (to the north) are projected to reach approximately 36 dBA for most work; this compares to the ambient background noise levels there of 40 dBA L_{eq}. This would increase the background level by, at most, 1 dBA, an unnoticeable amount.

In the event that actual construction noise should exceed this limit and annoy nearby workers or residents, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a Noise Complaint Process that requires the applicant to resolve any problems caused by construction noise.

The applicant commits to performing noisy construction work (that which causes offsite annoyance as evidenced by the filing of a legitimate noise complaint) during daytime and evening hours, that is, 7 a.m. to 10 p.m. (PEFE 2005a, Attachment K § 5.12.2.1). To ensure that these hours are, in fact, adhered to, staff proposes Condition of Certification **NOISE-6**.

The applicant has stated that steam blows are not anticipated (PEFE 2005a, AFC § 5.12.2.1).

CEQA Impacts

Construction activities are normally of short duration and do not occur all at the same time; therefore it is unlikely that the existing ambient noise level within adjacent mining or agricultural production areas will be impacted, or that the noise levels indicated above would adversely impact (or even be audible at) the nearest residential receptors. To ensure this, staff proposes Conditions of Certification **NOISE-**1 and **NOISE-**2, which would establish a Noise Complaint Process to resolve any complaints regarding construction noise.

Linear Facilities

The PEFE requires no modification to the existing PEF offsite linear facilities (e.g., electric transmission line, fuel gas supply line, or water supply line). The PEFE will use the existing PEF administration and control, warehouse and shop, and water treatment buildings (PEFE 2005a, AFC § 5.12).

Vibration

The only construction operation likely to produce vibration that could be perceived off-site would be pile driving. The applicant does not anticipate pile driving will be required for construction of the PEFE; therefore, no vibration impacts are likely.

Worker Effects

The applicant does not specifically acknowledge the need to protect construction workers from noise hazards. The applicant does, however, recognize those applicable LORS that will protect construction workers, and commits in general to complying with them (PEFE 2005a, AFC §§ 5.12.4.1, 5.12.4.2). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**.

Operation Impacts and Mitigation

During its operating life, the PEFE will represent essentially a steady, continuous noise source day and night. Occasional short-term increases in noise level will occur during startup or shutdown as the plant transitions to and from steady-state operation. At other times, such as when the plant is shut down for lack of dispatch or for maintenance, noise levels will decrease.

The primary noise sources anticipated from the proposed PEFE include the combustion turbine generator, combustion turbine air inlet, exhaust stack, electrical transformer, and various pumps and fans. Staff compares the expected project noise with applicable LORS. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (PEFE 2005a, AFC § 5.12.1.1). The noise prediction calculations yield a noise contribution from the PEFE project of less than 20 dBA at either of the nearest noise-sensitive areas. Specifically, the equipment associated with the PEFE project is predicted to produce a noise level of approximately 17 dBA at the nearest noise-sensitive land use, approximately 4.4 miles from the project site (PEFE 2005a, AFC § 5.12.1.1). Staff agrees with the applicant's conclusion that this noise level is also below the existing ambient noise levels at the noise-sensitive receptor locations and will be inaudible (PEFE 2005a, AFC § 5.12.2.2).

The applicant's previous noise impact calculations for the PEF indicate that the operating noise level will be approximately 37 dBA Ldn at the closest residential receptor (PEFE 2005a, AFC Attachment K § 5.12.1.5). The noise impact calculations indicate that the normal operating noise level from the proposed PEFE would be approximately 24 dBA L_{dn} at the closest residential receptor (approximately 4.4 miles), which is well below the Kern County maximum allowable noise level of 65 dBA L_{dn} (PEFE 2005a, AFC § 5.12.1.1). When added (on a logarithmic basis) to the equipment noise levels predicted from the existing PEF, the resultant increase in total PEF noise levels, as a result of the proposed PEFE, is estimated to be 0.3 dBA at the nearest noise-sensitive land use. Based on the Kern County standards, staff agrees that the project will not produce significant noise impacts.

CEQA Impacts

Power plant noise is unique. A power plant operates as, essentially, a steady, continuous, broadband noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, staff compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at the affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated in the project to reduce or remove the impact.

In most cases, a power plant will be intended to operate around the clock for much of the year. Staff evaluates project noise emissions by comparing them to the nighttime ambient background level; this assumes the potential for annoyance due to power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than the daytime levels; differences in background noise levels 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.

Adverse impacts, as defined in CEQA, can be detected by comparing predicted power plant noise levels to the ambient nighttime background noise levels at the nearest sensitive receptors.

The noise prediction calculations yield a noise contribution from the PEFE project of less than 20 dBA at either of the nearest noise-sensitive areas. Specifically, the equipment associated with the PEFE project is predicted to produce a noise level of approximately 17 dBA at the nearest noise-sensitive land use, approximately 4.4 miles from the project site. When added (on a logarithmic basis) to the equipment noise levels predicted from the existing PEF, the resultant increase in total PEF noise levels, as a result of the proposed PEFE, is estimated to be 0.3 dBA at the nearest noise-sensitive land use. As described above (under Method and Threshold for Determining Significance), staff regards an increase of up to 5 dBA as a clearly less than significant impact, and an increase of more than 10 dBA as a clearly significant impact. An increase of 0.3 dBA is inaudible at the nearest noise-sensitive receptor locations. Staff therefore believes that an increase of 0.3 dBA clearly amounts to a less than significant impact.

Staff therefore concludes that the power plant operating noise would not pose a significant adverse impact on any sensitive receptors.

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. To ensure the avoidance of such tonal sound, the noise control design of the PEFE can be balanced to bring as many noise sources as possible to the same relative sound level, causing them all to blend without any one source standing out. To ensure that tonal noises do not cause annoyance, staff proposes Condition of Certification **NOISE-4**.

Linear Facilities

All water and gas piping will lie underground, and will 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 will thus be inaudible to any receptors.

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 turbines, compressors, and various pumps. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors are attached to the turbines and generators. Energy Commission staff believes that it is unlikely that any vibration would be felt beyond the equipment and that groundborne vibration from the PEFE will 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. The PEFE's chief source of airborne vibration would be the gas turbine's exhaust. In a power plant such as the PEFE, however, the exhaust must pass through the selective catalytic reduction (SCR) module and the stack silencer before it reaches the atmosphere. The SCR acts as an efficient muffler; the combination of SCR unit and stack silencer makes it highly unlikely that the PEFE would cause perceptible airborne vibration effects.

Worker Effects

The applicant has acknowledged the need to protect plant operating and maintenance personnel from noise hazards, and has committed to comply with applicable LORS (PEFE 2005a, AFC Attachment K §§ 5.12.4.1, 5.12.4.2). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required. To ensure that plant operation and maintenance personnel are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**.

CUMULATIVE IMPACTS AND MITIGATION

The gravel extraction operations adjacent to the PEF would be considered an Insensitive Use, with Kern County Noise Standards of 65 dBA L_{50} daytime and 60 dBA L_{50} nighttime. These standards would apply to the boundary line between the project and the adjacent gravel extraction operation. It should be noted that the nighttime standard should not be applied to this project because the sand and gravel operations do not continue at night and the property is not occupied at night. Further, the 65 dBA L_{50} daytime level would not be appropriate for this gravel operation because the on-site noise levels generated by the sand and gravel operations are routinely in the 80+ dBA range. In addition, the personnel at the gravel extraction company are required to wear personnel protective equipment or are working within an enclosed structure (PEFE 2005a, AFC Attachment K § 5.12.1.4).

Although there is no proposed development within 5 miles of the existing PEF site, there are several construction projects planned for the region around the PEFE, including the Tejon Industrial Complex, residential and industrial development described in the San Emidio New Town Specific Plan, and State Route 223 and Other State Route improvements (PEFE 2005a, AFC § 5.18.2). However, based on the distance of these projects from the proposed PEFE, no cumulative noise impacts would occur during the construction or operation of the proposed power plant.

NOTEWORTHY PROJECT BENEFITS

The noise from a power plant such as the PEFE, in itself, could not be deemed a benefit. However, the provision of electric power while avoiding the creation of significant adverse noise impacts must be considered a benefit.

FACILITY CLOSURE

In the future, upon closure of the PEFE, all operational noise from the project would cease, and no further adverse noise impacts from operation of the PEFE 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

The PEFE, if built and operated in conformance with the proposed Conditions of Certification below, would comply with all applicable noise and vibration LORS, and would produce no significant adverse noise impacts, either direct or cumulative. While a power plant such as the PEFE could be designed and built to produce unacceptable noise impacts, the applicant has proposed appropriate mitigation, in the form of good design practice and inclusion of necessary project equipment that would avoid any such impacts.

PROPOSED CONDITIONS OF CERTIFICATION

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one-half mile of the site and the linear facilities, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project. 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 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;
- If the noise is project related, take all feasible measures to reduce the noise at its source; 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 local jurisdiction and the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a 3-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. 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. The project owner shall make the program available to Cal-OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 Within 30 days of the Pastoria 160 MW Expansion first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey, at a time when the entire Pastoria Energy Facility is operating, utilizing the same monitoring sites employed in the pre-project ambient noise survey as a minimum. The survey shall also include the octave band pressure levels to ensure that no new pure-tone noise components have been introduced. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints. Steam relief valves shall be adequately muffled to preclude noise that draws legitimate complaints. If the results from the survey indicate that the project noise levels are in excess of 46 dBA L_{eq} (41 dBA L_{eq} + 5 dBA threshold) at the residence along Laval Road (4.4 miles northeast of

the proposed site), additional mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

Verification: Within 30 days after completing the survey, the project owner shall submit a summary report of the survey to the Kern County Environmental Health Services Department, and to the CPM. Included in the report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limits, and a schedule, subject to CPM approval, for implementing these measures. Within 30 days of completion of installation of these measures, the project owner shall submit to the CPM a summary report of a new noise survey, performed as described above and showing compliance with this condition.

NOISE-5 Following the project first achieving a sustained output of 80 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 (Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

CONSTRUCTION TIME RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times of day delineated below:

Any Day	7 a.m. to 10 p.m.

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

REFERENCES

Kern County 2004 – Kern County General Plan, Noise Element. June 15, 2004.

PEFE (Pastoria Energy Facility Expansion) 2005a – Application for Certification. Submitted to the California Energy Commission on April 29, 2005.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Pastoria Energy Facility 160 MW Expansion
(05-AFC-1)

NOISE COMPLAINT LOG NUMBER _____

Complainant's name and address:

Phone number: _____

Date complaint received: _____
Time complaint received: _____

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: _____

Initial noise levels at 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).

NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Noise Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (Effects of Noise on People, U.S. Environmental Protection Agency, December 31, 1971).

In order to help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** has been provided to illustrate common noises and their associated sound levels, in dBA.

Noise Table A1 Definition of Some Technical Terms Related to Noise	
Terms	**Definitions**
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the Noise Level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

Noise Table A2 Typical Environmental and Industry Sound Levels			
Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new

noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.
With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.

2. Outside of the laboratory, a three dB change is considered a barely noticeable difference.

3. A change in level of at least five dB is required before any noticeable change in community response would be expected.

4. A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., The Effects of Noise on Man, 1970)

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). The rules for decibel addition used in community noise prediction are:

Noise Table A3
Addition of Decibel Values

When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Architectural Acoustics, M. David Egan, 1988

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by six dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

Noise Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 C.F.R. § 1910.95

PUBLIC HEALTH

Testimony of Alvin J. Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the Pastoria Energy Facility Expansion project, and does not expect there to be any significant adverse cancer, or short - or long-term non-cancer health effects from project toxic emissions.

INTRODUCTION

The purpose of this Final Staff Assessment (FSA) is to determine if toxic emissions from the proposed Pastoria Energy Facility Expansion (PEFE) would have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

Although staff addresses potential impacts of regulated or criteria air pollutants in the **Air Quality** section of this FSA, **Public Health Appendix A** at the end of this section provides information on the health effects of such pollutants. Impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section. Health effects from electromagnetic fields are discussed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project in wastewater streams to the public sewer system are discussed in the **Soil and Water Resources** section. Plant releases in the form of hazardous and nonhazardous wastes are described in the **Waste Management** section.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

PUBLIC HEALTH Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	Requires new sources which emit more than ten 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).
Clean Air Act § 112 (42 USC § 7412)	
State	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. 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 §39650 et seq.	
California Health & Safety Code § 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.”

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Features of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas, due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density, which, in turn, affects public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

The PEF site is located in an area of predominantly undeveloped or agricultural land (PEFE 2005a Attachment H). There are two industrial developments existing within a 2-mile radius of the PEF site, the Edmunston Pumping Plant and a gravel mining operation, with no others planned for the foreseeable future. The PEFE project will not require the installation of any pipelines or auxiliary structures, as it would be connected to the existing PEF infrastructure.

There are no residences or planned urban development within a 5-mile radius of the site, and no sensitive receptors within 10 miles of the site. As mentioned above, the location of sensitive receptors near the proposed site is an important factor in considering potential public health impacts.

The location of elevated terrain (terrain above the power plant stack height) is an important factor to be considered in assessing potential exposure. An emission plume may impact high elevations before impacting lower elevations. The PEFE stack would be at 1200 feet above sea level including grade elevation (the proposed stack will be 131 feet high). Terrain above stack height in the project vicinity exists to the south, east, and west of the site (PEFE 2005a Figure 5.16-1). The site topography itself, at an elevation of approximately 1070 feet above sea level, is relatively flat with a gentle slope (an approximate 3-percent grade) to the north-northwest from the nearby foothills (PEFE 2005a Section 5.2.1.1).

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may be increased.

Hot summers with minimal precipitation and mildly windy and rainy winters characterize the climate of the San Joaquin Valley (PEFE 2005a Section 5.2.1.2). The climate at the project site is dominated by the influence of the mountains located on three sides of the San Joaquin Valley and the Pacific high-pressure system, which is a semi-permanent, subtropical high-pressure system located off the coast. The size and strength of the

Pacific high is at a maximum during the summer, when it is at its northernmost position, and results in southwesterly airflow and negligible precipitation. During this period temperatures are high, humidity is low, and skies are clear. The Pacific high's influence weakens during the fall and winter when it moves southwestward, which creates windy rain storms in between periods of clear weather or persistent fog (PEFE 2005a Section 5.2.1.2).

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **Air Quality** section presents more detailed meteorological data.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The Public Health section of this staff assessment discusses toxic emissions to which the public could be exposed during project construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Air pollutants for which no ambient air quality standards have been established are called non-criteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, non-criteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since non-criteria pollutants do not have such standards, a process known as health risk assessment is used to determine if people might be exposed to those types of pollutants at unhealthy levels. The risk assessment procedure consists of the following steps:

- Identify the types and amounts of hazardous substances that the PEFE could emit to the environment;
- Estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
- Estimate amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact; and
- Characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the

risks as estimated by the screening level assessment. This is accomplished by examining conditions that would lead to the highest, or worst-case risks, and then using those in the study. Such conditions include:

- Using the highest levels of pollutants that could be emitted from the plant;
- Assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- Using the type of air quality computer model which predicts the greatest plausible impacts;
- Calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
- Assuming that an individual's exposure to cancer-causing agents occurs continuously for 70 years; and
- Using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses).

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from non-inhalation pathways of exposure (see California Air Pollution Control Officers Association (OEHHA 2003, Tables 5.1, 6.3, 7.1). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (OEHHA 2003, p. 5-3).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) non-cancer effects, and cancer risk (also long-term). Acute health effects result from short-term (one-hour) exposure to relatively high concentrations of pollutants. Acute effects are temporary in nature, and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those which arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from twelve to one hundred percent of a lifetime, or from eight to seventy years (OEHHA 2003, p. 6-5). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for non-cancer health effects compares the maximum project contaminant levels to safe levels called "reference exposure levels" or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (OEHHA 2003, p. 6-2). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature, and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified.

The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformance with CAPCOA guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (OEHHA 2003, pp. 1-5, 8-12). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively) (Id). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in chances per million, and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called “potency factors”, and established by the California Office of Environmental Health Hazard Assessment), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks are likely to be considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions would be performed to obtain a more accurate assessment of potential public health risks. This more detailed analysis will also include a specific Environmental Justice analysis to determine if a significant disproportional impact to a minority population exists.

Significance Criteria

Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above.

As described earlier, non-criteria pollutants are evaluated for short-term (acute) and long-term (chronic) non-cancer health effects, as well as cancer (long-term) health

effects. Significance of project health impacts is determined separately for each of the three categories.

Acute and Chronic Non-cancer Health Effects

Staff assesses the significance of non-cancer health effects by calculating a "hazard index." A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than one signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance which has the same type of health effect is added to yield a total hazard index. The total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than one indicates that cumulative worst-case exposures are less than the reference exposure levels (safe levels). Under these conditions, health protection is likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant non-cancer project-related public health impacts.

Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, §§ 25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations, section 12703(b) states that "the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure." This level of risk is equivalent to a cancer risk of ten in one million, or 10×10^{-6}. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that which applies to Proposition 65.

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. Staff's analysis also addresses potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them more sensitive to the adverse effects of toxic air contaminants and any Environmental Justice populations if disproportional impacts to a minority population are found to exist. In order to accomplish this goal, staff utilizes the most current acceptable public health exposure levels (both acute and chronic) set to protect the public from the effects of airborne toxics. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. If facility risk, based on refined assumptions, exceeds the significance level of ten in one million, staff would require appropriate measures to reduce risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than ten in one million, staff would deem such risk to be significant, and would not recommend project approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Construction Impacts and Mitigation

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation, as well as diesel exhaust from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **Air Quality** analysis.

Site disturbances will occur during facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of airborne dust, material being carried off-site through soil erosion, and uncovering buried hazardous substances.

The proposed PEFE project is located on approximately two acres within the existing PEF site. A Phase I Environmental Site Assessment (ESA) was conducted on the 31-acre PEF site in 1999 as part of the original proceedings for PEF, and a new Phase I ESA was conducted in February 2005, both by URS Corporation. These assessments found no evidence or record of any use, spillage or disposal of hazardous substances on the site, nor any other environmental contamination concern that would require remedial action (PEFE 2005a Section 5.14.1.2 and URS 2005). For a more detailed discussion of the findings, please refer to the **Waste Management** Section of this document.

Staff finds that Conditions of Certification **Waste-1** and **Waste-2** (which require having a California registered Geologist, certified Engineering Geologist, or registered Civil Engineer with experience in remedial investigation and feasibility studies available for consultation during soil excavation and grading activities and with authority to address the issue) are adequate to address any soil or groundwater contamination that may be encountered.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by CARB as toxic air contaminants.

Exposure to diesel exhaust causes both short- and long-term adverse health effects. Short-term effects can include increased cough, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel (SRP) on Toxic Air Contaminants recommended a chronic REL (see REL discussion in Method of

Analysis section above) for diesel exhaust particulate matter of 5 $\mu g/m^3$ and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP 1998, p. 6). [The SRP, established pursuant to California Health and Safety Code section 39670, evaluates the risk assessments of substances proposed for identification as Toxic Air Contaminants by the Air Resources Board (ARB) and the Department of Pesticide Regulation (DPR). The SRP reviews the exposure and health assessment reports and the underlying scientific data upon which the reports are based.] The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, CARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Construction of the PEFE is anticipated to take place over a period of 12 months. As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from eight to seventy years.

AFC Section 5.2.5.6 and Appendix D of the Air Quality Technical Report present diesel exhaust emissions from engines. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Modeling of construction activities over a 12 month period resulted in a predicted annual average concentration of 0.0281 $\mu g/m^3$ of PM10 at any location. Using the HARP model, the cancer risk predicted for this exposure is between 1.2 and 1.7 in one million (PEFE 2005a, Section 5.16.2.1). Mitigation measures are proposed by staff in the Air Quality section of this staff analysis to reduce the maximum calculated PM10 concentrations, including the use of extensive fugitive dust control measures and diesel exhaust particulate mitigation. The fugitive dust control measures are assumed to result in 90% reductions of emissions.

In order to mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, Air Quality staff recommends through Conditions of Certification in the **Air Quality** section, the use of ultra low sulfur diesel fuel and either Tier 2 or Tier 1 California Emission Standards for Off-Road Compression-Ignition Engines or the installation of oxidation catalysts and soot filters on diesel equipment. The catalyzed diesel particulate filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is comparable for both mitigation measures in the range of approximately 85-92 percent. Such filters will reduce diesel emissions during construction and reduce any potential for significant health impacts.

Operation Impacts and Mitigation

Emissions Sources

The proposed PEFE includes two sources of emissions, the combustion turbine generator (CTG) and a minor incremental increase in emissions from the PEF cooling tower.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility.

Table 5.16-1 of the AFC lists non-criteria pollutants that may be emitted from the PEFE CTG as combustion byproducts, and Table 5.16-2 lists the anticipated amounts of these substances emitted from the Expansion (emission factors). Emission factors are from the California Air Toxics Emission Factors (CATEF II) database (CARB, 2001). **Public Health Table 2** lists toxic emissions and shows how each contributes to 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.

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				✔	✔
Benzene			✔	✔	✔
1,3-Butadiene			✔	✔	
Ethylbenzene				✔	
Hexane				✔	
Napthalene		✔	✔	✔	
Polynuclear Aromatic Hydrocarbons (PAHs)	✔	✔	✔	✔	
Propylene				✔	
Propylene oxide			✔	✔	✔
Toluene				✔	✔
Xylene				✔	✔

*Sources: OEHHA 2003 Appendix L and PEFE 2005a Table 5.16-1

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a “worst case” analysis. Maximum hourly emissions are required to calculate acute (one-hour) non-cancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) non-cancer health effects.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The PEFE project applicant’s screening analysis was performed using the CARB/OEHHA Hotspots

Analysis and Reporting Program (HARP) modeling program (please see staff's **Air Quality** section for a detailed discussion of the modeling methodology) in combination with the ICSCT3 dispersion model (PEFE 2005a Section 5.16.2.2). Ambient concentrations were used in conjunction with RELs and cancer unit risk factors to estimate health effects which might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother's milk.

The above method of assessing health effects is consistent with OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2003) referred to earlier, and results in the following health risk estimates.

Impacts

The applicant's screening health risk assessment for the PEFE CTG resulted in a maximum acute hazard index of 0.03 and a maximum chronic hazard index of 0.004. Total worst-case individual cancer risk was calculated by the applicant to be 0.08 in one million at the location of the Maximally Exposed Individual (MEI) which is a farmhouse approximately two miles from the site. The applicant also calculated a maximum cancer risk at the closest residence of <0.0001 in one million, and a cancer risk of 0.02 in one million for the maximally exposed worker. The locations of the maximum acute and chronic hazards and cancer risk are shown in Figure 5.16-1 of the AFC (PEFE 2005a). As **Public Health Table 3** shows, both acute and chronic hazard indices are under the REL of 1.0, indicating that no short- or long-term adverse health effects are expected. In addition, cancer risk is well below the significance level of 10 in one million.

PUBLIC HEALTH Table 3
Operation Hazard/Risk at Maximally Exposed Individuals

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Non-cancer	0.03	1.0	No
Chronic Non-cancer	0.004	1.0	No
Individual Cancer	0.08×10^{-6}	10.0×10^{-6}	No

Source: PEFE 2005a Table 5.16-6.

Staff reviewed the applicant's modeling and conducted a qualitative evaluation of the applicant's screening health risk assessment (SHRA) for the proposed Pastoria Energy Facility Expansion. Staff was unable to conduct a quantitative assessment due to the manner in which risk was calculated in the SHRA, which was confusing and lacked transparency, as outlined below.

The AFC states that the HARP model was used to assess cancer risk and chronic and acute impacts. In the opinion of Staff, this is only partially true. While HARP was used for the risk assessment portion of the analysis, it was not used for the air dispersion modeling of facility emissions. Instead, the HARP model was used to generate cancer risk values for each pollutant and route of exposure, based on an exposure of 1.0 g/m^3. These unit values were then combined with emission rates of the toxic air contaminants (TACs) and these weighted values were used in the ISCST3 dispersion model to obtain

actual cancer risks and hazard indices. While this approach seems cumbersome, it is probably reasonable, although it did preclude a quantitative evaluation of the risk assessment by staff because the parameters used to build the models were not readily apparent. Thus, staff was compelled to conduct a qualitative assessment of the results presented in the SHRA.

Table 5.16-2 of the AFC presents the maximum TAC emissions from the proposed expansion project's new combustion turbine generator (CTG) while Table 5.16-3 of the AFC presents TAC emissions from the PEF existing CTGs which are part of the facility's combined cycle configuration. A comparison of the values presented shows little difference in the maximum hourly and annual emissions listed for each substance per CTG (see **Public Health Table 4** below). In other words, each CTG contributes approximately the same emissions of each substance. Based on the projected emissions from the four CTGs (three existing plus one expansion), an increase in overall CTG emissions of about 33 percent would be expected due to the additional CTG. However, the exhaust plume from simple cycle CTG is hotter and, due to thermal buoyancy, would have a higher rise than a plume from a combined cycle configuration, so that the emissions are more dispersed. Thus, the increase in ground level exposure (and risk) is not expected to be proportional to the increase in emissions.

PUBLIC HEALTH Table 4
Comparison of Maximum Hourly and Annual Emissions for the Expansion CTG versus the Existing CTGs

Maximum Proposed Emissions				
	Expansion CTG		Existing CTGs (each)	
Substance	lb/hr	tpy	lb/yr	tpy
Ammonia	24.1	101.2	24.06	105.4
Propylene	1.3	5.7	1.34	5.87
Acetaldehyde	6.9E-02	0.3	7.09E-02	0.31
Acrolein	1.1E-02	4.9E-02	1.14E-02	4.98E-02
Benzene	2.1E-02	9.1E-02	2.14E-02	9.37E-02
1,3-Butadiene	7.4E-04	3.3E-03	7.63E-04	3.34E-03
Ethylbenzene	5.5E-02	0.24	5.67E-02	0.25
Formaldehyde	0.11	0.47	0.11	0.48
Hexane	0.44	1.9	0.45	1.97
Naphthalene	2.25E-03	9.9E-03	2.31E-03	1.01E-02
PAHs	3.0E-04	1.3E-03	3.11E-04	1.36E-03
Propylene oxide	4.6E-02	0.20	4.68E-02	0.20
Toluene	0.23	0.99	0.23	1.01
Xylene	0.11	0.48	0.11	0.50
Total Hazardous Air Pollutants		4.8		4.89

Table 5.16-6 of the AFC presents the results of the SHRA. Incremental cancer risk due to emissions from the expansion project to the MEI under the Derived (OEHHA) Method[1] of the HARP model is 0.08 in one million. Risk from the existing facility, including emissions from the three existing CTGs, the emergency generator and the

[1] Other risk methodologies evaluated by the HARP model for the MEI include Average Point Estimate, High-end Point Estimate, and Derived (adjusted) Method.

diesel fire pump engine, is shown in **Public Health Table 5**. Chronic and acute hazard indices listed in Table 5.16-6 for the existing and expanded facility are less than 1.0, indicating lack of hazard.

Further analysis of the modeling results presented in Appendix C, Attachment C-2 of the Air Quality Technical Report of the AFC, provides the following risk and hazard index results for the MEI under the Derived (OEHHA) Method (**Public Health Table 5**):

PUBLIC HEALTH Table 5
Summary of Screening Health Risk Assessment Results

Equipment	Cancer Risk	Acute HI	Chronic HI
	(in one million)		
Expansion CTG	0.08	0.03	0.004
Existing CTGs	0.68	0.24	0.033
Emergency Generator	0.068	0.35	0.0014
Diesel Fire Pump Engine	2.2	n/a	0.0011
Totals	3.03	0.62	0.040

Based on the results presented in the AFC for the expansion project, it appears that the incremental risk due to the additional CTG does not represent a significant increase to overall facility risk nor does it represent an increase that would bring overall facility risk close to the significant impact criterion for lifetime incremental cancer risk of 10 in one million.

Minimal cooling tower emissions are expected due to the proposed expansion of the existing project, which currently has a four-cell cooling tower permitted for a maximum water circulation rate of 74,000 gpm, drift rate 0.0005 percent (Pastoria Energy Facility 160 MW Expansion, Data Request Package No. 2, Response to Data Request 40). AFC Table 3.4.8-1 shows that with the PEFE, total project cooling tower makeup water requirements would increase from 2882 gallons per minute (gpm) to 2898 gpm under average water use conditions and from 4598 gpm to 4614 gpm for maximum summer day usage (increases of 0.56 and 0.35 percent, respectively). Such minimal increases in cooling water use would not result in any significant change to health impacts from cooling tower emissions.

In conclusion, staff's analysis shows that this project alone will not result in a significant cancer risk and that non-cancer hazards and in combination with the existing PEF project, will also not result in a significant risk to public health.

Cooling Tower

In addition to being a source of potential toxic air contaminants, the possibility exists for bacterial growth to occur in the cooling towers, including Legionella. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' Disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as

industrial cooling towers and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

As noted in the LORS section above, the State of California regulates recycled water for use in cooling towers in Title 22, Section 60303, California Code of Regulations. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide to be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation applies to this project for it intends to recycle its own water for cooling purposes.

The U.S. Environmental Protection Agency (U.S. EPA) published an extensive review of Legionella in a human health criteria document (EPA 1999). The U.S. EPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. The U.S. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk –(however small) of disease in humans.

In 2000, the Cooling Technology Institute (CTI) issued its own report and guidelines for the best practices for control of Legionella (CTI 2000). The CTI found that 40-60 percent of industrial cooling towers tested were found to contain Legionella. It estimated that more than 4,000 deaths per year are believed to occur from Legionellosis (from all sources, not limited to industrial cooling towers), but only about 1,000 are reported. The CTI listed no reference or supportive data for this assertion, however.

To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling towers, and the overall general control of microbiological populations.

Good preventive maintenance is very important in the efficient operation of cooling towers and other evaporative equipment (ASHRAE 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and bio-fouling and not to control Legionella.

The efficacy of any biocide in ensuring that bacterial and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures and effective monitoring.

If the PEFE project were proposed as a stand-alone project with new cooling towers, staff would propose Condition of Certification **Public Health-1** to protect both workers and the public from Legionella exposure. Staff has found that the bacteria in the existing PEF cooling tower, that will have shared usage with the PEFE, may pose a risk to workers and even the off-site public traveling on the access road. Because the existing cooling towers are a potential source of such exposure, staff proposes Condition of Certification **Public Health-1** in this case. The condition would require the project owner to prepare and implement a Cooling Water Management Plan to ensure that the potential for bacterial growth in cooling water is kept to a minimum. Although the proposed requirement would apply to existing cooling towers, staff does not believe it presents an operational or engineering burden to the project owner since biocides are already being added to the cooling water and the plan could be virtually identical to those already required and approved at other power plants.

CUMULATIVE IMPACTS AND MITIGATION

To assess cumulative impacts from the PEFE and the existing PEF facility combined, the applicant conducted a screening health risk assessment for the facility as a whole. The results of this assessment are summarized in Table 5.16-6 of the Expansion AFC (PEFE 2005a). Total cancer risk from the PEF facility as a whole was calculated to be 2.2 in one million at the location of the maximally exposed individual (MEI). The acute hazard index at the MEI was found to be 0.35, and the chronic hazard index was 0.03. These results are well below the levels of significance used by staff.

The MEI occurs where pollutant concentrations from the PEF facility would theoretically be the highest. Even at this location, staff does not expect any significant change in lifetime risk to any person, and the increase does not represent any real contribution to the average lifetime cancer incidence rate due to all causes (environmental as well as life-style and genetic). Modeled facility-related residential risks are lower at more distant locations and actual risks are expected to be much lower, since worst-case estimates are based on conservative assumptions and thus overstate the true magnitude of the risk expected. As described earlier in this assessment, staff conducted a qualitative assessment and review of cumulative impacts and found them to be insignificant.

The worst-case long-term non-cancer health impact from the PEF is well below the significance level of 1.0 at the MEI. At this level, staff does not expect any cumulative health impacts to be the result of emissions from the proposed power plant. As with cancer risk, long-term hazard would be lower at all other locations.

As described above, the contribution of the PEF facility including the proposed Expansion to both cancer risk and chronic and acute non-cancer disease are insignificant. Therefore staff concludes that cumulative impacts from the PEF facility and the proposed Expansion are insignificant.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the PEFE will be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of Public Health.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

None received in the area of public health.

CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the PEFE and does not expect there to be any significant adverse cancer, short-term, or long-term health effects from project toxic emissions. Staff's analysis also shows that there will be no significant direct or cumulative impact to any population.

Staff has found that the bacteria in the existing PEF cooling tower, that will have shared usage with the PEFE, may pose a risk to workers and even the off-site public traveling on the access road. To ensure that Legionella growth is kept to a minimum, staff has proposed Condition of Certification **Public Health-1**.

PROPOSED CONDITION OF CERTIFICATION

Public Health-1 The project owner shall develop and implement a Cooling Water Management Plan to ensure that the potential for bacterial growth in cooling water is kept to a minimum. The Plan shall be consistent with either staff's "Cooling Water Management Program Guidelines" or with the Cooling Technology Institute's "Best Practices for Control of Legionella" guidelines but in either case, the Plan must include sampling and testing for the presence of Legionella bacteria at least every six months. After two years of power plant operations, the project owner may ask the CPM to re-evaluate and revise the Legionella bacteria testing requirement.

Verification: At least 60 days prior to the commencement of cooling tower operations, the Cooling Water Management Plan shall be provided to the CPM for review and approval.

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Public Health Appendix A

CRITERIA POLLUTANT HEALTH EFFECTS

CRITERIA POLLUTANT HEALTH EFFECTS

OZONE (O_3)

Ozone is formed when reactive organic gases are mixed with nitrogen oxides in the presence of sunlight. Heat speeds up the reaction, typically leading to higher concentrations in the summer months. Ozone is a colorless, very reactive gas which oxidizes other materials. Oxidation damages living cells and tissues by altering their protein, lipid, and carbohydrate components or products. Such damage leads to dysfunction and death of cells in the lung and in other internal tissues.

The U.S. EPA revised the federal ozone standard on July 18, 1997 (62 Fed. Reg. 38856), based on new health studies which became available since the standard was last revised in 1979. These new studies showed that adverse health effects occur at lower ambient concentrations over longer exposure times than those reflected in the previous standard, which was based on acute health effects associated with heavy exercise and short-term exposures. The U.S. EPA's ozone rule lists health effects which have been attributed to result from short-term (one to three hours) and prolonged (six to eight hours) exposure to ozone (61 Fed. Reg. 65719). On April 28, 2005, the California Air Resources Board (CARB) approved the nation's most health protective ozone standard with special consideration for children's health. The new 8-hour-average standard at 0.070 parts per million (ppm) will further protect California's most vulnerable population from the adverse health effects associated with ground-level ozone, or smog.

Acute health effects induced by short-term exposures include transient reductions 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 associated with short-term or prolonged O_3 exposures include increased airway responsiveness (a predisposition to bronchoconstriction caused by external stimuli such as pollen and dust), susceptibility to respiratory infection by impairing 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 populations at greatest risk of acute effects from ozone exposures are children and adults engaged in physical exercise. Children are most at risk because they are active outside, playing and exercising, during the summer when ozone levels are at their highest. Adults who are outdoors and engaging in activities involving heavy levels of exertion during the summer months are also among those most at risk. 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, but is quickly converted to carbon dioxide. However, it can reach high levels in localized areas, or "hot spots".

CO reduces the oxygen carrying capacity of the blood, thereby disrupting the delivery of oxygen to the body's organs and tissues. Persons sensitive to the effects of carbon monoxide include those whose oxygen supply or delivery is already compromised. Thus, groups potentially at risk to carbon monoxide exposure include persons with coronary artery disease, congestive heart failure, obstructive lung disease, vascular disease, and anemia, the elderly, newborn infants, and fetuses (CARB 1989, p. 9). In particular, people with coronary artery disease were found to be especially at risk from carbon monoxide exposure (CARB 1989, p. 9). Tests conducted on patients with confirmed coronary artery disease indicated that exposure to low levels of carbon monoxide during exercise produced significant cardiac effects. These included earlier onset of 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, impairment of central nervous system functions, and increased risk to fetuses (Title 17, Cal. Code Regs., sec70200).

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 (or PM10), which may be inhaled and deposited within the deep portions of the lung (PM10). PM may originate from anthropogenic or natural sources such as stationary or mobile combustion sources or windblown dust. Particles may be emitted directly to the atmosphere or result from the physical and chemical transformation of gaseous emissions such as sulfur oxides, nitrogen oxides, and volatile organic compounds. PM10 may be made up of elements such as carbon, lead, and nickel; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and soil fragments. The size, chemical composition, and concentration of ambient PM10 can vary considerably from area to area and from season to season within the same area.

PM10 can be grouped into two general sizes of particles, fine and coarse, which differ in formation mechanisms, chemical composition, sources, and potential health effects. Fine-mode particles are those with a diameter of 2.5 micrometers or less (PM2.5), while the coarse-mode fraction of PM consists of particles ranging from 10 micrometers down to 2.5 micrometers in diameter.

Coarse-mode PM10 is formed by crushing, grinding, and abrasion of surfaces, and in the course of reducing large pieces of materials to smaller pieces. Coarse particles consist mainly of soil dust containing oxides of silicon, aluminum, calcium, and iron; as

well as fly ash, particles from tires, pollen, spores, and plant and insect fragments. Coarse particles normally have shorter lifetimes (minutes to hours) and only travel over short distances (of less than tens of kilometers). They tend to be unevenly distributed across urban areas and have more localized effects than the finer particles.

PM2.5 is derived both from combustion by-products, which have volatilized and condensed to form primary PM2.5, and from precursor gases reacting in the atmosphere to form secondary PM2.5. Components include nitrates, organic compounds, sulfates, ammonium compounds, and trace elements (including metals) as well as elemental carbon such as soot. Major sources of PM2.5 are fossil fuel combustion by electric utilities, industry and motor vehicles, vegetation burning, and the smelting or other processing of metals. Dry deposition of fine mode particles is slow allowing such particles to often exist for long periods of time (of from days to weeks) in the atmosphere and travel hundreds to thousands of kilometers. They tend to be uniformly distributed over urban areas and larger regions and are removed from the atmosphere primarily by forming cloud droplets and falling out within raindrops.

The health effects of PM10 from any given source usually depend on the toxicity of its constituent pollutants. The size of the inhaled material usually determines where it is deposited in the respiratory system. Coarse particles are deposited most readily in the nose and throat area while the finer particles are more likely to be deposited within the bronchial tubes and air sacs, with the greatest percentage deposited in the air sacs. Until recently, PM10 particles had been considered to be the major fraction of airborne particulates responsible for various adverse health effects. The PM10 fraction is known to be capable of penetrating the thoracic and alveolar regions of the human and animal lungs. The PM2.5 fraction, however, was found to pose a significantly higher risk for health. This is due to their size and associated deposition and retention characteristics in the respiratory tract, enabling it to penetrate and deposit within the deeper alveolar regions of the lung. The following aspects of PM2.5 deposition all contribute to the more serious health effects attributed to smaller particles:

- The deposition of PM2.5 favors the periphery of the lungs, which is especially vulnerable to injury for anatomical reasons.
- Clearance of the PM2.5 from within the deeper reaches of the lungs is a much slower process than from the upper regions. Consequently, the residence time is longer, implying longer exposure, and hence greater risk.
- The human anatomy further allows the penetration of the superficial tissues by PM2.5 and entry into the bodily circulation without much effort in the periphery of the lungs.

Many epidemiological studies have shown exposure to particulate matter capable of inducing a variety of health effects, including premature death, aggravation of respiratory and cardiovascular disease, changes in lung function and increases in existing respiratory symptoms, effects on lung tissue structure, and impacts on the body's respiratory defense mechanisms. The underlying biological mechanisms are still poorly understood. Based on their review of a number of these epidemiological studies (as published after 1987 when the federal standards were revised), together with suggestion of PM2.5 concentrations as a more reliable surrogate for the health impacts

of the finer fraction of PM than PM10, the U.S. EPA concluded that the then-current standards were not sufficiently stringent to protect against significant effects in exposed humans. Therefore, federal PM standards were revised on July 18, 1997 (62 Fed. Reg. 38652) to add new annual and 24-hour PM2.5 standards to the existing annual and 24-hour PM10 standards. Taken together, these new standards were meant to provide additional protection against a wide range of PM-related health effects, including premature death, increased hospital admissions and emergency room visits, primarily among sensitive individuals such as the elderly, children and individuals with cardiopulmonary diseases such as asthma. Other impacts include decreased lung function (particularly in children and asthmatics), and alterations in lung tissue and structure.

California has also had 24-hour and annual standards for PM10 (CARB 1982, pp. 81, 84). These studies were aimed at establishing the PM10 levels capable of inducing asthma, premature death and bronchitis-related symptoms. They were set to protect against such impacts in the general population as well as sensitive individuals such as patients with respiratory disease, declines in pulmonary function, especially as related to children (Tit. 17, Cal. Code Regs., sec. 70200). These standards were set to be more stringent than the federal standard, which the ARB regarded as inadequate for the protection desired (CARB 1991, p. 26).

On June 20, 2002, the ARB approved the adoption of a lower annual state standard for PM10, as well as a new annual standard for PM2.5 (CARB 2002). 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., sec. 70200).

NITROGEN DIOXIDE (NO2)

Nitrogen dioxide is formed either directly or indirectly when oxygen and nitrogen in the air combine during combustion processes. It is a relatively insoluble gas which is able to penetrate deep into the lungs, its principal site of toxicity. Its toxicity is thought to be due to its capacity to initiate free radical reactions and to oxidize cellular proteins and other biomolecules (CARB 1992, Appendix A, p. 4).

Sublethal exposures in animals produce inflammation and various degrees of tissue injury characteristic of oxidant damage (Evans in CARB 1992, Appendix A, p. 5). The changes produced by low-level acute or subchronic exposure appear to be reversible when animals are 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 (CARB 1992, Appendix A, 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 using controlled brief exposures on sensitive groups have shown an increase in bronchial reactivity or airway responsiveness of some asthmatics, and decreased lung function in some patients with chronic obstructive lung disease (CARB 1992, Appendix A, p. 2). In general, bronchial hyper reactivity (an exaggerated tendency of the airways to constrict) is markedly greater in asthmatics than in nonasthmatics upon exposure to respiratory irritants (CARB 1992a, p. 107). At exposure concentrations relevant 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 (SO2)

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 cause changes in lung cell structure and function that adversely affect a major lung defense mechanism known as muco-ciliary 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 an increased incidence of respiratory symptoms (e.g., coughing and wheezing) or respiratory disease, decreases in pulmonary function, and an increased risk of mortality (CARB 1991a, p. 12). The long-term (24 hour) standard is based upon increased incidence of respiratory disease and excess 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, whereby "no adverse effects" are expected from exposures to concentrations at the state standard (Ibid.).

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SOCIOECONOMICS

Testimony of Joseph Diamond

SUMMARY OF CONCLUSIONS

The Pastoria Energy Facility Expansion of 160 megawatts would require a construction period of twelve months to complete. The project owner would use largely local labor. This would not create any significant negative socioeconomic impacts on the area's schools, housing, law enforcement, emergency services, hospitals, or utilities. Public benefits from the construction of the project include capital costs, construction payroll, property and sales taxes, and the value of locally purchased materials and supplies.

INTRODUCTION

The California Energy Commission staff socioeconomics impact analysis evaluates the project induced changes on community services and/or infrastructure, and related community issues such as Environmental Justice (EJ). Staff discusses the estimated impacts of the construction and operation of the Pastoria Energy Facility Expansion (PEFE) on local communities, community resources, and public services.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

CALIFORNIA GOVERNMENT CODE, SECTIONS 65996-65997

These sections include provisions for school district levies against development projects. As amended by SB 50 (Stats. 1998, ch. 407, sec. 23), these sections state that public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.

SETTING

The PEFE is located in unincorporated southern Kern County. For a full description of the socioeconomic setting please refer to the 5.10.1.1 **Study Area** section of the PEFE AFC Vol. II, Attachment I (PEFE 2005a). The study area (affected area) defined by the PEFE applicant in the socioeconomics section of the AFC and by staff includes: southern Kern County, Arvin, Bakersfield, California City, Delano, Maricopa, McFarland, Ridgecrest, Taft, Shafter, Tehachapi, Wasco, and 50 smaller communities within 80 miles of the site. The smaller communities within the study area are unlikely to be affected because of their small size, access, and limited available housing resources.

Communities within the project study area are within a two-hour one-way commute distance of the power plant site, and are where construction and operations workers may live. Staff agrees with the applicant's conclusion that construction workers could potentially be drawn from these areas, or if non-local workers are required for the project, they will likely relocate to these communities during construction (PEFE 2005a, AFC pages 5.10-2 to 5.10-4 and PEFE 2005e, Supplement to the Application for Certification Exhibit 5 Socioeconomic Materials page 5.10-4). Therefore, staff utilized

this labor market area for its evaluation of construction worker availability and community services and infrastructure impacts from the PEFE construction.

Kern County was used as the study area by staff in identifying fiscal and non-fiscal (private sector) benefits and other potential socioeconomic impacts from the PEFE.

DEMOGRAPHIC SCREENING

The purpose of an 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 conducts screening analyses in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in [the Environmental Protection Agencies'] EPA's [National Environmental Policy Act] NEPA Compliance Analysis," Guidance Document (EPA 1998). Minority populations, as defined by this Guidance Document, are identified where either:

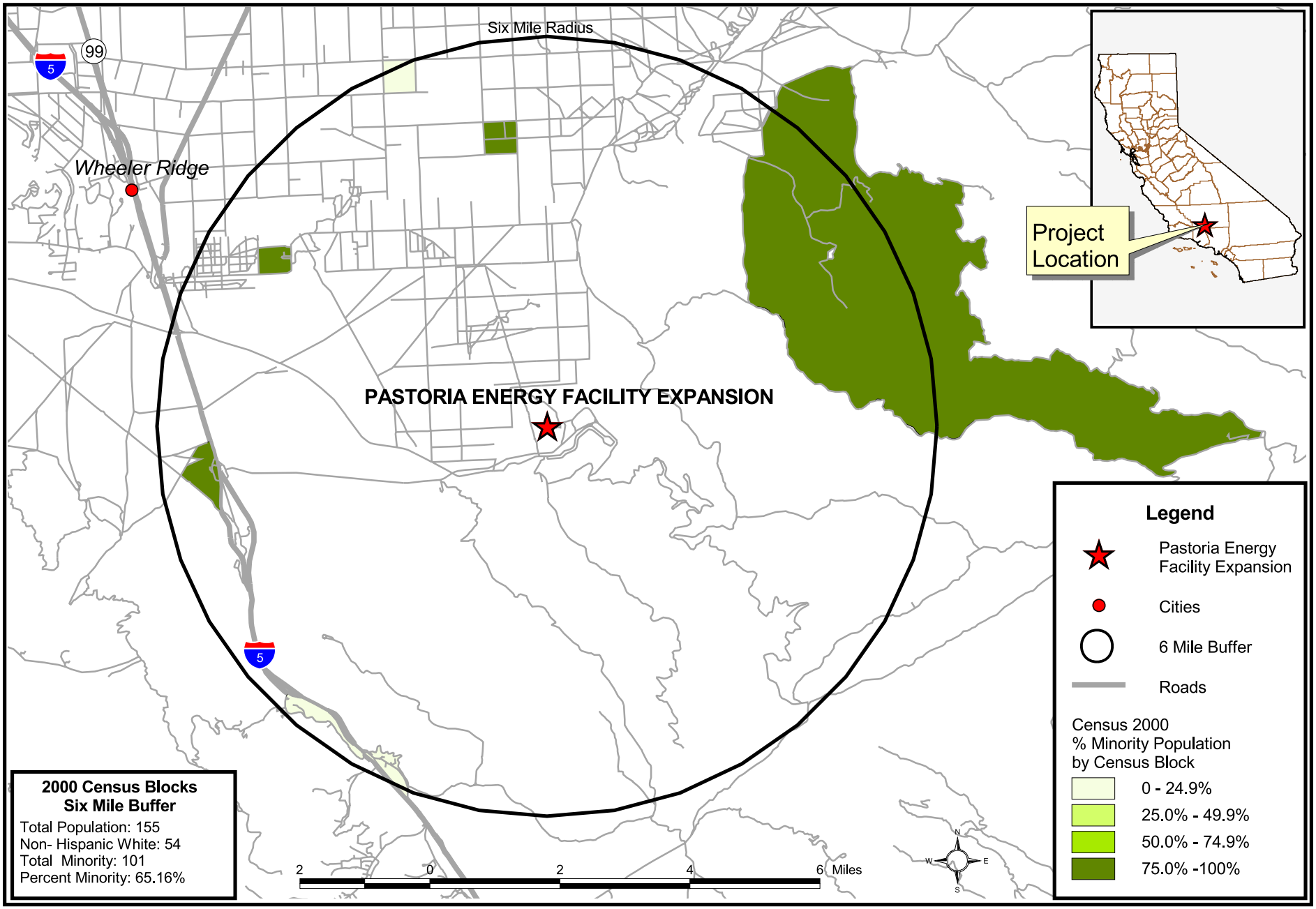
- the minority population of the local area is greater than fifty percent of the affected area's general population; or
- the minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis; or
- one or more census blocks in the local area have a minority population greater than fifty 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 that shows the minority population by census block is 65.15 percent, which is greater than staff's threshold of fifty percent within a six-mile radius of the proposed PEFE (**See Socioeconomics Figure 1**). Census 2000 by census block group information shows that the low-income population is 15.33 percent within the same radius. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old. There is no population at a one or two mile radius.

SOCIOECONOMICS - FIGURE 1

Pastoria Energy Facility Expansion - Census 2000 Minority Population by Census Block - Six Mile Buffer



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2005

SOURCE: California Energy Commission Statewide Transmission & Power Plant Maps 2005, Census 2000 PL 94-171 Data - Matrix PL2

ASSESSMENT OF IMPACTS

Staff reviewed the PEFE socioeconomic section in the Application for Certification (AFC) and other socioeconomic data (PEFE 2005a and PEFE 2005e). Staff used the socioeconomic data provided and referenced from governmental agencies, trade associations and its own independent analysis.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

In this analysis staff used fixed percentage criteria for housing and environmental justice in evaluating potential impacts. For housing, staff considers a vacancy rate of five percent or less of permanent available housing as an indicator of a tight housing market with higher prices and possible overcrowding. For environmental justice, staff uses a threshold of greater than 50 percent for minority/low-income population as a subset of the total population in the local area. Criteria for subject areas such as fire protection, water supply and wastewater disposal are analyzed in other sections of this staff assessment. Educational impacts are subjectively determined but are moot, as described later. Impacts on medical services, law enforcement, community cohesion, and cumulative impacts are based on subjective judgments or input from local and state agencies. Typically, substantial employment of people who come from regions outside the study area has the potential to result in significant socioeconomic impacts.

DIRECT IMPACTS AND MITIGATION

Population and Employment

The applicant provided a worst-case analysis that shows 15 construction workers may be non-local (from outside of Kern County). This is 10 percent of the average construction workforce or seven percent of the peak construction workforce. Assuming a household size of 3.04 for the 15 non-local workers (3.04 is the average household size for Kern County in 2003), the total population increase associated with the PEFE would be about 45 persons during the 12-month construction period. However, since dependents do not usually accompany non-local construction workers to the site, the number should be less than 45 (PEFE 2005a, AFC page 5.10-2).

The results of population dispersion, as presented in the PEFE AFC (Table 5.10-2) are that 66 percent of the non-local construction workers (approximately 10 workers) are predicted to live in Bakersfield. This result would be expected because more amenities are available in Bakersfield when compared to the communities closer to the project site. The results also indicate two workers will likely live in Delano; two workers will likely live in Wasco and Arvin, and one in other areas of Kern or Los Angeles Counties (PEFE 2005a, AFC page 5.10-2). Staff finds the population dispersion analysis to be reasonable.

The following **Socioeconomics Table 1** shows that available labor, by skill, in Kern County is considerable when compared to the PEFE project. It shows there is ample labor supply for the PEFE project.

SOCIOECONOMICS TABLE 1
Available Labor by Skill in Kern County By Craft/Skill Versus Project Labor Needs

Craft	Total Number of Workers in Kern County 2004*	Maximum Number of Workers Needed for the Project**
Specialized Insulation Workers	80	10
Boilermakers/Ironworkers	510	18
Carpenters	970	12
Electricians	1,320	26
Laborers	1,560	26
Millwrights	70	12
Operating Engineers	940	6
Painters	430	12
Pipefitters	960	30
Plasterers/Cement Masons	650	10
Mechanical Equipment Erection Workers	***	26
Field Staff	340	35
Teamsters	4,110	2

Source: California Employment Development Department (2004).

* Data from the State of California, Employment Development Department (EDD), Labor Market Information, Table 6, Occupational Employment Projects 2001-2008. Total workers calculated from the 2004 EDD estimated workforce for Kern County. (State of California Employment Development Department, 2004.

** The maximum number of workers by each craft would be needed at different points in time during project construction. Refer to Table 3.8-3.

*** Data not available.

The Impact Analysis For Planning (IMPLAN) model (an input-output model), used in the PEFE AFC to estimate employment impacts from the project on the affected area, is widely used and therefore acceptable to staff. The University of California at Berkeley uses the IMPLAN model for regional economic assessment, and it has been used to assess other generating projects. Employment multipliers refer to the total additional employment stimulated by new economic activity. IMPLAN is a disaggregated type of model that divides the (regional) economy into sectors and provides a multiplier for each sector (Lewis et al. 1979). A multiplier of 3.23 was used for construction (i.e., each new construction job supports approximately 2.2 indirect and induced jobs in the regional economy).

The PEFE construction period is 12 months with an estimated start-up time of June 2006 and an online date of June 2007. The average number of construction workers will range from 34 in the first month of construction to approximately 225 workers in the 7th month of construction. The maximum number of non-local workers needed for power plant construction is estimated to be 15.

The total employment, estimated by the PEFE using an IMPLAN multiplier of 3.23 for construction, is the equivalent of 468 jobs (which includes 323 secondary jobs) based on an average of 145 project-related construction jobs (PEFE 2005e, Supplement to the Application for Certification Exhibit 5 Socioeconomics Materials page 5.10-4).

Housing

According to federal standards, permanent housing is considered to be in short supply if the vacancy rate is less than five percent (Cleary 1989). Staff does not expect any housing to be displaced from this project. Sufficient vacant housing exists to accommodate any workers that elect to temporarily relocate to the study area. As of 2003, there were approximately 242,622 housing units in Kern County including single family, multi-family, and mobile homes. The vacancy rates for this housing were approximately 7.5 percent or 18,312 units in 2003 (U.S. Census Bureau 2003).

As of May 1998, there were approximately 8,758 hotel/motel rooms in Kern County. There were 65 hotel/motels totaling 5,318 rooms in Bakersfield with a 61 percent occupancy rate (or 2,074 rooms for a 39 percent vacancy rate). Smaller communities did not have occupancy rates (PEFE 2005a, AFC Attachment I page 5.10-5). In April 2005, there were 8,643 hotel/motel rooms in Kern County. So for April 2005, Kern County had a hotel/motel (all lodgings over 15 rooms) occupancy rate of 68.1 percent (or a 31.9 percent vacancy rate) and Bakersfield had a hotel/motel occupancy rate of 68.3 percent (or 31.7 percent vacancy rate) (Smith Travel Research 2005).

Again, most of the construction workforce is expected to come from Kern County residents. There is an adequate supply of housing and hotels/motels available to accommodate the estimated 15 non-local construction workers who may relocate (most likely on a week-to-week basis). Staff does not expect any housing to be displaced (moved) as a result of this project.

Fiscal and Non-Fiscal Effects

Some fiscal impacts (all dollars are 2005) of the PEFE are:

- First year property taxes: $2.1 million. The project life is a minimum of thirty years.
- Construction sales tax: $72,500 associated with the initial purchase of the equipment and materials.
- Operation sales tax: $7,250 each year of PEFE.

Non-fiscal impacts include:

- Capital costs are estimated at $70 million.
- The construction payroll is: $16 million over twelve months.
- Approximately $1 million would be spent locally on construction equipment and materials and $100,000 each operation year of the PEFE project (PEFE 2005e, Supplement to the Application for Certification pages 11 and 12).

Public Services

Education

Based on the applicant's worst-case scenario of 15 non-local construction workers, using an average household size of 3.04 for Kern County in 2003 results in 15 school-aged children being added to Kern County school enrollment. Sixty-six percent or ten school children would likely go to Bakersfield, two to Delano, and the remaining three would go to another area of Kern County (including Arvin, Wasco, McFarland, Shafter, Maricopa, Taft, Wasco, and Tehachapi) or in Southern California (PEFE 2005a, AFC Table 5.10-2 and page 5.10-4). For 2003-04, the Kern County ratio of student-to-(full-time) teachers is below the California average (Kern County Superintendent of Schools Office 2004). 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 the non-local construction workers would not likely relocate family members for the relatively short duration of construction.

Education Code section 17620 states that public agencies may not impose fees, charges or other financial requirements to offset the cost for "school facilities". School facilities are defined as "any school-related consideration relating to a school district's ability to accommodate enrollment." Local and state agencies are precluded from imposing (additional) fees or other required payments on development projects for the purpose of mitigating possible enrollment impacts to schools.

Since there are no new buildings proposed as part of the PEFE project, no new building fees (e.g., school impact fees) are expected to be assessed for the PEFE Project.

Law Enforcement

Police service for the PEFE project will be provided by the Kern County Sheriff's Department which is in the Frazier Park Substation, 27 miles away. The Frazier Park Substation has four deputies, a senior deputy, sergeant, four volunteer reserve deputies, nine citizen service members, and 27 search and rescue members to cover 400 square miles (PEFE 2005a, AFC Attachment I page 5.10-8). Staff finds the law enforcement resources adequate.

Public Utilities

The Wheeler Ridge-Maricopa Water Storage District can meet the project's water supply needs. Power will be supplied by the local utility.

Water and wastewater discharge is discussed in the **Soil and Water Resource** testimony, solid waste removal is discussed in the **Waste Management** testimony, and supplies of electricity and natural gas are discussed in the **Reliability** testimony.

Medical Services

During the construction phase, emergency services will be coordinated with the Kern County Fire Department and the Westside District Hospital in the City of Taft (about 45 miles or about three quarters to an hour) or the five hospitals located in Bakersfield

(about 25 to 30 miles or about half an hour away). An urgent care facility (the Westside District Hospital in Taft) has been contracted to set up non-emergency physician referrals (PEFE 2005a, AFC Attachment I page 5.10-15).

Construction workers on the PEFE project will have health insurance from their companies. This will prevent burdening the state and local entities with uncompensated health services.

CUMULATIVE IMPACT

Cumulative impacts might occur when more than one project has an overlapping construction schedule that creates a demand for workers that can not be met by local labor, resulting in an influx of non-local workers and their dependents.

The PEFE project will average 145 workers per month and 225 during the peak month, for twelve months from approximately June 2006 to June 2007.

Other projects planned in Kern County in addition to PEFE are:

- the Western Midway-Sunset Project in western Kern County owned by Mission Energy for 500 MWs. It was approved by The Energy Commission on March 21, 2001, but is on hold. At peak construction, it is expected to employ 400 workers. Its online date was delayed to July 2006 and subsequently to November 2007. Staff regards this project's status as uncertain with no definite date for the start of construction.

The Tejon Industrial Complex West is the only foreseeable project during the PEFE permitting and construction phase. It encompasses 341 acres of industrial and commercial development which was approved with construction starting in October 2000. To date, 2.45 million square feet have been constructed out of five million square feet. It is seven miles from the project site, but potential cumulative impacts associated with the need for construction workers are not expected because the trades used to construct industrial/commercial buildings are not the same as the trades used to construct a power plant (PEFE 2005a, AFC Table 5.18-1 and pages 5.18-3 to 5.18-7). Staff concurs with the applicant's assessment of no labor overlap with the Tejon Industrial Complex West. Overall, the Kern County labor market is sufficiently large, 314,000 in March 2005 (not seasonally adjusted), to absorb a large part of the needed manpower for the PEFE construction (EDD 2005). Therefore, there are no significant adverse socioeconomic cumulative impacts.

NOTEWORTHY PUBLIC BENEFITS

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

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received from agencies or members of the public regarding the PEFE project.

CONCLUSIONS

Estimated gross public benefits from the PEFE project include increases in property and sales taxes, employment, and income for Kern County. For example, there are estimated to be an average of 145 direct project-related construction jobs for the twelve months of construction. The PEFE project is estimated to have capital costs of $70 million. The construction payroll is estimated at $16 million for twelve months of construction, but the operation payroll is zero since no new workers would be hired. Property taxes are estimated at $2.1 million for the first year for a project life of a minimum of 30 years. The estimated total sales tax during construction is $72,500, and during operation $7,250 annually over the life of the project. An estimated $1 million would be spent locally for materials and equipment during construction, and an additional $100,000 would be spent annually in local materials and equipment.

Staff concludes that construction and operation of the PEFE project would not cause a significant direct or cumulative adverse socioeconomic impact on the study area's housing, schools, law enforcement, emergency services, hospitals, and utilities. Hence, there are no socioeconomic environmental justice issues related to this project.

The PEFE project, as proposed, is consistent with applicable socioeconomic LORS.

The following **Socioeconomic Table 2** provides a summary of socioeconomic data and information from this analysis, with emphasis on economic benefits of the PEFE project.

PROPOSED CONDITIONS OF CERTIFICATION

None.

SOCIOECONOMIC DATA AND INFORMATION - TABLE 2[1]	
Project Capital Costs	$70 million
Estimate of Locally Purchased Equipment and Materials	
Construction	$1 million
Operation	$100,000 locally per year of operation
Estimated Annual Property Taxes	$2.1 million for the first year. Project life is for a minimum of 30 years.
Estimated School Impact Fees	N/A
Direct Employment	
Construction (average)	145 jobs
Operation	N/A No additional permanent employees.
Secondary Employment	
Construction	323 jobs
Operation	N/A
Direct Income	
Construction	N/A
Operation	N/A
Secondary Income	
Construction	N/A
Operation	N/A
Payroll	
Construction	$16 million for 12 months
Operation	N/A
Estimated Sales Taxes	
Construction	Total sales tax is $72,500
Operation	$7,250 annually
Existing /Projected Unemployment Rates	Existing – 10.0 percent in September 2005 (not seasonally adjusted for Kern County). Projected - Not available.
Percent Minority Population (6 mile radius)	65.16 percent based on the 2000 Census.
Percent Poverty Population (6 mile radius)	15.33 percent based on the 2000 Census.

[1] Construction is for twelve months, and PEFE project life is planned for a minimum of 30 years. Economic (non-fiscal and fiscal in 2005 dollars) impacts, unemployment, and population information are for Kern County, the study area.

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SOIL AND WATER RESOURCES

Testimony of Linda D. Bond, P.G.

SUMMARY OF CONCLUSIONS

Based on its final assessment of the proposed Pastoria Energy Facility Expansion project, staff makes the following findings:

- Potential adverse impacts caused by erosion and stormwater flows during construction and operation would be mitigated with the development and implementation of an effective Storm Water Pollution Prevention Plan and Drainage, Erosion and Sedimentation Control Plan;
- A reliable water supply will be provided through a facilities-sharing agreement with the existing Pastoria Energy Facility.
- The proposed project will cause no unmitigated significant adverse impacts to the water resource supply;
- Water use for the project will be consistent with state water conservation policy with the adoption of the recommended conditions of certification;
- Potential adverse impacts from the processing of wastewater or the use and storage of hazardous materials would be avoided with the adoption and implementation of an effective Hazardous Materials Management Program and Storm Water Pollution Prevention Plan; and
- The proposed project would comply with all applicable federal, state and local laws, ordinances, regulations and standards with the adoption of the recommended conditions of certification.

INTRODUCTION

This section of the Final Staff Assessment (FSA) analyzes potential effects on soil and water resources by the Pastoria Energy Facility Expansion Project (PEFE), specifically focusing on the potential for the project:

- to induce wind or water erosion and sedimentation,
- to adversely affect surface water or groundwater supplies,
- to fail to beneficially use fresh inland water to the fullest extent feasible,
- to degrade surface or groundwater quality, and
- to comply with all applicable federal, state and local laws, ordinances, regulations and standards (LORS).

Where the potential for significant impacts is identified, staff proposes mitigation measures to reduce the level of the impact to below significance and, as appropriate, recommends conditions of certification.

Flooding and drainage issues are also addressed in the **Geology and Paleontology** chapter of this document. Solid waste disposal is discussed in the **Waste Management** section of this FSA.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

SOIL & WATER RESOURCES Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Federal LORS	
Clean Water Act (33 U.S.C. Section 1257 et seq.)	The Clean Water Act (33 USC § 1257 et seq.) requires states to set standards to protect water quality through the regulation of point source and certain non-point source discharges to surface water. These discharges are regulated through requirements set forth in specific or general National Pollutant Discharge Elimination System (NPDES) permits. Stormwater discharges during construction and operation of a facility are addressed through a general NPDES permit. In California, requirements of the Clean Water Act regarding regulation of point source discharges and stormwater discharges are delegated to and administered by the nine Regional Water Quality Control Boards (RWQCB). Section 404 of the act regulates the discharge of dredged or fill material into waters of the United States, including rivers, streams and wetlands. Site-specific or general (nationwide) permits for such discharges are issued by the Army Corp of Engineers (ACOE) and are certified by the RWQCB.
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.
Porter-Cologne Water Quality Control Act	The Porter-Cologne Water Quality Control Act of 1967, Water Code section 13000 et seq., requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. These criteria include the identification of beneficial uses, narrative and numerical water quality standards and implementation procedures. The criteria for the project area are contained in the Water Quality Control Plan for the Tulare Lake Basin (1995). The Porter-Cologne Water Quality Control Act also requires the SWRCB and the nine RWQCBs to ensure the protection of water quality through the regulation of waste discharges to land. Such discharges are regulated under Title 23, California Code of Regulations, Chapter 15, Division 3.
State Water Resources Control Board Policy 75-58	The SWRCB has also adopted a number of policies that provide guidelines for conservation and water quality protection of the state's water supplies. State water policy regarding power plants is specified in Resolution 75-58 adopted by the adopted by the SWRCB on June 19, 1976. With respect to using fresh water, the Resolution articulates an underlying policy "to protect beneficial uses of the state's water resources and to keep the consumptive use of freshwater for power plant cooling to that minimally essential for the welfare of the citizens of the state." This policy further states that use of fresh inland waters should only be approved for power plant cooling if other water supply sources or other methods of cooling would be environmentally undesirable or economically unsound. The SWRCB Policy 75-58 requires that power plant cooling water should, in order of priority come from wastewater being discharged to the ocean, ocean water, brackish water from natural sources or irrigation return flow, inland waste waters of low total dissolved solids, and other inland waters. The policy also reflects the state's concerns regarding discharges from power plants, as well as the conservation of fresh water, and addresses cooling water discharge prohibitions.

Warren-Alquist Act	The Warren-Alquist Act reiterates state water policy in terms of conserving water and using alternative sources of water supply: "It is further the policy of the state and the intent of the Legislature to promote all feasible means of energy and water conservation and all feasible uses of alternative energy and water supply sources."
Energy Commission Power Plant Water Use and Waste Water Discharge Policy	In the 2003 Integrated Energy Policy Report (IEPR), consistent with State Water Resources Control Board Policy 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating they will approve the use of fresh water for cooling purposes by power plants it licenses only where alternative water supply sources and alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound." The IEPR is the legislatively mandated guidance document for the California Energy Commission (CEC). As stated in the IEPR, the CEC has the "responsibility to apply state water policy to minimize the use of fresh water, promote alternative cooling technologies, and minimize or avoid degradation of the quality of the state's water resources." The IEPR specifically cites state policy that applies the use of water by power plants in Article X Section 2 of the State Constitution, SWRCB Resolution 75-58, and the Warren-Alquist Act. (CEC 2003).
State and Local Guidance	
Monterey Agreement	The Monterey Agreement was the result of extensive negotiations between State Water Project (SWP) contractors and the State to resolve disputes among them. Included in this agreement was the exchange of 45,000 acre-feet of SWP contractor entitlements for the Kern Water Bank (KWB) property and transfer of the bank to the Kern Water Bank Authority (KWBA). A final Program EIR was completed on the Monterey Agreement in 1995 that included possible impacts associated with the water use from the SWP and the KWB. An Initial Study and Addendum to the Monterey Agreement EIR (KWB Addendum EIR) was completed for the KWBA. Subsequent to this KWB Addendum EIR, mitigation measures were developed to address possible impacts associated with the construction, operation and maintenance of the KWB, as well as a water recharge and recovery, farming and conservation bank program proposed for approximately 20,000 acres in Kern County. Implementation of the KWB program and subsequent sale of groundwater to third parties were considered and addressed in these documents.
Wheeler Ridge-Maricopa Water Storage District Rules and Regulations for the Distribution of Water	*"Rules and Regulations for the Distribution of Water"* is the guidance document for water allocations from Wheeler Ridge-Maricopa Water Storage District, which is developed by the district. Rule 4p., Priority of Requests, specifies that water requests from pre-existing Agricultural Water Service Contracts receive priority for allocation of district water supplies over Industrial Water Service Contracts.
Kern Water Bank Authority MOU	The 1995 MOU between KWBA and its member agencies and surrounding entities specifies a set of rules and processes (i.e., minimum operating criteria, a comprehensive monitoring program and a dispute resolution process) to ensure that the KWB provides maximum benefits to its participants without adversely impacting water levels, water quality or resulting in land subsidence in the area.

SETTING

Calpine Corporation (Calpine) proposes to build an additional 160 MW electric generating unit within its existing Pastoria Energy Facility (PEF). The existing facility is located on a 31-acre site at the base of the Tehachapi Mountains on the Tejon Ranch in the southeast portion of the lower San Joaquin Valley in Kern County. The site is about 30 miles south of Bakersfield and about 6.5 miles east of the Interstate 5 Grapevine and

is approximately 0.85 mile north of the California Aqueduct and 1.3 miles north of the Edmonston Pumping Plant.

The existing PEF site has been zoned for industrial use. Land surrounding the project site is used for cattle grazing and an active gravel quarrying operation is located about 0.5 mile southeast of the site (CEC 2000c, page 228). No known urban development is presently planned within five miles of the plant site (PEFE 2005a, page 3-2).

The electrical unit would be the only new component constructed. No other new facilities would be needed because the existing facilities for PEF were designed with sufficient capacity to accommodate the addition of the proposed project if the energy demand warranted its construction. The water supply, water delivery system, and water processing systems for PEFE would be provided under a facilities-sharing agreement with the existing PEF.

No new ground disturbance beyond the boundaries of the existing PEF site is proposed for the PEFE project. The existing PEF facility occupies a 31-acre site, and the proposed PEFE would occupy approximately two acres entirely within the footprint of the existing plant. The applicant anticipates that the PEFE would use the existing linear facilities and roads and would require no additional offsite construction. The proposed project would also use the existing PEF administration and control, warehouse and shop, and water treatment buildings. Site preparation, laydown area, parking lots and offsite utilities that would be used for the PEFE were completed as part of the existing PEF construction. Accordingly, land disturbance should be limited to the two-acre area within the existing 31-acre PEF plant site that was reserved for the PEFE and a twelve-acre area within the 25-acre existing PEF laydown area that would be used during the construction of the PEFE (**SOIL & WATER RESOURCES Table 2**). (PEFE 2005a)

SOIL & WATER RESOURCES Table 2
Pastoria Energy Facility Expansion Construction and Laydown Area

Project Component	Temporary Construction Laydown Area	Project Construction and Operation
Land use for PEFE	12 acres	2 acres
Location	within existing PEF 25-acre laydown area	within footprint of PEF 31-acre plant site

Source: PEFE AFC, Volume 1, Section 1.2 Executive Summary, Project Overview.

The existing PEF stormwater control system was designed with sufficient capacity to accommodate the addition of the PEFE (PEFE 2005a, page 3-12). A system of above ground and underground drainage and collection structures has been constructed to collect stormwater on the existing PEF site. Ditches, culverts, catch basins and maintenance holes convey stormwater to an unlined stormwater detention pond located in the northwestern corner of the plant site. Stormwater that does not infiltrate into the soils or evaporate is discharged to the Pastoria Creek. When discharge to the creek is necessary, the project owner coordinates with the Tejon Ranch and would comply with applicable regulations (PEFE 2005a, page 3-3).

Two studies, Hydrology Analysis for the Pastoria Energy Facility (URS 2001a) and Flood Inundation Study for the Pastoria Energy Facility (URS 2001b), were developed to define flood limits and elevations for the existing PEF site. The information in these studies was used to modify the project design to protect PEF from flooding hazards associated with Pastoria Creek. Based on a 100-year flood-modeling analysis, the Flood Inundation Study reports an estimated maximum flood depth of two feet at the upstream end of the power block. The analysis estimated a maximum range of flow velocities of 0.8 to 4.9 feet/second across the plant site. These studies and the final design plan of the project were reviewed and approved by the Kern County Engineering and Survey Services Department. In addition, a Storm Water Pollution Prevention Plan (SWPPP), which was reviewed and approved by the Regional Water Quality Control Board (RWQCB), Kern County and the Energy Commission Compliance Project Manager (CPM), has been implemented for both construction and operation phases.

The existing PEF plant's process wastewater consists of wash water, stormwater from equipment drains and sanitary sewage wastewater. The proposed PEFE would cause a small increase in the volume of wash water and stormwater only. The proposed project would generate washwater and stormwater flows to the equipment drainage system. Wash water, as well as stormwater, which can contain oil and immiscible chemicals, would be collected from the equipment drains and would be processed in the existing oil-water separator. The separator consists of a basin with a clearwell and oil-absorbent pillows. Skimmed oil from the separator is sent off-site for disposal. Clear water is discharged to the existing stormwater detention pond.

The proposed PEFE would also use the existing PEF zero liquid discharge wastewater treatment system (ZLD) for processing wastewater generated in the production of demineralized water for the CTG inlet evaporative cooling. The ZLD includes a two-stage reverse osmosis process, a brine concentrator and a crystallizer. The ZLD system physically and chemically separates dissolved and suspended solids from the wastewater resulting in recoverable water and a salt cake byproduct. Recovered water from the ZLD system is recycled back into the plant's water system, maximizing the use of water in the plant's processes. The salt cake is disposed of at an approved landfill. The resulting salt cake is not expected to be hazardous (PEFE 2005a). For more discussion of the handling of the project's waste streams, please see the **Waste Management** section of this FSA.

SOILS

The proposed PEFE is located at the foot of the Tehachapi Mountains in the alluvial fan of Pastoria Creek. Prior to the construction of the existing project, the proposed PEFE site was relatively flat with a 4 percent slope running from southeast to northwest with an elevation change from 1,058 feet to 1,088 feet. The existing plant site was tiered to conform to the existing grades during construction, according to the approved site plan.

The site soils are coarse-grained fanglomerate deposited mostly by debris flows with higher percentage of gravel present beneath the sloping alluvium near the base of the foothills. This fanglomerate is composed of sand, gravel, cobble and boulders with little silt and almost no clay. Observed soils at the site, prior to the construction of the

existing plant, consist mostly of coarse-grained unconsolidated alluvium subject to erosion (PEF 1999, Section 5.3).

In November 1999, a subsurface exploration program was completed for the existing PEF site. The applicant reports that this investigation found gravelly sands consisting mainly of well graded coarse-grained sands with a gravel content of 30-60 percent. These deposits comprise the alluvial fan of Pastoria Creek (PEFE 2005a, Attachment C).

The predominate soil type of the proposed project location is Hesperia Sandy Loam, which is a very deep, well-drained sandy loam soil that is formed on the alluvial fans from alluvial material derived from granitic rock. The Hesparian Sandy Loam has moderately rapid permeability, slow runoff and low shrink-swell potential. Water and wind erosion susceptibility for this soil is low to moderate but increases with the removal of vegetation and excessive cattle grazing or irrigation.

SURFACE WATER BODIES

Surface water bodies located in the vicinity of the proposed power plant site are the California Aqueduct, Tejon, Tunis, El Paso and Pastoria Creeks.

Although not naturally occurring, the California Aqueduct which is owned and operated by the California Department of Water Resources (DWR) State Water Project (SWP) passes through the Tejon Ranch as it travels to DWR's Edmonston Pumping Plant approximately 1.5 miles southeast of the site. At its closest point to the plant, the Aqueduct passes 4,000 feet to the south.

The plant site is located in the 100-year floodplain of Pastoria Creek. Pastoria Creek is an ephemeral stream and drains a watershed of approximately 51 square miles out of the Tehachapi Mountains through Pastoria Canyon. It flows through a gap in the aqueduct and passes approximately 1,000 feet to the west of the plant site tending north (PEF 1999). At the aqueduct, peak flows of 3,600 cubic feet per second (cfs) have been recorded. Based on measurements taken between 1966 and 1978, peak annual flows of Pastoria Creek range from 12.4 to 200 cfs (PEFE 2005a, Attachment D, p.5.5-12, Table 5.5-1). For more discussion of flooding and surface hydrology, please see the **Geology and Paleontology** chapter of this FSA.

The applicant has submitted water quality data for samples from Pastoria Creek that establish the pre-project chemical characteristics of the creek. The creek was sampled three times at the existing culvert at the intersection of Pastoria Creek and the Edmonston Pumping Plant Road: twice during February 2003 and once during May 2005. The sampling results are included as part of Data Response 43 (PEFE 2005h).

GROUNDWATER

Information regarding the groundwater elevations in the vicinity of the project indicates that depth to groundwater is 150 to 180 feet below land surface. The applicant reports that groundwater in the project area generally occurs at depths below 180 feet below the surface. Cross sectional figures submitted by the applicant indicate that confined groundwater levels are approximately 150 feet below land surface one mile north east

of the project (PEFE 2005h, cross section D-D'). Staff provided additional information regarding groundwater conditions in the FSA of the PEF. Staff reported that the gravel pit located adjacent to the proposed site is approximately 100 feet deep and has not encountered any groundwater. However, shallow, possibly perched water may be present near the mouths of stream valleys such as Tejon, Tunis and El Paso Creeks. Fresh water aquifers extend down to 1,100 to 1,700 feet below surface and are hydraulically separated from oil bearing strata below at approximately 2,800 to 3,000 feet. (CEC 2000b)

Minimal natural groundwater recharge occurs in the area because regional rate of evaporation usually exceeds rainfall. Annual precipitation in this area is approximately 12 inches (measured at Lebec located 8 miles south of the plant site) with nearly 90 percent of the rainfall occurring between the months of November and April. The region has a long growing season and an average annual evaporation rate of 82 inches (PEFE 2005a, Attachment D, p. 5.5-3, Table 5.5-2).

Groundwater quality data submitted by the applicant establishes the pre-project chemical characteristics of groundwater in the vicinity. Groundwater was sampled twice, in December 2002 and in January 2003. The monitoring well (MW1, State Well No. T10NR18W06Q01S) sampled is located approximately 1 mile northeast of the existing PEF site. The well penetrates to the base of the Santa Margarita Formation to a depth of about 900 feet. The sampling results are part of Data Response 42 (PEFE 2005h).

PROJECT WATER DEMAND

The primary water demand for PEFE would be limited to water for evaporative cooling of the CTG inlet air, cooling of the CTG auxiliary heat exchangers, and utility water for wash down. The proposed project does not include a steam-generation cycle. Water used in the cooling towers would undergo 10 cycles of concentration and the use of a zero liquid discharge waste water processing system would allow for water recovery and re-use. There would be no increase in the demand for potable water because PEFE would require no increase in the operational workforce. (PEFE 2005a, Section 3)

During operations, PEFE would require 55 acre-feet per year of water (**SOIL & WATER RESOURCES Table 3**). The PEFE cooling towers would require an average of 16 gallons per minute (gpm) and the CTG inlet fogging would require an average of 17 gpm. The applicant estimates that water demand for PEFE and the existing PEF combined would average of 4,292 acre feet annually. (PEFE 2005a)

SOIL & WATER RESOURCES Table 3
Estimated Average Annual Water Demand for the Existing Pastoria Energy Facility and the Proposed Pastoria Energy Facility Expansion

	Existing PEF (99-AFC-7) 750 MW	Proposed PEFE (05-AFC-01) 160 MW	Combined Demand for PEF and PEFE
gallons per minute	2,627	34	2,661
acre-feet per year	4,237	55	4,292

Source: PEFE 2005a, Volume 1, Table 5.5-1 Calculation Sheet.

PEFE water demands for construction would be less than water demands for operation. During construction, water would be needed for dust control and potable uses for construction personnel (PEFE 2000e). Construction water would be supplied either by the construction contractors from off-site or by the existing PEF project's raw water supply. Potable water used during construction by the construction workers would be provided by the construction contractors from off-site. (PEFE 2005i) The applicant anticipates that the total construction water usage would be approximately 1.53 million gallons (4.7 acre-feet) during the 12-month construction period (PEFE 2000e).

The proposed water supply is raw water, which is treated prior to use in the cooling towers. The fogging system of the CTG evaporative coolers requires water with low concentrations of dissolved solids and no chlorine. The water requires clarification and chemical treatment to avoid possible scaling, corrosion and biofouling of the system. The existing PEF system has sufficient capacity to process the additional water needed for PEFE without significant modification. The average volume of demineralized water would increase from about 121 gpm for the existing PEF to about 138 gpm for PEF and PEFE combined (PEFE 2005a, pages 3-11 and 3-12).

The chemicals that would be added to the water during the water treatment process include sulfuric acid, organic phosphates and sodium hypochlorite (PEFE 2005a, Appendix A, page 3.4-14). For a complete list of treatment chemicals and their anticipated volumes need for use at PEF, please see Table 3.4.10-1 of the AFC (PEFE 2005a, Appendix A, page 3.4-43). For a discussion of the handling, management and disposal of hazardous materials to be used at the PEFE, please see the **Hazardous Materials Management** chapter of this FSA).

PROJECT WATER SOURCES

The PEFE proposes to obtain water under a facilities-sharing agreement with the PEF through Calpine's existing water contracts for PEF (PSA Workshop, October 2005). PEF's primary water supply is provided through a long-term industrial water service agreement with the Wheeler Ridge-Maricopa Water Storage District (WRMWSD) (WRMWSD-PEF 2000). PEF's backup water supply is provided through a contract with the Kern Water Bank Authority (PEF-KWBA 2001). The maximum water supply specified in each contract is 5,000 acre-feet per year, which is sufficient to supply both the existing PEF project and the proposed PEFE project. Although both contracts contain provisions to increase the amount of the annual delivery, the applicant has stated that "the PEF and PEFE project combined will require less than 5,000 acre-feet of water per year at full plant load" (PEFE 2005a).

PEF's primary water supply is provided by WRMWSD from excess water sold through the district's pool that is directly delivered or exchanged for SWP surface water (PEFE 2005a). The WRMWSD is entitled to 197,088 acre-feet a year from the SWP under its contract with the Kern County Water Agency and the California Department of Water Resources, which will remain in force through 2035. Over the last ten years (1995-2004), WRMWSD has delivered an annual average of 163,000 acre-feet of water to its customers. The SWP water is provided to the WRMWSD through the Kern County Water Agency (KCWA). During those years with the driest hydrologic conditions,

WRMWSD expects to receive at least 60,000 acre-feet a year of water from the SWP. In addition to the SWP contract allocation, the WRMWSD is also entitled to flood flows or interruptible water that is usually available January to March. (WRMWSD 2005b)

WRMWSD provides water to PEF from the district's "pool," which is the unused portion of the district's SWP annual allocation. The purchase of water through the WRMWSD pool is governed by established rules. Pool water is excess water, which has been made available for sale by SWP water right holders within the WRMSWD. (CEC 2000c) The rules that allow the use and sale of pool water are described in the WRMWSD Rules and Regulations for the Distribution of Water (WRMWSD 2005b).

In the case that insufficient water is available from the WRMWSD pool, the applicant proposes to obtain backup water for PEFE from the Kern Water Bank (KWB) through Calpine's existing PEF contract with the KWBA (PEFE 2005a). The use of banked water from the KWB by PEF is consistent with the designated beneficial uses for KWB. The KWBA administers the KWB under established and approved rules and includes an active monitoring program (CEC 2000c, page 191).

The contract for the backup supply was originally obtained by Azurix-Pastoria, Inc. on behalf of PEF with the KWBA for water banked by the Westside Mutual Water Company (Westside) in the KWB (Azurix-KWBA, 2001). In March 2001, PEF submitted a petition to the Energy Commission to amend **SOIL&WATER-5**, which addresses the project water supply. The petition requested a change in the description of the PEF backup water supply that indicated banked water would be obtained directly from the KWBA, rather than from the Westside water reserves. The Energy Commission reviewed the modification and adopted the amendment in March 2001 (CEC 2001). The backup water supply contract was subsequently transferred to the Pastoria Energy Facility, LLC, owned by Calpine, and the Kern Water Bank Authority on August 20, 2001 (PEF-KWBA, 2001).

SOIL & WATER RESOURCES Table 4 summarizes chemical composition of the SWP water that will be used at PEFE, based on analyses of SWP water conducted between July 1998 and June 1999.

SOIL & WATER RESOURCES Table 4
California Aqueduct Water Quality

Constituents	Mean Concentration (Range)
Cations (mg/l)	
Calcium	18 (12-27)
Magnesium	9 (5-13)
Sodium	34 (19-52)
Iron	<0.005
Manganese	<0.005
Hardness	84 (52-121)
Anions (mg/l)	
Sulfate	33 (20-53)
Chloride	39 (20-62)
Fluoride	< 0.1
Bromide	0.13 (0.06-0.19)
Nitrate + Nitrite	0.55 (0.44-0.79)
Phosphorus (total)	0.13 (0.04-0.44)
Alkalinity	71 (41-109)
Metals (mg/l)	
Arsenic	0.002 (0.001-0.003)
Boron	0.2 (0.1-0.2)
Chromium	<0.005 (<0.005-0.007)
Copper	0.002 (0.002-0.005)
Lead	< 0.001
Selenium	<0.001
Zinc	< 0.005
Other	
TOC	3.7 mg/l (2.5-9.0 mg/l)
Turbidity	34 NTU* (3-140 NTU)
TDS	189 mg/l (114-249 mg/l)
Sp. Conductance	339 μS/cm** (205-436 μS/cm)
THM Formation Potential	372 μg/l (303-485 μg/l)

Source: PEFE 2005a, Table 3.4.8-2 Pastoria Energy Facility Expansion, California Aqueduct Water Analysis.
Note: Samples taken by CDWR at Tehachapi Afterbay (Check 41) on the California Aqueduct.
* Nephelometric Turbidity Unit
** MicroSiemens per centimeter

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This project was analyzed to determine if it complies with LORS and meets the standards found in relevant documents such as California Environmental Quality Act (CEQA) Guidelines. The threshold of significance is based upon the ability of the project

to be built and operated without violating erosion, sedimentation, flood, surface or groundwater quality, water use (supply) or wastewater discharge standards.

The Federal and State LORS and State and Local Policies presented in **SOIL & WATER Table 1** were used to determine the threshold of significance for this proceeding and project consistency with state water policy. For those impacts that exceed the published standards or do not conform to the established practices, mitigation will be proposed by staff to reduce or eliminate the impact.

Responsible or co-lead (CEQA/National Environmental Policy Act - NEPA) agencies (or those with an advisory or trustee capacity), particularly those with discretionary approval over various aspects of the project will be consulted as required. For example, the local Regional Water Quality Control Board has extensive expertise and LORS responsibility for soil and water issues under their jurisdiction. Where it is necessary for the project to conform to legally enforceable LORS or other regulatory requirements in which the purpose is to define an allowable level of impact or activity, such requirements may be used if they are determined by staff to be adequate as thresholds of significance.

The application of Best Management Practices (BMPs) will be required to manage stormwater related drainage, erosion, and sedimentation issues during for construction and operational of PEFE. The need to develop, implement, monitor, maintain, and modify or change as appropriate construction and operational plans, procedures, and BMPs to prevent the occurrence of significant impacts will be considered in a manner similar to a threshold of significance, i.e., if not for effective BMPs, significant impacts would likely occur. Requiring appropriate and effective BMPs is analogous to using performance criteria rather than prescriptive measures to ensure impacts remain less than significant. However, staff recommended and proposed conditions of certification specifically prescribing BMPs and procedures where necessary.

The methods used to analyze impacts and determine thresholds of significance for any impact are, in many cases, particular to the situation and reflect a site-specific approach for each project component and each impact. While all projects will likely have impacts, the goal is to limit any impacts to an insignificant or acceptable level, or to avoid them, if possible. Such a determination will rely on science, technology, expert opinion, and best professional judgment to determine what the level of change to the baseline or pre-existing conditions should be allowed.

The available scientific, technical, or other appropriate literature was considered in the analysis and determination of significant impacts. Project-specific studies or assessments were reviewed, as necessary, in order to establish thresholds, adequately estimate the project's impacts, and develop appropriate mitigation.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Erosion Control and Stormwater Management

Erosion control and stormwater management must be addressed during both the construction and operational phases of the project to avoid potential adverse impacts to water quality and soil resources.

Accelerated wind and water induced erosion may result from earth moving activities associated with construction of the proposed project. Alteration of the soil structure leaves soil particles vulnerable to detachment and removal by wind or water. Construction and maintenance-related erosion is of particular concern in areas of sandy soils. Increasing the amount of impervious surfaces would increase the amount of runoff and peak discharges from a development. Rainfall can greatly enhance the potential for water erosion. The AFC indicates that the soils that would be affected by the proposed project consist of Hesperia Sandy Loam, which has a moderate susceptibility to erosion (PEFE 2005a). However, because the protective cover of vegetation has been removed and the structure of the surface soil has been altered, these soils can be highly vulnerable to erosion.

Land disturbance should be limited to the two-acre area within the existing 31-acre PEF plant site that was reserved for the PEFE. Site preparation for the PEFE would include excavation, storage, and disposal of various materials. No additional grading would be required because PEFE site was graded and tiered during the construction of the PEF. A stormwater drainage system and a stormwater pond has also already been constructed for the existing PEF site, including the area in which the PEFE would be constructed; therefore, potential increase in sediment loading caused by water erosion to creeks and natural drainages would be avoided (PEFE 2005a, Section 3). However, increased wind erosion caused by project construction could cause an increase in sediment loading of creeks and drainages.

Construction activities would consist primarily of foundation construction, erection of major equipment and structures, installation of piping, electrical systems, control systems, and start-up/testing. The only surface material noted by the applicant that would be used at the site is concrete.

Finally, during project operation, an increase in the amount of impervious surfaces can increase runoff, leading to the erosion of unprotected surfaces. The project site, when completed, would be covered with impervious surfaces.

Staff recommends the adoption of three conditions that address mitigation measures designed to reduce any soil erosion and stormwater impacts to less than significant levels.

Condition of certification **SOIL&WATER-1** requires the project owner to comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity, including the development and implementation of a Storm Water Pollution Prevention Plan for Construction, which is administered by the RWQCB.

Condition of certification **SOIL&WATER-2** requires the project owner to obtain CPM approval for a site-specific final Drainage, Erosion and Sedimentation Control Plan (DESCP) that addresses all project elements and ensures protection of water and soil resources for the construction and operational phases of the project. The DESCP was developed by staff following the certification of the existing PEF to standardize the

elements of the Energy Commission-administered requirements for the protection of water quality and soil resources.

Condition of certification **SOIL&WATER-3** requires the project owner to comply with all requirements of the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity, including the development and implementation of an operational Storm Water Pollution Prevention Plan, which is administered by the RWQCB.

With the development and implementation of an effective SWPPP for Construction (**SOIL&WATER-1**), a DESCP (**SOIL&WATER-2**), and an effective SWPPP for Operations (**SOIL&WATER-3**), staff concludes that the PEFE would mitigate the potential adverse impacts caused by erosion or stormwater discharge during construction and operation of the project.

Water Use

The PEFE proposes to obtain water under a facilities-sharing agreement with the PEF through Calpine's existing primary and backup water supply contracts for PEF. This information was provided by the applicant at the PSA Workshop on October 4, 2005. These contracts provide 5,000 acre-feet per year, which is sufficient to meet the water-use demand of both the existing PEF project and the proposed PEFE project (PEFE 2005a). To ensure that PEFE has obtained a reliable water supply, staff recommends the adoption of **SOIL&WATER-6**. This condition requires the project owner to verify the execution of the proposed facility-sharing agreement, which includes water supply, water delivery system and water processing systems, with PEF prior to the start of construction of the PEFE.

Staff evaluated the potential impact of PEFE water use on existing water users. PEFE proposes to purchase water primarily from the WRMWSD and proposes to purchase backup water from the KWBA.

WRMWSD allocates water according to the district's guidance document, *Rules and Regulations for the Distribution of Water*, which was established and is maintained by the district's elected Board of Directors. Rule 4p of this guidance document specifies that water requests from pre-existing agricultural water service contracts receive priority for allocation of district water supplies over industrial water service contracts. PEF currently holds WRMWSD's only industrial water service contract. The WRMWSD-PEF contract specifically identifies this guidance document and states that water will be delivered to the PEF according to the district's Rules and Regulations (WRMWSD-PEF 2000). Based on these WRMWSD water-distribution provisions, staff concludes that PEFE water use would not cause an adverse impact to the district pre-existing agricultural water users.

During drier years, SWP contractors, including WRMWSD, do not receive their full water allotments. In the case that WRMWSD has insufficient water to supply the project, KWBA would provide backup water to PEFE from the KWB, under the existing PEF-KWBA water supply contract (PEF-KWBA 2001). The KWBA has established a program to operate, monitor and maintain the KWB and to resolve water bank use problems between its members (CEC 2000c, page 192). Based on the authority of the KWBA

water-management program, staff concludes that use of water from the KWB by PEFE would not cause unmitigated adverse impacts to KWB members.

The Monterey Agreement is the guidance document adopted by the California Department of Water Resources (DWR) and its contractors that addresses environmental impacts for water provided by the SWP, including the KWB. In 1995, a final Program Environmental Impact Report (EIR) was completed on the Monterey Agreement that included possible impacts associated with the KWB. An Initial Study and Addendum to the Monterey Agreement EIR (KWB Addendum EIR) was completed for the KWBA. Subsequent to this KWB Addendum EIR, mitigation measures were developed to address possible impacts associated with the construction, operation and maintenance of the KWB. The DWR is now in the process of preparing an updated EIR for the Monterey Amendment to the SWP contracts (including the Kern Water Bank) to satisfy California Environmental Quality Act requirements as part of a proposed settlement agreement in *Planning and Conservation League v. Department of Water Resources*. Staff assumes that any environmental impacts cause by the project's proposed water use would be addressed and fully mitigated through the provisions of the Monterey Agreement and any subsequently adopted amendments.

Staff also assessed whether PEFE's proposed water use would be consistent with state water conservation policy. Conservation of the state's fresh inland water supplies to the extent feasible is mandated under the provisions of state water-use policy, which includes Section 2 under Article X of the State Constitution, the Warren-Alquist Act, the SWRCB Policy 75-58, and the 2003 Integrated Energy Policy Report. During the proceeding for PEF, the commission concluded that the use of fresh inland water was the only feasible and economical method of cooling for the PEF project. The applicant proposes the same method of cooling for PEFE. Although the project would use fresh inland water, the proposed project would implement water-conserving processes. The applicant has proposed to conserve water use by the PEFE through the reuse of cooling tower water, which would undergo 10 cycles of concentration, and the use of a zero liquid discharge waste water processing system. As a result of these water conservation processes, PEFE would use a maximum of 55 acre-feet of water per year. PEFE and the existing PEF combined would require an estimated 4,292 acre-feet of water per year. The applicant has stated that "the PEF and PEFE project combined will require less than 5,000 acre-feet of water per year at full plant load" (PEFE 2005a). Staff concludes that, if PEFE is constructed and operated as proposed, which would enable the project to limit its water use to 55 acre-feet per year or less, PEFE's water use would be consistent with state water conservation policy.

In its comments on the PSA, the applicant specifically objects to the requirements for water-use limits, water metering and water-use reporting that were proposed by staff in **SOIL&WATER-4** of the PSA. These requirements were not included in the water-use condition for PEF (PEF **SOIL&WATER-5** amended in 2001). The applicant reasons that the PEFE requires only a small increase in water consumption relative to the current PEF water consumption rate and would not cause a significant adverse impact on water resources. Based on these considerations, the applicant's position is that the staff's proposed requirements for water metering, limits or reporting are not warranted. Instead, the applicant recommends that the wording of PEF's water-use condition be adopted for the PEFE, with one exception. The applicant recommends that the wording

of **SOIL&WATER-4** be modified so that the annual water-use summary required in the verification should report the combined water use of PEF and PEFE rather than the water use of PEFE alone. (PEFE 2005i)

Staff considered the applicant's request regarding the water-use condition for PEFE. In response to the applicant's comments, staff has modified the requirements in condition **SOIL&WATER-4** for water-use limits, water metering and water-use reporting. However, these requirements have not been entirely eliminated from staff's recommendation, as requested by the applicant. Staff's key concern is that, without these provisions, there would be no limit to the amount of water that the project could use and no means by which to ensure that the proposed water-conservation processes were implemented.

Accordingly, staff disagrees with applicant's request to remove all water-use limits from **SOIL&WATER-4**. However, staff has modified **SOIL&WATER-4** to apply to water use by PEFE alone. The applicant proposes to obtain water through the existing PEF water contracts, which contain no actual limit on the amount of water that can be purchased. Although the primary and backup water contracts identify 5,000 acre-feet as the "maximum amount of water" that can be purchased annually, both of Calpine's existing water supply contracts actually contain provisions for increases above 5,000 acre-feet per year (WRMWSD-PEF 2000 and Azurix-KWBA 2001). Therefore, without the staff's recommended conditional requirement, there would be no limitation on the amount of water the project could use.

However, in response to the applicant's concerns regarding this requirement, staff has added a provision by which the water-use limit may be modified if unforeseen conditions warrant a change. Staff's proposed water-use limitations for **SOIL&WATER-4** would permit the project owner to increase water use for PEFE above 55 acre-feet per year if the owner obtains prior approval from the CPM. Approval would be granted by the CPM if the project owner can demonstrate that the requested increase is necessary and is not caused by wasteful practices or malfunctions in the water processing systems.

In addition, the terms of the condition that required the project to shut down if water were not available from WRMWSD or KWBA has been deleted from **SOIL&WATER-4**. Staff determined that this provision was not necessary because, if a change in water supply represented a substantial change in the project, the CPM would direct the project owner to submit a petition to be evaluated through the amendment process.

With regards to water metering, staff received water metering information from the WRMWSD and has reviewed the existing PEF water contracts with WRMWSD and KWBA. Both water contracts state that the supplying agency is responsible for metering the total amount of water delivered. However, the supplying agencies have no means by which to monitor the amount of water used by PEFE. Therefore, staff recommends that **SOIL&WATER-4** include the requirement that the project owner shall meter water use for the PEFE**.**

Staff agrees with the applicant that water-use reporting should be included in the Verification but need not be included in the condition, **SOIL&WATER-4.** Water-use reporting is necessary to ensure compliance with the approved water-use limit.

However, as long as water-use monitoring is required in the condition, reporting should only be required as verification. The units of measurement for the annual water-use summary, which are specified in the Verification, are preferred, but not required.

Staff concludes that project water use would cause no significance unmitigated adverse impacts to water resources and would comply with state water conservation policy with the adoption and implementation of the wording of proposed **SOIL&WATER-4**.

On-site Water Treatment

The PEFE proposes to use the existing PEF water treatment system for demineralization of the water used for cooling. No increase in treatment of the potable/domestic water for the operations staff is needed by the proposed project because the operation of PEFE would require no increase in the existing PEF work force. There would be no increase in the potable water demand during the construction of the PEFE because the construction contractor would provide potable water for construction workers. Owing to the very low volume of water required for the PEFE, the proposed project would require no new storage tanks and would have a negligible effect on the water treatment systems. Thus staff concludes that no adverse impact to water resources would be caused by the proposed on-site water treatment for PEFE.

Cooling System Alternatives

Given that the PEFE would use the auxiliary equipment and facilities that have been already constructed for the existing PEF and would only increase the throughput of water, staff assumes the analysis in the previous proceeding has adequately covered the issue of alternatives.

Given the expected costs and benefits associated with the application of dry cooling to the PEFE and consideration of the lack of any potentially significant adverse impacts associated with PEFE's proposed use of SWP and KWB resources, staff concludes that dry cooling for PEFE would be feasible, but not required, and that the water supply as proposed by the applicant would be acceptable under SWRCB Policy 75-58.

WASTEWATER DISCHARGE

The proposed PEFE would use the existing PEF wastewater treatment systems for the processing of all wastewater that would be generated from the proposed PEFE project. The applicant plans to employ the wastewater management procedures that have been established with the existing PEF to the PEFE to ensure that liquid and solid wastes are properly collected, treated, if necessary, and discharged from the facility. The applicant indicates in water balance diagrams of the existing PEF and the proposed project that the PEFE would have a negligible impact on the existing PEF wastewater and discharge systems and states that no significant modification of these systems would be required. Staff concurs with the applicant's impacts assessment.

Process Wastewater and Site Drainage

The proposed PEFE would cause a small increase in the volume of wash water and stormwater. The proposed PEFE would generate less than 0.01 gpm of wash water, which would be processed with the existing PEF system. All of the stormflow that occurs

within the PEFE installation would be collected in equipment drains and would be routed to the separator. The separator would remove oil from the wash water and stormwater and route the clear water to the stormwater detention pond. The existing separator and pond were designed in compliance with the applicable federal, state and local regulations and standards and have been sized to accommodate the PEFE project.

The PEFE would require no increase in the operational workforce, so the proposed project would cause no increase in volume of sanitary sewage wastewater. The applicant expects that wastewater during construction would be limited to construction staff sanitary sewage waste in portable chemical toilets. The applicant estimates that approximately 150 gallons of wastewater would be generated per day, and a total of 30,000 gallons of wastewater would be generated during the 12-month construction phase. These portable toilets would be serviced regularly by the vendor. Staff considers this impact minimal, with no adverse impacts (PEFE 2000e).

With the development and implementation of an effective SWPPP for Construction and for Operations (**SOIL&WATER-1** and **SOIL&WATER-3**) and a DESCP (**SOIL&WATER-2**), staff concludes that the potential adverse impacts caused by the processing of wastewater and the management of site drainage during construction and operation of the project would be mitigated.

Zero Liquid Discharge Treatment and Recovery System

The applicant reports that the zero liquid discharge system (ZLD) has sufficient capacity to accommodate the volume of additional wastewater that would be generated by the PEFE project without significant modification. The applicant provides water balances for the existing PEF and the PEFE combined with the PEF. The volume of water generated by the PEFE and processed by the ZLD is very small. The ZLD return water would increase from 57.16 gpm to 57.56 gpm. A comparison of the water balance shows that the average crystallizer cake generated from the existing PEF is 1.15 gpm and the discharge rate for the PEFE would be less than 0.01 gpm (PEFE 2005a, Figures 3.4-4 and 3.4-5).

A current condition of certification for the existing PEF requires the accounting of the amount of salt cake generated from the ZLD (PEF **SOIL&WATER-6**). Since wastewater from PEFE would be processed by the existing ZLD system, staff has included a condition of certification that would require PEFE to report the amount of ZLD salt cake generated by PEFE and PEF combined (**SOIL&WATER-5**). Staff does not anticipate that PEFE's use of the existing ZLD system would cause any adverse impact to water resources.

Spill Control and Prevention

The applicant proposes to adopt the Hazardous Materials Management Program (HMMP) and to modify the existing PEF SWPPP or develop a new SWPPP for the proposed PEFE. The HMMP includes procedures for spill control and prevention for hazardous materials that will be stored and used on the site (see the **Hazardous Materials Management** section of this FSA for more information). The HMMP specifies that bulk chemicals are stored in an aboveground storage tank and all other chemicals are stored in their original shipping containers. Chemical storage and transfer areas

include secondary containment structures that are sized to hold the volume of the largest tank or container plus an allowance for rainfall. The SWPPP includes procedures that will ensure the protection of stormwater from pollution from hazardous chemicals used on site.

Staff concludes that the adoption and implementation of the existing PEF HMMP and modification of the existing PEF SWPPP or the development of a new SWPPP, would meet all of the laws, ordinance, regulations and standards applicable to the proposed PEFE and avoid the occurrence of any adverse impacts related to the use and storage of hazardous materials by the project.

CUMULATIVE IMPACTS

Temporary and permanent disturbances associated with construction of the proposed project would cause accelerated wind and water induced erosion. However, staff has concluded that the implementation of the proposed mitigation measures would ensure that the proposed project would not contribute to cumulative erosion and sedimentation impacts.

The impacts of the water supply for the existing PEF project and for other existing and anticipated projects were previously evaluated for the PEF Application. The water supply for the proposed PEFE project will be provided under the existing WRMWSD contract with PEF. In the Commission's Final Decision for PEF, the Commission determined that the proposed water use for the PEF would not result in any significant adverse cumulative impacts to water resources (CEC 2005c, page 192).

Wastewater streams would be minimized by the use of the ZLD system. No wastewater-related cumulative impacts are expected.

Staff concludes that the PEFE would not cause any adverse cumulative impacts.

COMPLIANCE WITH LORS

CLEAN WATER ACT

Staff has determined that the PEFE will satisfy the requirements of the General National Pollutant Discharge Elimination System (NPDES) Permit with the adoption of condition of certification **SOIL&WATER-1**, which requires the development and implementation of a SWPPP for construction and condition of certification **SOIL&WATER-3**, which require the development and implementation of a SWPPP for operations.

CALIFORNIA CONSTITUTION, ARTICLE X, SECTION 2

The State Constitution requires that the water resources of the state be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use or unreasonable method of use of water is prohibited. The proposed project will conserve water through the reuse of cooling tower water, which will undergo 10 cycles of concentration, and the use of a zero liquid discharge waste water processing system. If the project is constructed and operated as proposed, fresh water use would be minimized. Therefore, staff has determined that, with the adoption of Condition of

Certification **SOIL&WATER-4**, which limits the use of water, the PEFE will be consistent with terms of the California Constitution, Article X, Section 2.

PORTER-COLOGNE WATER QUALITY CONTROL ACT

Since the project will have no industrial wastewater discharge as a result of the use of the ZLD system, no further discussion is required. For a discussion of the project's compliance with solid waste requirements, please see the **Waste Management** section of this FSA.

SWRCB POLICY 75-58

SWRCB Policy 75-58 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. Given that the proposed PEFE water supply would be provided under an existing contract and that the project can use an existing water delivery system and water treatment system, staff concludes that it would be economically unsound to use an alternative water source.

The SWRCB policy also calls for water availability studies for projects to be constructed in the Central Valley to consider potential impacts on Delta outflow and water quality objectives. Since PEFE proposes to use water supplied under the PEF contract with WRMWSD, which is derived from excess water supplies from existing, approved SWP entitlement or from KWB resources, additional studies are not required.

SWRCB Policy 75-58 states that "…studies associated with power plants should include an analysis of the cost and water use associated with the use of alternative cooling facilities employing dry, or wet/dry modes of operation." Since the proposed project would use existing cooling towers and associated water supply, which were analyzed in PEF, staff concludes that an analysis of alternative cooling technologies is not necessary.

Finally, the proposed project will conserve water through the reuse of cooling tower water and the use of a zero liquid discharge waste water processing system. If the project is constructed and operated as proposed, the use of fresh inland water by the PEFE would be minimized.

Based on this review and with the adoption of condition of certification **SOIL&WATER-4**, staff has determined that the water supply, as proposed by the applicant, would be consistent with SWRCB 75-58.

WARREN-ALQUIST ACT

The Warren-Alquist Act promotes all feasible means of water conservation. The proposed project will conserve water through the reuse of cooling tower water and the use of a zero liquid discharge waste water processing system. As a result of the water conservation processes proposed by the applicant, the use of fresh inland water by the PEFE would be minimized. Therefore, staff determined that, with the adoption of condition of certification **SOIL&WATER-4**, which limits the use of water by PEFE, the PEFE would be consistent with terms of the Warren-Alquist Act.

MONTEREY AGREEMENT AND THE KERN WATER BANK AUTHORITY

The PEFE backup water supply would be obtained from the KWB through the existing PEF contract with the KWBA. The rules for sales from the KWB to third parties are specified in the Monterey Agreement and administered by the KCWA. The authority to resolve conflicts between KWB water contractors is assigned to the KWBA through the 1995 MOU between KWBA and its member agencies. As a contractor with the KWBA, PEFE would be subject to these rules and regulations. Based on this review, staff has determined that the water supply, as proposed by the applicant, would be consistent with the rules of both the Monterey Agreement and KCWA.

WHEELER RIDGE-MARICOPA WATER STORAGE DISTRICT

Water sales and deliveries from the WRMWSD are governed by the district's Rules and Regulations for the Distribution of Water. The proposed water contract for PEFE with WRMWSD specifically requires compliance with these rules and regulations. Therefore, staff concludes that the water supply, as proposed by the applicant, would be consistent with the rules of WRMWSD.

CALIFORNIA ENERGY COMMISSION INTEGRATED ENERGY POLICY REPORT: POWER PLANT WATER USE AND WASTE WATER DISCHARGE POLICY

The California Energy Commission, under legislative mandate specified in the 2003 Integrated Energy Policy Report (IEPR), has the "responsibility to apply state water policy to minimize the use of fresh water, promote alternative cooling technologies, and minimize or avoid degradation of the quality of the state's water resources."

With the adoption of the condition of certification **SOIL&WATER-4**, staff has determined that the proposed PEFE would be consistent with terms of the 2003 IEPR.

NOTEWORTHY PUBLIC BENEFITS

Neither the applicant nor staff identified any noteworthy benefits to soil or water resources that would be provided by this project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The Wheeler Ridge-Maricopa Water Storage District (WRMWSD) provided comments on the Preliminary Staff Assessment (PSA) on October 19, 2005 in the form of edits in strike-out and insertions to the text of the Soil & Water Resources testimony. The WRMWSD also commented on Condition of Certification **Soil&Water-4**. These comments and suggested edits address information that directly related to the district's operations, policies, contracts or data. (WRMWSD 2005b)

Comment 1: WRMWSD states, "It is also felt that separate metering for the Expansion described in 'Proposed Condition of Certification – **SOIL&WATER-4**' is unnecessary as all water deliveries to the Pastoria Facility are metered by the District."

Response 1: Staff concurs with WRMWSD that the project can rely on WRMWSD (and KWBA) water-use measurements for its annual Water Use Summary to the CEC compliance manager. Staff has modified **SOIL&WATER-4** accordingly.

Comment 2 (edit to PSA Section Setting/Groundwater): WRMWSD provided corrections and clarification to staff's interpretation of depth of groundwater, aquifer confinement and well depth from WRMWSD cross sections provided by applicant.

Response 2: Staff concurs with WRMWSD. Accordingly, staff has revised information in the Setting/Groundwater Section.

Comment 3 (edit to PSA Section Setting/Project Water Sources): WRMWSD provided corrections to information on its policies, operations, its SWP contract, and its contract to provide water to PEF. WRMWSD also clarified that KWBA, not the district, has contracted to provide PEF with a backup water supply.

Response 3: Staff concurs with WRMWSD. Accordingly, staff has revised information in the Setting/Project Water Sources Section.

Comment 4 (edit to PSA Section Assessment of Impacts and Discussion of Mitigation/Water Supply): WRMWSD provided corrections to references to the supplier for project backup water.

Response 4: Staff concurs with WRMWSD. Accordingly, staff has revised information in the Assessment of Impacts and Discussion of Mitigation/Water Supply Section.

Comment 5 (edit to PSA Section Compliance with LORS/Monterey Agreement and the Kern Water Bank Authority): WRMWSD provided corrections to references to the supplier for project backup water.

Response 5: Staff concurs with WRMWSD. Accordingly, staff has revised information in the Compliance with LORS/Monterey Agreement and the Kern Water Bank Authority Section.

CONCLUSIONS

Based on its final assessment of the proposed Pastoria Energy Facility Expansion project, staff makes the following findings:

- Potential adverse impacts caused by erosion and stormwater flows during construction and operation would be mitigated with the development and implementation of an effective Storm Water Pollution Prevention Plan and a Drainage, Erosion and Sedimentation Control Plan;

- A reliable water supply will be ensured through a facilities-sharing agreement with the existing Pastoria Energy Facility. The existing PEF project was designed with sufficient capacity to share its water supply, water delivery system, and water processing systems with the proposed Pastoria Energy Facility Expansion.
- The proposed project will cause no unmitigated significant adverse impacts to the water resource supply;
- Water use for the project will be consistent with state water conservation policy with the adoption of the recommended conditions of certification;
- Potential adverse impacts from the processing of wastewater or the use and storage of hazardous materials would be avoided with the adoption and implementation of an effective Hazardous Materials Management Program and Storm Water Pollution Prevention Plan; and
- The proposed project would comply with all applicable federal, state and local laws, ordinances, regulations and standards with the adoption of the recommended conditions of certification.

Based on these findings, staff concludes that PEFE would not result in any unmitigated project-specific or cumulative significant adverse impacts to soil or water resources and would comply with all applicable LORS if all of the recommended conditions of certification are adopted by the Commission and implemented by the applicant.

PROPOSED CONDITIONS OF CERTIFICATION

SOIL&WATER-1: The project owner shall comply with the requirements of the General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Storm Water Associated with Construction Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan for the construction of the entire Pastoria Energy Facility Expansion (PEFE) project (Construction SWPPP).

Verification: The project owner shall submit copies to the CPM of all correspondence between the project owner and the Regional Water Quality Control Board (RWQCB) regarding the General NPDES permit for the Discharge of Storm Water Associated with Construction Activities within 10 days of its receipt (when the project owner receives correspondence from the RWQCB) or within 10 days of its mailing (when the project owner sends correspondence to the RWQCB). This information shall include copies of the Notice of Intent sent to the State Water Resources Control Board, and the Notice of Termination for the project.

SOIL&WATER-2: Prior to site mobilization, the project owner shall obtain CPM approval for a site-specific Drainage, Erosion and Sedimentation Control Plan (DESCP) that ensures protection of water quality and soil resources of the project site and all linear facilities for both the construction and operations phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, meet

local requirements, and identify all monitoring and maintenance activities. The DESCP shall contain the following elements:

- ***Vicinity Map*** – A map shall be provided indicating the location of all project elements with depictions of all significant geographic features to include watercourses, washes, irrigation and drainage canals, and sensitive areas.
- ***Site Delineation*** – The PEFE site and all project elements shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.
- ***Watercourses and Critical Areas*** – The DESCP shall show the location of all nearby watercourses including washes, irrigation and drainage canals, and drainage ditches. Indicate the proximity of those features to the PEFE construction site.
- ***Drainage*** – The DESCP shall provide a topographic site map showing all existing, interim and proposed drainage systems; drainage area boundaries and water shed sizes in acres; the hydraulic analysis to support the selection of Best Management Practices (BMPs) to divert off-site drainage around or through the site and laydown areas. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off-site for a minimum distance of 100 feet in flat terrain.
- ***Clearing and Grading*** – The plan shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections or other means. The locations of any disposal areas, fills, or other special features will also be shown. Illustrate existing and proposed topography tying in proposed contours with existing topography. The DESCP shall include a statement of the quantities of material excavated or filled for each element of the PEFE (for example, project site, transmission corridors, and pipeline corridors), whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported.
- ***Project Schedule*** – The DESCP shall identify on the topographic site map the location of the site specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each project element for each phase of construction.
- ***Best Management Practices*** – The DESCP shall show the location, timing, and maintenance schedule of all erosion and sediment control BMPs to be used prior to initial grading, during project element excavation and construction, final grading/stabilization, and post-construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule should include

post-construction maintenance of treatment control BMPs applied to disturbed areas following construction.

- ***Erosion Control Drawings*** -- The erosion control drawings and narrative must be designed and sealed by a professional engineer/erosion control specialist.

Verification: No later than 90 days prior to start of site mobilization, the project owner shall submit a copy of the plan to Kern County for review and comment, and a copy to the CPM no later than 60 days prior to the start of site mobilization for review and approval. The CPM shall consider comments received from Kern County. During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage, erosion and sediment control measures and the results of monitoring and maintenance activities. Once operational, the project owner shall provide in the annual compliance report information on the results of monitoring and maintenance activities. The plan shall be consistent with the grading and drainage plan as required by condition of certification **CIVIL-1** and may incorporate by reference any SWPPP developed in conjunction with any NPDES permit.

SOIL&WATER-3: 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 and implement a Storm Water Pollution Prevention Plan for the operation of the Pastoria Energy Facility Expansion (PEFE) site (Operation SWPPP).

Verification: The project owner shall submit copies to the CPM of the operational SWPPP for the entire PEFE site prior to commercial operation and all correspondence between the project owner and the RWQCB about the General NPDES permit for Discharge of Storm Water Associated with Industrial Activity within 10 days of its receipt (when the project owner receives correspondence from the RWQCB) or within 10 days of its mailing (when the project owner sends correspondence to the RWQCB). This information shall include a copy of the Notice of Intent sent to the State Water Resources Control Board and the Notice of Termination. A letter from the RWQCB indicating no General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity is required will satisfy this condition.

SOIL&WATER-4: Water used for project operation shall be State Water Project (SWP) water obtained from the Wheeler Ridge-Maricopa Water Storage District's (WRMWSD) excess water sold through the district's pool or shall be banked water obtained from the Kern Water Bank (KWB) that is directly delivered or exchanged for SWP surface water.

Water use for Pastoria Energy Facility Expansion (PEFE) shall not exceed the annual water-use limit of 55 acre-feet without prior approval by the CPM.

Prior to the use of any water by the PEFE, the project owner shall install and maintain a metering device as part of the water supply system to monitor and record the volume of water supplied to the PEFE. The metering device shall be operational for the life of the project. The project owner shall monitor and record the total water used by the PEFE on a monthly basis.

Verification: At least 60 days prior to use of any water source at the PEFE, the project owner shall submit to the CPM evidence that a metering device has been installed on the water supply pipeline serving the project and is operational. The project owner shall provide a report on the servicing, testing and calibration of the metering devices in the annual compliance report.

The project owner, in the annual compliance report, shall provide a water-accounting summary for PEFE that states the source and quantity of water used on a monthly basis in units of gallons per minute and on an annual basis in units of acre-feet. The annual compliance report shall also indicate whether the water was obtained through the WRMWSD's district pool, direct pumping of KWB banked water for delivery to PEFE, or the result of surface water exchanges.

If the amount of water that is to be used by PEFE will exceed 55 acre-feet per year during any single annual reporting period, the project owner shall provide a written request and explanation for the anticipated water-use increase to the CPM sixty (60) days prior to the date when the water-use limit is expected to be exceeded. If the project owner can demonstrate that the requested increase is necessary and is not caused by wasteful practices or malfunctions in the water processing systems, the CPM shall approve an up to one-year increase in the water-use limit for the period requested.

SOIL&WATER-5: Following the commencement of project operation, the project owner shall maintain a log of the volume of residual cake solid waste produced by the zero liquid discharge system. The project owner shall coordinate reporting with PEF.

Verification: Within 60 days following the commencement of project operations, the project owner shall submit to the CPM a report on the volume of residual cake solids generated by the Pastoria Energy Facility Expansion and the Pastoria Energy Facility combined. The tally sheets from the trucks disposing the cake will be used to confirm this information and attached to the CPM report. A status report on the volumes of residual cake solids generated and the landfills used for disposal, shall also be included in the annual compliance report submitted to the CPM.

SOIL&WATER-6: The project owner shall document the Pastoria Energy Facility-Pastoria Energy Facility Expansion (PEF-PEFE) facilities-sharing agreement, which includes water supply, water delivery system, and water processing systems, with the CPM prior to the start of commercial operation.

Verification: The project owner shall provide a copy of the PEF-PEFE facilities-sharing agreement, which includes the WRMWSD and KWBA water supply contracts, to the CPM at least thirty (30) days prior to the start of construction of the PEFE. The CPM shall receive copies of any amendments to the facilities-sharing agreement as part of the annual compliance reporting.

REFERENCES

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CEC (California Energy Commission) 2000c - Commission Decision Application for Certification of the Pastoria Power Plant Project, Docket No 99-AFC-7, California Energy Commission, Sacramento, California, December 2000.

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PEF-KWBA (Pastoria Energy Facility, LLC-Kern Water Bank Authority) 2001 – Second Amendment to Option and Water Services Agreement, August 20, 2001.

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PEFE (Pastoria Energy Facility Expansion) 2005e – Supplement to the Application for Certification. Submitted to the California Energy Commission on June 13, 2005.

PEFE (Pastoria Energy Facility Expansion) 2005h – Data Responses Package 1. Submitted to the California Energy Commission on July 25, 2005.

PEFE (Pastoria Energy Facility Expansion) 2005j – Data Responses Package 2. Submitted to the California Energy Commission on August 11, 2005.

PEFE (Pastoria Energy Facility Expansion) 2005i – Applicant's Response to the Preliminary Staff Assessment. Submitted to the California Energy Commission on October 21, 2005.

URS (URS Corporation) 2001a - Hydrology Analysis for the Pastoria Energy Facility, prepared for Calpine, July 12, 2001.

URS (URS Corporation) 2001b - Flood Inundation Study for the Pastoria Energy Facility, prepared for Calpine, September 6, 2001.

WRMWSD (Wheeler Ridge-Maricopa Water Storage District) 2005a – Letter to Natasha Nelson, California Energy Commission, Facilities Siting Division. “Subject: Pastoria Energy Facility Expansion (05-AFC-1)”. September 19, 2005

WRMWSD (Wheeler Ridge-Maricopa Water Storage District) 2005b – Pastoria Energy Facility Expansion (05-AFC-1) – Comments on Preliminary Staff Assessment, Submitted to the California Energy Commission on October 20, 2005.

WRMWSD-PEF (Wheeler Ridge-Maricopa Water Storage District-Pastoria Energy Facility, LLC) 2000 – Contract Between Wheeler Ridge-Maricopa Water Storage District-Pastoria Energy Facility, LLC for Industrial Water Service, November 22, 2000.

TRAFFIC AND TRANSPORTATION

Testimony of David Flores

SUMMARY OF CONCLUSIONS

With implementation of the recommended conditions of certification, the Pastoria Energy Facility Expansion would be consistent with the Circulation Element of the County of Kern General Plan and all other laws, ordinances, regulations, and standards. The project would not have a significant impact on the local and regional road/highway network. During the construction phase, local roadway and highway demand resulting from the daily movement of workers and materials would not increase beyond significance thresholds established by Kern County and the California Department of Transportation. During the operational phase, increased roadway demand resulting from the daily movement of workers and materials would be minimal.

INTRODUCTION

The Traffic and Transportation section of the Final Staff Assessment (FSA) addresses the extent to which the Pastoria Energy Facility Expansion (PEFE) may impact the transportation system in the local area. This analysis includes the identification of: the roads and routings which are proposed to be used for construction and operation; potential traffic-related problems associated with the use of those routes; the anticipated encroachment upon public rights-of-way during the construction of the proposed project and associated facilities; the frequency of trips and probable routes associated with the delivery of hazardous materials; and the possible effect of project operations on local airport flight traffic.

The influx of large numbers of construction workers can, over the course of the construction phase, increase roadway congestion and also affect traffic flow. In addition, the transportation of large pieces of equipment and facility components can impact roadway congestion and safety. The relevant laws, ordinances, regulations, and standards (LORS) are listed below, followed by discussion of the potential impacts related to traffic operations and safety hazards resulting from the construction and operation of the project.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Traffic and Transportation Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 49, Code of Federal Regulations (CFR), Sections 171-177; Sections 350-399 & Appendices A-G; Sections 350-399, and Appendices A-G, Federal Motor Carrier Safety Regulations.	Governs the transportation and definition of hazardous materials, the types of materials defined as hazardous; criteria and regulations for the safe transportation of hazardous materials.
State	
California Street and Highways Code (S&HC), Sections 660, 670, 1450, 1460 et seq., 1470, and 1480.	Regulates right-of-way encroachment and granting of permits for encroachments on state and county roads.
S & HC Sections 13369, 15275,2500-2505 and 15278, 25160 ET SEQ; 31303-31309, 31600-31620; 32000-32053, 32100-32109;3400-3421;34500,34501,34510-11 S & HC Sec. 117 & 660 &72, California Vehicle Code (CVC) Sec. 35780, ET SEQ; 35550-35559	Addresses licensing of drivers required for operation of particular types of vehicles, including those transporting hazardous, explosive, flammable, and/or combustible material; such as ammonia; safety requirements; hazardous material transport routes.
California State Planning Law, Government Code Section 65302 a&b	Requires permits for transport of oversized loads on county roads and state highways; requirements for encroachment permits on state highway; CALTRANS specific weight/load limitations for all state and local roadways. Requires cities and counties to adopt a general plan to guide its development, including a mandatory circulation element. All construction in public right-of-way needs to comply with the “Manual of Traffic Controls for Construction and Maintenance of Work Zones” (Caltrans, 1996).
California Street and Highways Code (S&HC), Sections 660, 670, 1450, 1460 et seq.,1470-1480	Regulates right-of-way encroachment and granting of permits for encroachments on state and county roads.
Sections 13369, 15275, and 15278	Addresses the licensing of drivers and classifications of licenses required for operation of particular types of vehicles. In addition, certificates permitting the operation of vehicles transporting hazardous materials are addressed.
Sections 25160 et seq.	Describes requirements for the safe transport of hazardous materials.
Sections 2500-2505	Authorizes the issuance of licenses by the Commissioner of the California Highway Patrol (CHP) to transport hazardous materials, including explosives.
California Vehicle Code (CVC) Sections 31303-31309	Regulates the highway transportation of hazardous materials, routes used, and restrictions. CVC Section 31303 requires hazardous materials to be transported on state or interstate highways that offer the shortest overall transit time possible.

Sections 31600-31620	Regulates the transportation of explosive materials.
Sections 32000-32053	Regulates the licensing of carriers of hazardous materials and include noticing requirements.
Sections 32100-32109	Establishes special requirements for the transportation of substances presenting inhalation hazards and poisonous gases. CVC Section 32105 requires shippers of inhalation or explosive materials to contact the CHP and apply for a Hazardous Material Transportation License. Upon receiving this license, the shipper will obtain a handbook specifying approved routes.
Sections 34000-34121	Establishes special requirements for transporting flammable and combustible liquids over public roads and highways.
Sections 34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5, and 34510-11	Regulates the safe operation of vehicles, including those used to transport hazardous materials.
S&HC, Sections 117 and 660-72, and CVC, Sections 35780 et seq.,	Require permits to transport oversized loads on county roads. California S&HC Sections 117 and 660 to 711 requires permits for any construction, maintenance, or repair involving encroachment on state highway rights-of-way. CVC Section 35780 requires approval for a permit to transport oversized or excessive loads over state highways.
California Department of Transportation (Caltrans)	Weight and load limitations for state highways apply to all state and local roadways. The weight and load limitations are specified in the CVC Sections 35550 to 35559.
County of Kern	
General Plan Circulation Element	The project, and construction and operation traffic routes connecting to highways, are located entirely within the boundaries of the County of Kern. The Kern Circulation Element of the General Plan is required by State law. • Kern County General Plan sets up local goals and guidance policies about building and transportation improvements. It introduces planning tools essential for achieving the local transportation goals and policies (County of Kern, 1972).

SETTING

SITE AND VICINITY DESCRIPTION

The power plant expansion would be located on a two acre site on a 31-acre parcel of developed land owned by the Tejon Ranch in southern Kern County. Access to the power plant site from any direction would be from Interstate 5 at the Grapevine Exit. Traffic would then take the Edmonston Pumping Plant Road for approximately 6.5 miles before exiting on the existing Pastoria Energy Facility access road. The power plant road is approximately 0.85 miles long and is asphalt paved. The plant administration and control building parking lot and the road encircling the power block are also asphalt paved. Other roads on the plant site are gravel or crushed stone.

Edmonston Pumping Plant Road is a private 2-lane road for which the California Department of Water Resources (DWR) holds an easement (DWR 2000a).

The highway and state routes that may be potentially affected by the proposed Pastoria Project include:

- Interstate 5 from Mt. Pinos Road to Highway 46;
- Highway 33 from Highway 166 to Highway 119;
- Highway 43, from Interstate 5 to Highway 46;
- Highway 58 from Highway 223 to Highway 202;
- Highway 99 from Interstate 5 to Highway 155;
- Highway 166, from Highway 33 (near Taft) to Highway 99; and
- Highway 223 from Interstate 5 to Highway 58.

Although traffic for the facility would impact these roads to a certain extent, all project-related traffic eventually must use Interstate 5 and then exit onto the Edmonston Pumping Plant Road, (see **Traffic and Transportation Figure 1**).

Railroads

The Burlington-Northern & Santa Fe (BN&SF) and Union Pacific Railroads provide rail service to the Bakersfield area. There are four rail line corridors in the project region (see **Traffic and Transportation Figure 1**): the BN&SF main line; the Union Pacific main line; the Arvin Branch line owned by San Joaquin Railroad Company; and the BN&SF Sunset Pacific Branch line currently operated by Union Pacific.

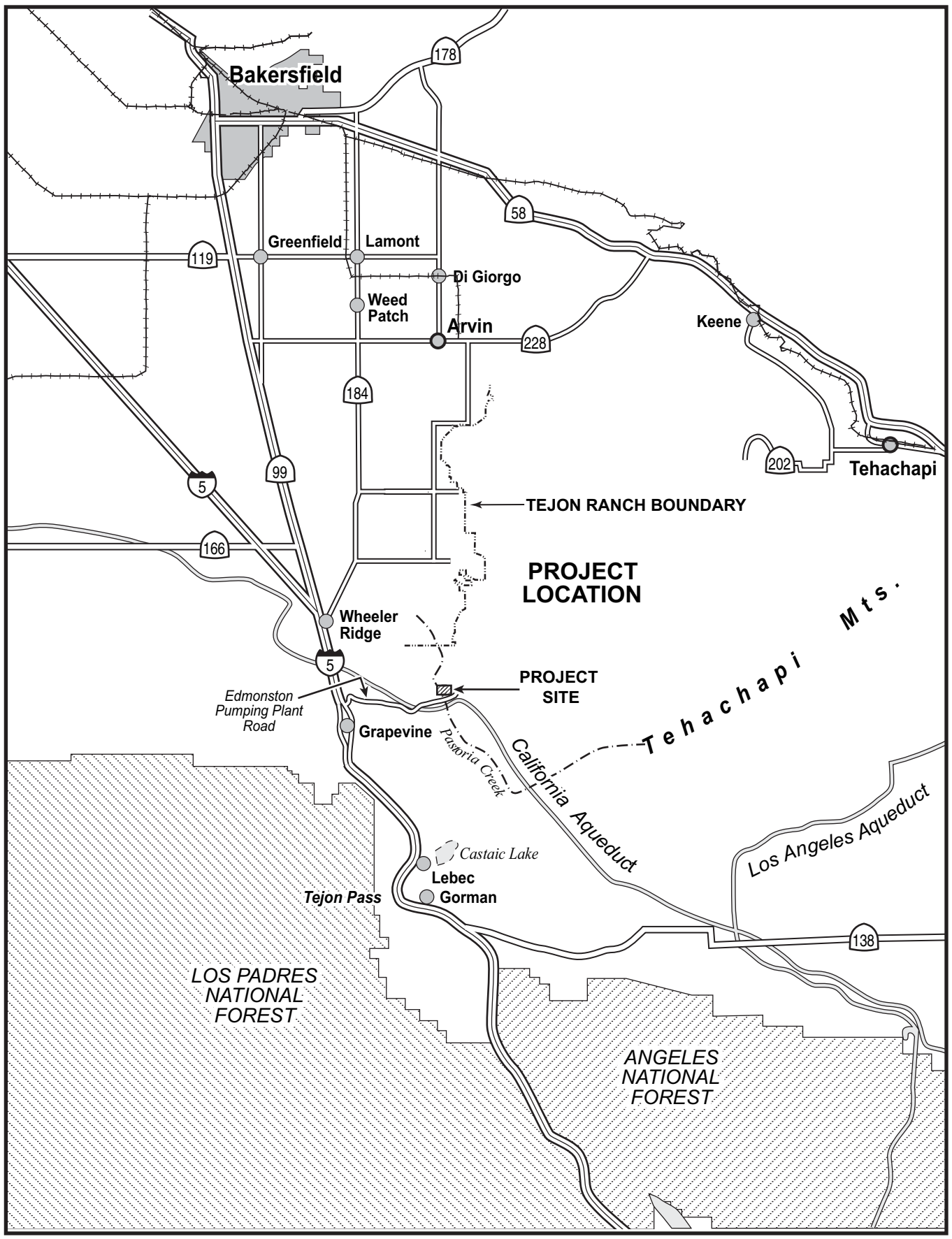
Airports

Kern County has several airports located throughout the County. The closest airports to the PEFE are the Bakersfield Municipal Airport located in the City of Bakersfield, and two small airports located in the community of Tehachapi: Kern County Airport No. 4 and Fantasy Haven Airport. All three of these airports are located approximately 30 miles from the proposed project site.

The PEFE will have an exhaust stack that will be 131 feet tall. The existing PEF stacks are currently 150 feet tall. The Federal Aviation Authority (FAA) has established that any construction or alteration more than 200 feet in height above the ground level at a site could create an obstruction in navigable air space.

Because the exhaust stack will be below the FAA height requirement of 200 feet, PEFE will not be required to file the FAA Form 7460-1, Notice of Proposed Construction or Alteration application.

TRAFFIC AND TRANSPORTATION - FIGURE 1
Pastoria Energy Facility Expansion Project - Regional Transportation Setting



CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2005
SOURCE: AFC Figure 1.2-1

Traffic and Transportation Table 2 gives the Level of Service (LOS) definitions used by PEFE to analyze traffic impacts by peak hour intersection capacity and operations. Intersection level of service is identified with letters of designation, from LOS A for least congested to LOS F for most congested.

TRAFFIC AND TRANSPORTATION Table 2
Level of Service (LOS) Criteria for Signalized Intersections

Level of Service	Average Vehicle /Capacity Ratio	Traffic Flow Characteristics
A	0.0 – 0.59	Free flow; insignificant delays
B	0.6 – 0.69	Stable operation; minimal delays
C	0.7 – 0.79	Stable operation; acceptable delays
D	0.8 – 0.89	Approaching unstable; queues develop rapidly but no excessive delays
E	> 0.9 – 0.99	Unstable operation; significant delays
F	N/A	Forced flow; jammed conditions

Current Highway Characteristics

Data about the existing traffic and characteristics for highways that the project could affect are depicted in **TRAFFIC AND TRANSPORTATION Table 3, Current Traffic Characteristics of Highways in the Project Area**. **Table 3** identifies the annual average daily traffic, annual average peak-hour traffic, annual average daily truck traffic, percent of truck traffic, highway capacity, and LOS for the highways and roads in the vicinity of the project. The traffic estimates are presented for various mileposts or junctions on highways that the project may impact.

Traffic volume counts for 1998 were used for **Table 3** as the 2003 traffic volume count data provided by Caltrans did not identify the current traffic roadway locations (mile posts) in the project area. With the extensive highway and interstate network in California, updated traffic data in this area may not be available for some time. The LOS capacities in the area of the project were considered stable traffic flow patterns in 1998; therefore it can be assumed that the current LOS characteristics have not changed dramatically.

All access to the facility would occur from Interstate 5 via the Edmonston Pumping Plant Road. Since the Edmonston Pumping Plant Road is a private road, traffic data is not available from Kern County Road Department. An estimate of the existing traffic characteristics for the Edmonston Pumping Plant Road was based on field observation of traffic conditions by PEFE's contractor URS, and is depicted in **TRAFFIC AND TRANPORTATION Table 4, Existing Traffic Characteristics of Local Roadways in the Project Area.**

TRAFFIC AND TRANSPORTATION Table 3
Current Traffic Characteristics of Highways in the Project Area (1998)

Highway / Mile post	Location	Annual Average Daily Traffic(1)	Annual Average Peak Hour Traffic(1)	Annual Average Daily Truck Traffic(2)	Percent Truck Traffic (3)	Hwy Cap. (vphpd) (4)	LOS (6)
Interstate 5							
0	Los Angeles-Kern County Line	52,000	7,000	17,820	34	5,520	D
10.15	Grapevine	52,000	6,200	13,770	26	7,360	C
15.86	Jct. Rte 99 North	25,550	2,700	5,250	21	3,560	A
19.61	Jct. Rte 166	23,900	2,550	4,997	21	3,520	C
33.49	Jct. Rte 223	23,200	2,420	4,830	21	3,560	C
38.78	Jct. Rte 119	23,600	2,500	4,914	21	3,560	C
41.19	Jct. Rte 43	23,200	2,450	4,914	21	3,600	C
52.15	Jct. Rte 58	24,100	2,600	7,378	31	3,600	C
65.61	Lerdo Hwy	24,300	2,550	7.953	32	3,600	C
73.02	Jct. Rte 46	23,700	4,200	7,260	31	3,560	C
Highway 33							
11.56	Jct Rte 166-East	4,400	450	1104	26	1,920	C
12.91	County Road P263	6,200	610	NA	NA	1,780	D
17.89	Jct Rte 119-East	8,600	840	2,236	26	1,860	D
Highway 43							
1.9	Jct Rte 5	3,550	320	856	26	1,760	B
8.11	Jct Rte 58-East Rosedale Hwy	3,300	300	795	24	1,690	B
9.16	Jct Rte 58-West McKittrick Hwy	9,600	940	853	9	1,640	A
16.55	East Lerdo Hwy	7,600	670	684	9	1,915	A
25.13	Jct Rte 46-West Famoso Hwy	7,200	650	864	12	1,760	C
25.19	Jct Rte 46-East	3,100	280	498	16	1,760	B
36.67	Garces Hwy (Jct Rte 155)	1,600	150	NA	NA	1,760	A
Highway 58							
75.62	Jct Rte 223-West	18,500	1,750	6,301	34	2,040	B
77.25	Bear Mt. Ranch	18,200	1,800	5,249	28	2,400	B
90.72	Jct Rte 202	19,500	2,650	7,718	37	3,320	B
Highway 99							B
0.75	Jct Rte 5	26,500	1,950	6,240	23	5,280	B
2.73	Jct Rte 166	28,000	3,050	6,600	24	5,280	B
13.41	Jct Rte 223	32,500	3050	6,840	21	5,280	B
17.50	Jct Rte 119	42,000	3,650	8,250	20	5,520	B
23.51	Jct Rte 58-East	108,000	11,000	20,520	19	7,280	C
25.65	Jct Rte 58 West-Jct 178 West	114,000	11,600	20,520	18	7,170	D
27.05	Jct Rte 204	73,000	5,800	27,170	37	5,340	C
29.88	Jct Rte 65	59,000	6,100	17,110	29	5,340	C
44.31	Jct 46	39,000	3,500	11,165	29	5,340	B
55.52	Jct Rte 155	36,000	2,700	9,940	27	3,600	B
Highway 166							
0.01	Jct Rte 33 North	36,000	410	862	23	1,260	C
22.80	Jct Rte 5 Freeway	2,200	400	609	29	1,820	B
24.62	Jct Rte 99	2,600	450	725	29	1,820	B

Highway / Mile post	Location	Annual Average Daily Traffic(1)	Annual Average Peak Hour Traffic(1)	Annual Average Daily Truck Traffic(2)	Percent Truck Traffic (3)	Hwy Cap. (vphpd) (4)	LOS (6)
Highway 223							
10.54	Jct Rte 5	680	70	124	18	1,600	A
10.94	Jct Rte 99	4,250	350	1,178	27	1,760	B
21.17	Derby Street	2,100	180	NA	NA	1,690	B
31.92	Jct Rte 58	1,150	100	290	25	1,090	B

Source: PEFE AFC, Table 5.11-1.

(1) Source: 1998 Traffic Volumes on the California State Highway System (Caltrans, 1999).
(2) Source: 1997 Truck Volumes on the California State Highway System (Caltrans, 1998).
(3) Percentages calculated using 1996 average daily truck traffic as a percentage of 1998 annual average daily traffic (AADT).
(4) Vphpd = vehicles per hour per direction, Source: Oputa 1999.
(5) Data not available from Caltrans, extrapolated from data on adjacent highway segments.
(6) Source: Oputa, 1999.

TRAFFIC AND TRANSPORTATION Table 4
Existing Traffic Characteristics of Local Roadways In the Project Area

Roadway	Location	Classification	Annual Average Daily Traffic (V)1	Projected Peak Vehicle Trips/Day	Projected Average Vehicle Trips/Day	Peak Increase (%)
Edmonston Pumping Plant Road	South of Plant Site	2-Lane local road	720	450	292	62

Source: PEFE AFC, Table 5.11-3.

(1) Edmonston Pumping Plant Road is a private road. Traffic count data is not available from the Kern County Roads Department (Hayslett, 1999). Based on a visual observation of traffic conducted 9/14/99, it is assumed that ADT for Edmonston Pumping Plant Road is 720 trips per day (average of 60 trips per hour x12 daytime hours).

Based on field observations of traffic conducted on September 14, 1999, the average daily traffic on Edmonston Pumping Plant Road was estimated to be 720 trips per day. The annual peak hour traffic was based on ten percent of the AADT. During the peak construction period for the PEFE, traffic on Edmonston Pumping Plant Road east of Interstate 5 is expected to increase by 450-vehicle trips/day, resulting in traffic increase of 62 percent. On average, over the entire 12-month construction period, construction related traffic generated by the workforce along Edmonston Pumping Plant Road east of Interstate 5 would result in an additional 292 vehicle trips per day, an increase of 40 percent over conditions prior to construction of the existing PEFE.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project may have a significant effect on traffic and transportation if the project will:

- 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; or
- conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

DIRECT/INDIRECT IMPACTS AND MITIGATION

Construction Impacts and Mitigation

Construction of the generating plant facility would occur over an estimated 12-month period after certification. The preferred commuting route that workers would take to the project site would depend on the community from which they commute. No matter what community the individual commutes from, all persons going to the site would eventually merge onto I-5 and exit at the Edmonston Pumping Plant Road to get to the PEFE. The commuting patterns indicated in **Table 3** would result in increased traffic on local highways as a result of the construction workforce driving to the project site. The applicant assumes that the major portion of the anticipated workforce, 83 percent, would commute to the work site from Bakersfield, Delano, and McFarland by way of Highway 99 and Interstate 5, which is consistent with the original Pastoria Energy Facility construction workforce commuting habits.

The project is estimated to require a total construction workforce of 146 workers per month on average, assuming a single shift and a 40-hour five-day workweek. During the peak construction period (in the 6th to the 9th month after the Notice to Proceed) an estimated 227 workers would be required at the plant site. Of the 227 workers, 155 are assumed to be local workers coming from the Bakersfield area and the remaining workers are expected to make up the non-local workforce commuting from Tehachapi and Southern California (PEFE 2005, AFC, page 5.11-3). **TRAFFIC AND TRANSPORTATION Table 5, Plant Construction Workforce Distribution** indicates

the expected origin and distribution of the workforce that would be commuting to the plant site during construction.

TRAFFIC AND TRANSPORTATION Table 5
Plant Construction Workforce Distribution

Origin of Vehicle Travel to PEF Site	Distribution of Local Workforce	Ave. Local Workforce	Peak Local Workforce	Ave. Non-Local Workforce	Peak Non-Local Workforce	Total Ave. Workforce (1)	Total Peak Workforce (2)
Bakersfield	69%	90	145	10	10	100	155
Delano	11%	14	23	2	2	16	25
Wasco	6%	8	13	1	1	10	14
Arvin	4%	5	8	1	1	6	9
McFarland	3%	4	6	0	0	4	7
Shafter	3%	4	6	0	0	4	7
Taft / Maricopa	2%	3	4	0	0	3	5
Other Areas Including Tehachapi & SoCal	2%	3	4	0	0	3	5
TOTAL	100%	131	209	14	14	146	227

Source: PEFE AFC, Table 5.11-1a.
(1) Sum of average local workforce and average non-local workforce.
(2) Sum of total peak local workforce and total peak non-local workforce.

TRAFFIC AND TRANSPORTATION Table 5 has been used to develop **TRAFFIC AND TRANSPORTATION Table 6, Plant Construction Trip Generation and Workforce Distribution** that indicates the estimated vehicle trips to be generated by the construction workforce. Based on a worst-case scenario, it is assumed that each of the 146 workers during the non-peak months would drive a separate vehicle to the project site, making two trips per day (one round trip from home to the site and back). This would result in approximately 292 total vehicle trips per day and at the peak construction period approximately 454 vehicle trips per day.

TRAFFIC AND TRANSPORTATION Table 6
Plant Construction Workforce Trip Generation and Workforce Distribution

Origin of Trip, Distribution To/From Pastoria Energy Facility Project Generating Plant Site	Average Workforce (1)	Average Vehicle Trips (2) per day	Peak Workforce	Peak Vehicle Trips per day
Bakersfield	100	202	155	310
Delano	16	32	25	50
Wasco	10	17	14	28
Arvin	6	11	9	18
McFarland	4	9	7	14
Shaffer	4	9	7	14
Taft and Maricopa	3	6	5	10
Other Areas Including Tehachapi and Southern California	3	6	5	10
Total	146	292	227	454

Source: PEFE AFC, Table 5.11-1b.
(1) From Table 4, Total Average Workforce.
(2) From Table 4, Total Peak Workforce.

Using the travel pattern assumption described in **Table 5** the anticipated increase in traffic on local roads due to plant construction can be estimated. **TRAFFIC AND TRANSPORTATION Table 7, Distribution of Plant Construction-Related Traffic on Highways** presents the expected increase in traffic on local roads and highways due to plant construction. During the peak construction period (assumed to be in the 7th month following the Notice to Proceed), construction related travel would affect Highways 99 and 223 the most. The resulting traffic increases on these roads during the peak months would be from 0.7 to 2.6 percent. Over the duration of construction project, the related increase in traffic for these roads would average 0.4 to one percent. Project related traffic is not expected to reduce the existing LOS on any of the highways in the project area, and therefore no significant impacts are anticipated to local highways. Staff's proposed Condition of Certification **TRANS-1** would require the applicant to comply with county and Caltrans vehicle size and weight requirements.

The Edmonston Pumping Plant Road providing access to the project site, would be the most affected by the construction workforce traffic commuting to and from the project site. The California Department of Water Resources (DWR) holds an easement for this road from the Tejon Ranch Corporation. PEFE has entered into an encroachment agreement with DWR for Edmonston Pumping Plant Road. Staff's proposed Condition of Certification **TRANS-2** would require the applicant to secure necessary encroachment permits from local and state agencies for encroachment rights within their right-of-way.

During the peak construction period, eastbound traffic on the Edmonston Pumping Plant Road from Interstate 5 would increase by 454-vehicle trips/day. This would result in a traffic increase of over 100 percent. Based on the average workforce traffic projections along the Edmonston Pumping Plant Road, construction traffic going east from Interstate 5 would be expected to increase by 292 vehicle trips per day. This represents an increase of 40 percent over the present traffic volume. The traffic increase would be most noticeable during the morning and evening peak commute hours, (between 6:00 a.m. and 7:00 a.m. in the morning and 4:00 p.m. and 5:00 p.m. in the evening). This increase in volume would be evident for most of the 12-month construction period.

The existing average daily traffic on the private road is estimated to be 60 trips per hour, which gives the road a LOS rating of A. Because of the low traffic level on this road, it can accommodate a large increase in construction traffic without significantly affecting its LOS rating. Therefore the peak-period traffic increases estimated for the Edmonston Pumping Plant Road would be greatly below its capacity and should not result in a significant adverse traffic impact. To reduce any potential problems that could be associated with the peak traffic conditions, development of a traffic control plan and an implementation program have been proposed (see proposed Condition of Certification **TRANS-4**).

Truck Traffic

Construction of the generating plant would require the use and installation of heavy equipment and associated systems and structures. Heavy equipment would be used throughout the construction period, including trenching and earthmoving equipment, forklifts, cranes, cement mixers and drilling equipment. In addition to deliveries of heavy

equipment, construction materials such as concrete, wire, pipe, cable, fuels and reinforcing steel would be delivered to the site by truck. Deliveries would also include hazardous materials to be used during construction, such as gasoline, diesel fuel, oil, lubricants, solvents, adhesives, paint materials, and welding gases (i.e. acetylene and oxygen). General construction and operation deliveries would occur between 7:00 AM and 5:00 PM on weekdays. However, there may be infrequent deliveries that may occur outside of these hours. It is expected that a majority of the equipment and materials would be transported from either Bakersfield or Los Angeles.

The applicant estimates that 269 truck deliveries (PEFE 2005) would be made to the plant site over the course of the 12-month construction period (on average approximately 20 truck deliveries per month).

The applicant has also assumed that about 70 percent of the truck deliveries would originate in Bakersfield and drivers would use Highway 99 south to Interstate 5, south on I-5 to the Grapevine exit and then take Edmonston Pumping Plant Road to the PEFE plant site. Truck deliveries from the Los Angeles area are assumed to be 20 percent. The drivers for these deliveries would use I-5 north exiting at the Grapevine exit and take the Edmonston Pumping Plant Road to the PEFE plant site. The remaining truck deliveries are expected to originate north of Bakersfield. These deliveries would travel via highway 43 south to I-5, I-5 to the Grapevine exit, and then take Edmonston Pumping Plant Road to the plant site.

TRAFFIC AND TRANSPORTATION Table 7
Distribution of Plant Construction-Related Traffic on Highways

Highway/Roadway	Existing AADT(1)	Existing LOS(1)	Projected Peak Vehicle Trips/Day	Peak Increase (%)	Projected Peak LOS (12)	Average Vehicle Trips/Day	Projected Average Increase (%)
Interstate 5							
@ jct. Hwy 99 North	67,000	A	450 (1)	0.7%	A	292	0.04%
@ jct Hwy 166	29,500	C	9 (4)	0.0%	C	6	0.0%
@ jct Hwy 223	29,500	C	41 (3)	0.1%	C	26	0.1%
@ jct Hwy 119	29,500	C	41 (3)	0.1%	C	26	0.01%
@ jct Hwy 43	30,500	C	41 (3)	0.1%	C	26	0.01%
@ jct Hwy 58	33,000	C	41 (3)	0.1%	C	26	0.01%
Highway 33							
@ jct Hwy 166-East	4,300	C	9 (4)	0.2%	C	6	0.1%
@ jct Hwy 119-East	8,500	D	9 (4)	0.1%	D	6	0.1%
Highway 43							
@ jct Hwy 5	4,100	B	41 (3)	0.1%	B	26	0.6%
@ jct Hwy 58-East Rosedale Hwy	9,600	B	41 (3)	0.4%	B	26	0.3%
@ jct Hwy 58-East McKittrick Hwy	2,650	A	41 (3)	1.5%	A	26	1.0%
@ jct Hwy 43-West	7,200	C	27 (5)	0.4%	C	17	0.2%
@ jct Hwy 43-East	3,600	B	27 (5)	0.8%	B	17	0.5%
Highway 58							
@ jct Hwy 223-West	20,600	B	9 (6)	0.0%	B	6	0.0%
@ jct Hwy 202	20,900	B	9 (6)	0.0%	B	6	0.0%
Highway 99							
@ jct Hwy 5	35,500	B	450 (2)	1.3%	B	292	0.8%
@ jct Hwy 166	36,000	B	383 (7)	1.1%	B	243	0.7%
@ jct Hwy 223	38,000	B	383 (8)	1.0%	B	242	0.6%
@ jct Hwy 119	41,500	B	374 (8)	0.9%	B	237	0.2%
@ jct Hwy 58-East Rosedale Hwy	137,000	C	374 (8)	0.3%	C	237	0.2%
@ jct Hwy 58-East McKittrick Hwy	101000	D	374 (8)	0.4%	D	237	0.2%
Jct Rte 178 West							
@ jct Hwy 204	95,000	C	374 (8)	0.4%	C	237	0.2%
@ jct Hwy 65	90,000	C	374 (8)	0.4%	C	237	0.3%
@ jct Hwy 45	51,000	B	63 (9)	0.1%	B	40	0.1%
@ jct Hwy 45	42,000	B	50(10)	0.1%	B	31	0.1%
Jct Rte 166							
@ jct Hwy 33 North	4,600	C	41 (3)	0.9%	C	26	0.6%
@ jct Hwy 5 Freeway	3,700	B	41 (3)	1.1%	B	26	0.7%
Jct Rte 223							
@ jct Hwy 5	1,050	A	27 (11)	2.6%	A	17	1.6%
@ jct Hwy 58	1,550	B	27 (11)	1.7%	B	17	1.1%

Source: PEFE AFC, Table 5.11-2.

1. See Table 1.
2. Assumes traffic from all directions.
3. Assumes traffic from Wasco and Shafter.
4. Assumes other areas of Kern County (including Taft and Maricopa).
5. Assumes traffic from Wasco only.
6. Assumes traffic from other areas of Southern California and Tehachapi.
7. Assumes traffic from Bakersfield, Delano, McFarland and other areas of Kern County.
8. Assumes traffic from Bakersfield, Delano, and McFarland.
9. Assumes traffic from Delano and McFarland.
10. Assumes traffic from Delano only.
11. Assumes traffic from Arvin and other areas of Southern California and Tehachapi.
12. Projected LOS estimated based on percentage peak increase. LOS calculations not available from Caltrans.

The impact of construction truck traffic on the highways and local roads would vary. **TRAFFIC AND TRANSPORTATION Table 8, Distribution of Plant Construction Related Truck Traffic on Highways,** compares the plant construction truck traffic traveling to the site with existing automobile and truck traffic on the area highway system. The influx of two truck trips per day on the highways that are expected to be used for access to the site would be minimal compared to existing truck traffic. The increase would be between 0.0001 to 0.0008 percent in truck traffic depending on the route used. The impact of construction-related truck traffic on the highways would be insignificant.

Transportation of equipment that would exceed the load size and limits of certain roadways would require special permits. The procedures and processes for obtaining such permits are fairly straightforward. Mitigation measures and conditions of certification that ensure compliance with these requirements are discussed later.

Construction debris and small quantities of hazardous wastes would be generated during project construction as described in the **Waste Management Section** of this report.

Transportation of hazardous materials by truck to and from the project during the construction period would be handled by the applicant's contractor. It is to be done in accordance with California Vehicle Code Section 31300 et seq.; Kern County does not have local ordinances regulating the transportation of hazardous materials. Because the amount of hazardous waste would be small and the roadways used to access the PEFE present no specific safety concerns, no significant impact on traffic is expected from the transportation of hazardous material. Condition of Certification **TRANS-3** requires compliance with Federal and State regulations for hazardous materials transport.

TRAFFIC AND TRANSPORTATION Table 8
Distribution Of Plant Construction Related Truck Traffic On Highways

Highway	Existing AADT	Existing Truck AADT	Average Increase %
Interstate 5			
@jct. Grapevine	67,000	17,002	0.0001
@jct. Hwy 99	67,000	18,200	0.0002
@jct. Hwy 58	33,000	10,230	0.0002
Highway 99			
@jct. Hwy 5	35,500	8,875	0.0007
@jct. Hwy 223	38,000	9,500	0.0007
Highway 43			
@jct. Hwy 5	4,100	1,025	0.0008

Source: PEFE AFC, Table 5.11-4.

All truck traffic would have to travel the Edmonston Pumping Plant Road to the plant access road. As shown in **TRAFFIC AND TRANSPORTATION Table 9, Distribution of Plant Construction-Related Truck Travel on Local Roads,** the construction related truck traffic is expected to result in a negligible increase in truck traffic for this road. Due to the size and weight of the trucks, this increase in traffic may increase the wear on the road. There would be increased need for regular roadway inspection and maintenance to insure that safety standards are maintained. Staff has proposed a

mitigation measure to ensure that damage to specific roadways, resulting from the PEFE project, would be repaired by the project owner (see proposed Condition of Certification **TRANS-5**).

TRAFFIC AND TRANSPORTATION Table 9
Distribution of Plant Construction-Related Truck Traffic on Local Roads

Local Road	Existing AADT	Project Average Truck Trips/Day	Average Increase (Percent)
Edmonston Pumping Plant Road	720	1	Negligible

Source: PEFE AFC, Table 5.11-5

Railways

PEFE has indicated that, whenever possible and cost effective, rail service would be used to transport heavy equipment and machinery to the Bakersfield area. The preferred rail line is the Union Pacific and Southern Pacific Railroad Company Arvin Branch. From the Arvin Branch Station, the heavy equipment would be loaded onto trucks for transport to the PEFE site. These trucks would take Highway 223 (Bear Mountain Boulevard) to Highway 99 south to I-5 and then to the PEFE project site which is approximately 33 miles from the rail terminal.

Operational Phase

Commute Traffic

Operation of the PEF and PEFE generating plants would require a labor force of approximately 25 full-time employees. Assuming that each employee would drive a separate vehicle to work and that they would make one round trip from home to work per day, operation of the plant would generate approximately 50 vehicle trips per day. PEFE has assumed that the majority of the permanent workforce would reside in Bakersfield. The preferred route to work for these employees would be southerly along Highway 99 to Interstate 5, then east on Edmonston Pumping Plant Road and then north on the plant access road to the Pastoria facility. The anticipated travel routes would accommodate the estimated operations related traffic. Adequate parking would be made available for employees on a paved lot adjacent to the administration building. The impact of operational traffic on the highways and roads is expected to be insignificant. There are no additional long-term traffic impacts associated with the facility's operational workforce.

Truck Traffic

Hazardous and non-hazardous materials, as described in the AFC Waste Management and Hazardous Materials sections, would be delivered by truck to the plant site on an incidental basis. None of the chemicals proposed for use at the PEFE project site are regulated substances subject to the requirements of the California Accidental Release Prevention Program with the exception of anhydrous ammonia. PEFE will use anhydrous ammonia for the selective catalytic reduction system (SCR). This would result in approximately two additional truck deliveries per year of anhydrous ammonia to the plant site when the PEFE project begins operation. There are currently

approximately 11 truck deliveries per month of anhydrous ammonia to the plant site. The anticipated travel routes for materials delivery would be along Highway 99 and/or Interstate 5. The two additional deliveries per year are considered insignificant.

The transportation and handling of hazardous substances associated with the project can increase road hazard potential. During project operation there would be about 11 truck deliveries per month of anhydrous ammonia. Approximately once every ninety days, hazardous waste generated on site would be transported offsite by a licensed hazardous waste transporter. The handling and disposal of hazardous substances are addressed in the **Waste Management** section of this report.

CUMULATIVE IMPACTS AND MITIGATION

The analysis of the available capacity of the regional highways described in this section shows that the regional transportation system serving the Kern County area (along the potentially affected highways) has ample capacity to accommodate the proposed project's construction and operation generated traffic.

The Kern County Planning Commission approved an application for a zoning change by the Tejon Industrial Complex, for 341 acres located on the west side of Interstate 5 at Laval Road. The zoning change was from light industrial to a medium industrial classification. The 341 acres would be developed for industrial and commercial uses. The first phase started in late September of 2000, and subsequent phases would continue throughout the coming years. The initial phase for roads and utilities would not require a large workforce. All development for this project would occur on the west side of I-5. Cumulative impacts could occur if construction of the PEFE generating project were to overlap with proposed projects whose workforce and/or equipment and material delivery related traffic were to occur concurrently on I-5 and the local roadways.

Traffic associated with operation of the proposed generating plant can be accommodated by the existing highway and roadway system. No significant impact from the plant operation is anticipated at the Laval Road exit/entrance to I-5 since plant workers would be arriving at the site using the I-5 Grapevine exit to the Edmonston Pumping Plant Road. No significant cumulative traffic impacts are expected.

RESPONSE TO COMMENTS

No public comments were received. The project owner requested a minor addition to the language detailing the construction and delivery timeframes to the project site. The additional language indicating that infrequent deliveries may occur outside the normal delivery time of 7:00AM to 5:00PM has been added to the **Truck Traffic** section.

COMPLIANCE WITH LORS

The applicant has stated its intention to comply with all applicable LORS. With adoption of the recommended conditions of certification, staff has concluded that the project would comply with relevant LORS.

CONCLUSIONS

1. The construction phase would cause increased roadway demand resulting from the daily movement of workers and materials. While noticeable, this increased traffic would not degrade existing area roadway LOS levels as established by local and regional authorities.
2. During the construction phase, if increased commuter traffic on Edmonston Pumping Plant Road caused by the workforce results in some traffic congestion, PEFE has stated it would work with Caltrans and the County to maintain traffic flow and safety. Condition of certification **TRANS-4** has been proposed to ensure that traffic impacts during construction of the PEFE project would remain less than significant. During the operational phase, increased roadway demand resulting from the daily movement of workers and materials would be minimal.
3. All transportation and handling of hazardous substances can be mitigated to insignificance by compliance with federal and state standards established to regulate the transport of these substances.

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall comply with Caltrans and Kern County limitations on vehicle sizes and weights. In addition, the project owner or its contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for roadway use.

Verification: In the Monthly Compliance Reports, the project owner shall submit copies of any oversize and overweight transportation permits received during that reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS-2 The project owner or its contractor shall comply with Caltrans and Kern County limitations for encroachment into public rights-of-way and shall obtain necessary encroachment permits from Caltrans (for temporary signalization during construction at the intersection of Interstate5/Edmonston Pumping Plant Road if necessary) and all relevant jurisdictions.

Verification: In Monthly Compliance Reports, the project owner shall submit copies of any encroachment permits received during the reporting period. In addition, the project owner shall retain copies of these permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

TRANS-3 The project owner shall ensure that permits and/or licenses are secured from the California Highway Patrol and Caltrans for the transport of hazardous materials.

Verification: The project owner shall include in its Monthly Compliance Reports, copies of all permits/licenses acquired by the project owner and/or subcontractors concerning the transport of hazardous substances.

TRANS-4 Prior to commencing onsite work to install permanent equipment or structures for the facility, the project owner shall consult with Kern County, and prepare and submit to the Compliance Project Manager (CPM) for approval a construction traffic control plan and implementation program which addresses the following issues:

- Timing of heavy equipment and building materials deliveries;
- Redirecting construction traffic with a flagperson;
- Signing, lighting, and traffic control device placement if required;
- Need for construction work hours outside of peak traffic periods;
- Insure access for emergency vehicles to the project site; and
- Temporary travel lane closure.

Verification: At least thirty days prior to commencing onsite work to install permanent equipment or structures for the facility, the project owner shall provide to the CPM for review and approval, and to Kern County for review and comment, a copy of its construction traffic control plan and implementation program. Prior to the commencing onsite work to install permanent equipment or structures for the facility the project owner shall provide a copy of Kern County's comments on the plan.

TRANS-5 Following construction of the power plant and all related facilities, the project owner shall complete the repair of Edmonston Pumping Plant Road to original or as near original condition as possible.

Prior to commencing onsite work to install permanent equipment or structures for the facility, the project owner shall photograph Edmonston Pumping Plant Road between Interstate-5 and the plant entrance road. The project owner shall provide the CPM, DWR, and Kern County with a copy of the photographs.

Verification: At least thirty days prior to the commencing onsite work to install permanent equipment or structures for the facility the project owner shall provide copies of the photographs taken of the Edmonton Pumping Plant Road. Within 30 days of the completion of project construction, the project owner shall meet with the CPM and DWR to discuss appropriate road repairs for Edmonston Pumping Plant Road. The project owner shall provide a copy of a letter from DWR acknowledging satisfactory completion of the roadway repairs in the first Annual Compliance Report following start of operation.

REFERENCES

PEF (Pastoria Energy Facility) 1999. Application for Certification, Pastoria Energy Facility, L.L.C. (99-AFC-7). Submitted to the California Energy Commission on November 30, 1999.

PEFE (Pastoria Energy Facility) 2005, Application for Certification, Pastoria Energy Facility 160 MW Expansion, LLC (05-AFC-1). Submitted to the California Energy Commission on April 23, 2005.

PEFE (Pastoria Energy Facility) 2005, Calpine Comments on the Preliminary Staff Assessment. Submitted to the California Energy Commission on September 30, 2005.

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The energy from the proposed Pastoria Energy Facility Expansion would be transmitted to the area's power grid through the same 230-kV overhead transmission line currently used for the energy from the Pastoria Energy Facility. The line was sized for the proposed energy addition and licensed by the California Energy Commission in December 2001 to ensure compliance with applicable laws, ordinances, regulations and standards. Since the line would be operated at its current voltage during project operations, its electric field impacts would not change from existing levels. The only line parameter that would change from the increased power transmission is the magnetic field. Staff has concluded from its assessment that this increased power flow would not significantly change the levels of either the electric or magnetic field in the line's impact area. Since the line would continue to comply with the applicable health and safety laws, ordinances, regulations and standards during project operations, staff recommends approval of the proposed use for the generated power. Staff recommends a specific condition of certification (**TLSN-1**) to verify the field reduction efficiency assumed by the applicant.

INTRODUCTION

The purpose of this Final Staff Assessment (FSA) is to assess the potential impacts of the additional power from the proposed Pastoria Energy Facility Expansion (PEFE) as proposed to be transmitted through the same overhead 230 kV transmission line currently used to transmit power to the area power grid. This Pastoria Energy Facility (PEF) line was sized to accommodate the proposed energy addition (PEFE 2005a, page 3-36) and was permitted by the California Energy Commission in December 2000 to be designed, built, and operated to minimize its field and non-field impacts whose reduction remains the focus of current laws, ordinances, regulations, and standards (LORS). The Energy Commission specified five Conditions of Certification to ensure compliance with these LORS. This staff analysis assesses the potential of the increased power flow to increase the impacts beyond acceptable limits and to recommend mitigation as appropriate. Staff's analysis focuses on the following issues as related primarily to the physical presence of the line and related facilities, or secondarily, to 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.

TRANSMISSION LINE SAFETY AND NUISANCE 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 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. 70/7460-2H, " 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 Communication (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	Not to exceed applicable local noise ordinances. (There are no design-specific federal or state regulations for noise from transmission lines)
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
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

Applicable LORS	Description
Industry Standards	
American national Standards Institute (ANSI/IEE) 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 specify when and where standards apply
GO-95, CPUC, "Rules for Overhead Electric Line Construction," Section 35	Covers all aspects of design, construction, operation, and maintenance of electrical transmission line and fire hazards

SETTING

According to information from the applicant, Calpine Corporation (PEFE 2005a, pages 3-1, 3-4, 3-5, and 3-36, and Attachment A), the proposed PEFE would be located on a two-acre parcel within the 31-acre site for the existing PEF. As more fully described in the **Project Description** section, the PEF site is on Tejon Ranch property approximately 30 miles south of Bakersfield and 6.5 miles east of Grapevine California. The PEF transmission connection to be used for the PEFE-generated power (the proposed line) is the existing 1.38-mile 230 kV, overhead, double-circuit line that connects PEF via its on-site 230 kV Switchyard, to the Southern California Edison (SCE) Pastoria Substation to the south.

The line is proposed to be used without modification as it runs parallel to the 230 kV SCE Pastoria-Magunden transmission line for most of its route to the 230 kV Pastoria Substation. The route traverses a mostly undeveloped area with no residences within 0.5 mile (PEFE 2005a, Attachment H). This means (as noted in staff's PEF assessment process) that the long-term, line-related residential field exposures at the root of the present health concern would remain insignificant for power transmission from both PEF and PEFE. The only project-related exposures of potential significance would be the short-term exposures to plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in transit under the project's lines. These types of exposures are short-term and well understood as not significantly related to the present health concern. The other transmission lines in the area are SCE 66 kV lines, which are not close enough for significant system impacts from the flow of PEF and PEFE power.

The PEF line was designed built, and is currently operated according to CPUC safety requirements and SCE standards and practices regarding field reduction, line efficiency, reliability, and maintainability. The supports are lattice structures as is typical of area SCE lines of similar voltage and current-carrying capacity. They range in height from 100 feet to 120 feet to provide a minimum ground clearance of 30 feet. (PEFE 2005a, Attachment A).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The potential magnitude of the line impacts of concern in this FSA depends on compliance with the listed LORS whose related mitigation measures have been established as adequate to maintain such impacts below levels of potential significance. The implementing conditions of certification for this existing PEF line were specified in staff's (99-AFC-7) final assessment as **TNSL-1**, **TNSL-2**, **TLSN-3**, **TLSN-4**, and **TLSN-5** (PEFE 2005a, Section 9, pages 21 and 22). This means that the line was designed and built to ensure aviation safety, while also minimizing the potential for hazardous shocks and contact-related fires. Since the line would be used at its existing 230 kV during PEFE operation, the post-energization electric fields would remain the same, meaning that the electric fields-related impacts (more fully identified in the PEF-related assessment as interference with radio-frequency communication, audible noise, spark discharge-related fires, and nuisance shocks), would remain minimized. This relative lack of intensity change is reflected by the value of 0.06 kV/m calculated for the edges of the right of way, before and after introduction of the PEFE energy. Only the line's magnetic field would change with the added 160 MW of PEFE power.

The corresponding magnetic field change from PEFE-related power flow would depend on the interactive effects of fields in the proposed 230 kV lines and conductors from nearby SCE lines. Such interactive effects would result in no net change to the 15 milligauss (mG) calculated by the applicant for the edges of the right-of-way for the periods before and after the introduction of PEFE energy. Staff recommends **TLSN-1** as a condition of certification necessary to verify the field reduction efficiency assumed by the applicant for these interactive field effects.

CUMULATIVE IMPACTS AND MITIGATION

Since the 15 mG for the edge of the right-of-way was calculated to reflect the interactive effects of the power lines in the PEF line's impact area, it should be seen as the potential magnitude of any exposure of a cumulative nature. The same is true of the 0.06 kilovolts per meter (kV/m) for exposure at the edge of the 80-ft right-of-way. These field strength values are as staff expects for SCE lines of similar voltage and current-carrying capacity. The actual values and contribution from PEFE-related current flow would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-1**.

COMPLIANCE WITH LORS

As noted in staff's assessment for the existing PEF, its transmission line (that would be used for the proposed PEFE) was designed according to the respective requirements of the noted GO 95, GO 131-D, and Title 8, Section 2700 et seq. of the California Code of Regulations and is currently operated and maintained according to current SCE guidelines on line safety and field strength management. Therefore, staff considers it appropriate to also use the line for the PEFE power as proposed by the applicant. 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-1**.

AGENCY AND PUBLIC COMMENTS

No comments were received.

CONCLUSIONS

Since electric or magnetic field health effects have neither been established nor ruled out for PEF and similar lines, the public health significance of any related field exposures cannot be characterized with certainty. As noted in staff's PEF assessment, the only conclusion to be reached with certainty is that this existing line 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. As with PEF, the long-term, mostly residential magnetic exposure at the root of the present health concern would be insignificant for the proposed PEFE-related power addition. On-site worker or public exposure would be short term and at levels staff expects for SCE lines of similar designs and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

The potential for nuisance shocks is currently assured through grounding and other field-reducing measures 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 is also being minimized through compliance with the height and clearance requirements of General Order 95. Compliance with sections of Title 14, California Code of Regulations, Section 1250, is also serving to minimize the potential for fires. This PEF line does not pose an aviation hazard to any area airports, further showing its safety for use as proposed. Given the noted compliance with the health and safety LORS of concern in this analysis, staff considers it appropriate use the PEF line to transmit the PEFE power as proposed. If the Energy Commission were to approve such use, staff recommends adoption of the condition of certification specified below to verify the field reduction efficiency assumed by the applicant.

PROPOSED CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall engage a qualified individual to measure the strengths of the line electric and magnetic fields from the PEF line before and after the introduction of the energy from the proposed PEFE. Measurements shall be (according to IEEE protocols) and at the representative points along the route as necessary to establish the strengths at the edges-of the right-of-way. These measurements shall be completed not later than 6 months after the start of PEFE 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.

REFERENCES

Carpenter D.O. and Ayraptan S. 1994. Biological Effects of Electric and Magnetic Fields. Vol. 2. Academic Press New York.

Electric Power Research Institute (EPRI) 1982. Transmission Line Reference Book: 345 kV and Above.

Energy Commission Staff 1992. High Voltage Transmission Lines: Summary of Health Effects Studies. California Energy Commission Publication, P700-92-002.

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.

PEFE (Pastoria Energy Facility Expansion 2005a). Application for Certification. Volumes II and I. Submitted to the California Energy Commission on April 29, 2005.

VISUAL RESOURCES

Testimony of James Adams

SUMMARY OF CONCLUSIONS

Energy Commission staff analyzed both the potential visual impacts of the proposed Pastoria Energy Facility Expansion in accordance with the California Environmental Quality Act, and the project's compliance with applicable laws, ordinances, regulations, and standards pertaining to visual resources. Staff concludes that the proposed project expansion would not cause significant adverse visual impacts. Effective implementation of the applicant's existing mitigation measures and recommended conditions of certification would reduce adverse visual impacts from the project to a less than significant level, and ensure that the project complies with applicable laws, ordinances, regulations, and standards regarding visual resources.

INTRODUCTION

Visual resources are the natural and man-made features of the environment that can be viewed. This analysis focuses on whether construction and operation of the Pastoria Energy Facility Expansion (PEFE) would cause visual impact(s) under California Environmental Quality Act (CEQA) and whether the project would be in compliance with applicable laws, ordinances, regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff has provided in **VISUAL RESOURCES Table 1** a general listing of applicable LORS that staff has evaluated to determine the proposed project's compliance. The project's consistency with specific LORS is discussed in **VISUAL RESOURCES Table 2** in this analysis.

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

Jurisdiction & Applicable LORS	LORS Description
Federal	
	The proposed project is not located on federally administered public lands, and is not subject to federal regulations pertaining to visual resources.
State	
Government Code § 65302(a)	Includes requirements that a land use element designate the proposed general distribution, general location, and extent of land for a variety of uses including the enjoyment of scenic beauty.
Local	
Kern County General Plan Land Use, Open Space, and Conservation Element	Industrial policies encourage upgrading the visual character of existing industrial areas through the use of landscaping, screening, or buffering. An additional requirement pertains to industrial uses providing design features such as screen walls, landscaping, increased height and/or setbacks, and lighting restriction etc.
Kern County Zoning Code Chapter 19.86- Landscaping	The purpose of the chapter is to ensure that development is aesthetically pleasing and compatible with surrounding development by requiring the provision of adequate landscaping in connection with new development, and the expansion of existing development and changes in use.

SETTING

The PEFE is proposed to be constructed on a two-acre site entirely within the existing PEF 31-acre property boundary. The new 160 MW simple cycle combustion turbine would not require any modification to the existing linear facilities (PEFE 2005a, p. 5.13-1). The site is surrounded by open fields and is in close proximity to the Tejon Hills to the east. In general, the views are open and panoramic.

The most visible component of the PEFE would be the 131-foot tall combustion turbine generator stack. The new stack would be about 20 feet smaller than the existing generator stacks. The only other new structure would be a generator step-up transformer in the existing switchyard. The project site would use 12 acres of the 25-acre construction laydown area identified in the original application for certification for the Pastoria Energy Facility (PEFE 2005a, p.1-2).

Within the project vicinity, foreground to middle-ground views (generally two miles or less) of the proposed project site are generally not available due to private land owned by the Tejon Ranch that is used for growing grapes and other fruit crops. Views toward the site from the local roads (Laval and Edmonston Pumping Plant Road) are either open or obscured by orchards. The nearest residences are more than three miles away along Laval Road (Final Staff Assessment, Pastoria Energy Facility, p. 234,

September 1, 2000). Other features in the view include fields, orchards, the Tejon Hills and Tehachapi Mountains.

Northbound travelers on Interstate-5 (I-5) looking towards the project site (90 degrees to the right), approximately 6.5 miles to the east, would barely see the project and would have a disrupted view caused by orchards, grassy fields, and elevated hillsides. The view for southbound travelers would be partially blocked by the row of oleander bushes in the center divide, but the project (90 degrees to the left) would be visible briefly in the distance.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Please refer to **Appendix VR-1** for a complete description of staff's Visual Resources evaluation process.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The following discussion of project impacts is organized around the four questions found in the CEQA Guidelines Appendix G Environmental Checklist Form pertaining to Aesthetics.

Scenic Vistas

The first checklist question; "Would the project have a substantial adverse effect on a federal, state, or local designated scenic vista?"

The proposed project would not have a substantial adverse effect on a scenic vista, and would cause a less than significant visual impact.

Scenic Resources

The second checklist question; "Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor?"

There are no state scenic highway corridors in the project vicinity; therefore, the visual change would not cause a significant adverse visual impact.

Visual Character or Quality

The third CEQA checklist question: "Would the project substantially degrade the existing visual character or quality of the site and its surroundings?" The project aspects that were evaluated under this criterion include project construction and operation, the power plant structures, and visible water vapor plumes.

Project Construction

Construction of the power plant is expected to take approximately 12 months (PEFE 2005a, p. 1-5). On the project site during the construction period, the view of tall cranes and other heavy equipment, building materials, and piles of debris, are expected to take

place, and would be visible to Edmonston Pump Plant visitors and employees. Viewers from staff's Key Observation Point (KOP)[1], on I-5 would not be able to see construction equipment or activities.

Linear Facilities and Construction Laydown Area

There are no new linear facilities required, and the original construction laydown area south of the current power plant would be sufficient for construction of the PEFE. There are no other structures near the project site.

As noted above, staff has selected a KOP as a representative location from which to conduct detailed analyses of the proposed project and to obtain existing condition photographs and prepare visual simulations. KOPs are selected to be representative of the most critical locations from which the project would be seen. However, KOPs are not the only locations that staff considered in each view area.

Although the proposed project would be visible from several areas near the project site, one KOP along I-5 has been chosen for analysis of the proposed PEFE. KOP 1 represents a viewpoint of the project site from a location adjacent to the northbound lanes of I-5. A large number of motorists use this major interstate highway as evidenced by average annual daily traffic counts ranging from 67,000 at the intersection with SR-99, to 29,500 at the intersections with SR-223 and SR-119 (PEFE 2005a, Table 5.11-2, p. 5.11-5). Staff traveled this highway segment, as well as other locations in the project's vicinity, and believes this one KOP is appropriate for this analysis (see **VISUAL RESOURCES - Figure 1)**.

The applicant selected two other KOPs; one looking north from Edmonston Pumping Plant Road (1.1 miles south of the existing PEF), and another looking south from the intersection of Laval and Rancho Roads 2.75 miles north of the PEF. Staff believes that these are not necessary because Edmonston Pumping Plant Road is a private road primarily used by plant employees who are familiar with the existing PEF. Similarly, the Ranch-Laval Roads intersection has very little traffic since there are only three residences on Laval Road that are at least 2 miles west of this intersection, and there are many orchards blocking the view toward the PEF/PEFE site. For these reasons, staff believes that the I-5 KOP best represents public views of the proposed PEFE.

The view from KOP1 is an open panoramic scene of agricultural fields in the fore and mid-ground with one or two fruit orchards visible. On September 9, 2005, staff visited the project area and viewed the project site from KOP1. The background view included the Tehachapi Mountains and unobstructed blue sky. The PEF is barely visible in the center of the view at the base of the mountains. The heat recovery steam generator stacks (HRSGs) are the most noticeable structures from this KOP.

Northbound motorists at KOP1 would have to look to the right about 90 degrees to be able to see the existing power plant and proposed new unit, and they would appear very small given the panoramic view. Southbound motorists would have a brief opportunity to see the power plant site, 90 degrees to the left, because it would be partially screened

[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.

by the oleander bushes noted earlier. During the construction and/or operation of the PEFE it would be very difficult to notice any significant physical change.

Visual Sensitivity

From KOP1, project site visibility would be from a level perspective that is unobstructed at a background viewing distance. As mentioned above, a high number of motorists travel on I-5. A vehicle traveling this section of I-5 would travel through the project viewshed in 10 seconds or less under normal driving situations. There are no residences in this area.

The panoramic view of the agricultural fields, orchards, mountains, and sky offers a diverse landscape with good visual quality. The power plant site is barely visible to passing motorists and, therefore, viewer concern and sensitivity is low.

Visual Change

The proposed PEFE power plant structures would probably not be visually discernable from KOP1. The structures would appear subordinate within the mosaic of agricultural features and the panoramic background mountain and sky landscape. In addition, the project would appear very small in size in the wide field of view. Project dominance is rated low.

The project would introduce one additional vertical structure: a fourth turbine generator stack. The new stack would blend in with the existing structures of the PEF. The introduction of a tan colored project structure into the view would present a minor color contrast with the more prominent green, brown and blue colors of the agricultural fields, mountains and sky. Staff has proposed Condition of Certification **VIS-1** to ensure that the PEFE project color treatment blends with the surrounding landscape. Overall, visual contrast with the existing setting would be low.

From KOP1, the overall visual change caused by the proposed project would be low due to the low visual contrast, and the project's low dominance and low degree of view disruption. The PEFE would not block the views of the good visual quality landscape.

When considered within the context of a low visual sensitivity of the existing landscape and viewing characteristics, and the low visual change that would be perceived from KOP1, the project would not cause a significant adverse visual impact.

Combustion Exhaust Stack Plumes

The proposed PEFE would add one 131-foot tall combustion exhaust stack. The stack would not generate a visible plume (Aspen 2005).

Light or Glare

The fourth CEQA checklist question asks; "Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?"

The response to this question is that there would not be an adverse impact. Whatever additional lighting is needed for PEFE would be subject to staff's proposed Condition of Certification **VIS-2** to ensure that there is no significant offsite increase in light or glare.

CUMULATIVE IMPACTS AND MITIGATION

As defined in Section 15355 of the CEQA Guidelines (California Code Regulation, Title 14), a cumulative impact is created as a result of the combination of the project under consideration together with other existing or reasonably foreseeable projects causing related impacts. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. In other words, though any one project in a given area may not create a significant impact to visual resources, the combination of the new project with all existing or planned projects in the area may create significant impacts. The significance of the cumulative impact would depend on the degree to which (1) the viewshed is altered; (2) visual access to scenic resources is impaired; or (3) visual quality is diminished.

The only foreseeable project in the area is the Tejon Industrial Complex West, which would encompass 341 acres of industrial and commercial development about seven miles west of the PEFE site (PEFE 2005a, pp. 5.10-17 & 18).

The PEFE's impact on visual resources is very low within the panoramic landscape, and in combination with the one other foreseeable project, its impact would not be cumulatively considerable. The project does not contribute to a significant cumulative impact to visual resources.

COMPLIANCE WITH LORS

The proposed power plant would be constructed within the jurisdiction of Kern County. Therefore, the PEFE would be subject to LORS pertaining to the protection and maintenance of visual/scenic resources that are found in the Kern County General Plan and Zoning Code. Specifically, the County's General Plan contains one applicable element for review: the Land Use, Open Space, and Conservation Element. The Kern County Zoning Code provides applicable zoning provisions for development on the project site.

VISUAL RESOURCES Table 2 provides a consistency review discussion of the applicable local LORS.

VISUAL RESOURCES Table 2
Proposed Project's Consistency with
Applicable LORS Specific To Visual Resources

State	California Government Code
Section 65302(a)	Requires that a land use element designate the proposed general distribution, general location, and extent of land uses for a variety of uses including the enjoyment of scenic beauty.
Project is consistent	The proposed project is not in an area that has been designated as a special scenic resource.
Local	**Kern County General Plan Land Use, Open Space, and Conservation Element**
Provision	Industrial policies encourage upgrading the visual character of existing industrial areas through the use of landscaping, screening, or buffering. An additional requirement pertains to industrial uses providing design features such as screen walls, landscaping, increased height and/or setbacks, and lighting restriction, etc.
Project is consistent	The applicant has agreed to maintain the conditions of certification related to landscaping, screening trash receptacles, and signs. These conditions are acceptable to Kern County.
Local	**Kern County Zoning Code**
Chapter 19.86 Landscaping	The purpose of this chapter is to ensure that development is aesthetically pleasing and compatible with surrounding development by requiring the provision of adequate landscaping in connection with new development, and the expansion of existing development and changes in use.
Project is consistent	The applicant's implementation of landscaping is acceptable to Kern County.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

There were no agency or public comments on visual resources.

CONCLUSIONS

The visual analysis focused on two main issues; (1) whether the construction and operation of the project would cause visual impacts, and (2) whether the project would be in compliance with applicable local LORS.

- The proposed PEFE would be consistent with applicable visual policies of the Kern County General Plan: Land Use, Open Space, and Conservation Element. Because

Kern County has an approved General Plan, State LORS are also met by the applicant.

- With mitigation, construction and operation of the PEFE would not cause any significant visual impacts to adjacent land uses, nor would the operation of the PEFE contribute considerably to any cumulative visual impacts. Therefore, there are no environmental justice issues.

PROPOSED CONDITIONS OF CERTIFICATION

VIS-1 The project owner shall treat the project structures, buildings, and tanks in an earthen hue or hues that minimize visual intrusion and contrast by blending with the surrounding landscape, and shall treat those items and the switchyard structures and electric transmission towers in a non-reflective finish with a low gloss.

The project owner shall submit a treatment plan for the project to the California Energy Commission Compliance Project Manager (CPM) for review and approval. The treatment plan shall include:

- specification, and 11” x 17” color simulations, of the treatment proposed for use on project structures, including structures treated during manufacture;
- a list of each major project structure, building, and tank, specifying the color(s) proposed for each item;
- documentation that a non-reflective finish will be used on all project elements visible to the public;
- a detailed schedule for completion of the treatment; and,
- a procedure to ensure proper treatment maintenance for the life of the project.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall submit a revised plan to the CPM.

After approval of the plan by the CPM, the project owner shall implement the plan according to the schedule and shall ensure that the treatment is properly maintained for the life of the project.

For any structures that are treated during manufacture, the project owner shall not specify the treatment of such structures to the vendors until the project owner receives notification of approval of the treatment plan by the CPM.

The project owner shall not perform the final treatment on any structures until the project owner receives notification of approval of the treatment plan from the CPM.

The project owner shall notify the CPM within one week after all precolored structures have been erected and all structures to be treated in the field have been treated and the structures are ready for inspection.

Verification: At least 60 (sixty) days prior to ordering the first structures that are color treated during manufacture, the project owner shall submit its proposed plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification, the project owner shall submit to the CPM a revised plan.

Within thirty (30) days following the start of commercial operation, the project owner shall notify the CPM that all structures treated during manufacture and all structures treated in the field are ready for inspection.

The project owner shall provide a status report regarding treatment maintenance in the Annual Compliance Report.

VIS-2 The project owner shall design and install all lighting such that light bulbs and reflectors are not visible from public viewing areas and illumination of the vicinity and the nighttime sky is minimized. To meet these requirements:

The project owner shall develop and submit a lighting plan for the project to the CPM for review and approval. The lighting plan shall require that:

- Lighting is designed so that exterior light fixtures are hooded, with lights directed downward or toward the area to be illuminated and so that backscatter to the nighttime sky is minimized. The design of this outdoor lighting shall be such that the luminescence or light source shall not cause obtrusive spill light beyond the project, and;
- High illumination areas not occupied on a continuous basis such as maintenance platforms or the main entrance are provided with switches or motion detectors to light the area only when occupied.

If the CPM notifies the project owner that revisions of the plan are needed before the CPM will approve the plan, the project owner shall prepare and submit to the CPM a revised plan. Lighting should not be installed before the plan is approved. The project owner shall notify the CPM when the lighting has been installed and is ready for inspection.

Verification: At least 90 (ninety) days before ordering the exterior lighting, the project owner shall provide the lighting plan to the CPM for review and approval.

If the CPM notifies the project owner that any revisions of the plan are needed before the CPM will approve the plan, within 30 days of receiving that notification the project owner shall submit to the CPM a revised plan.

The project owner shall notify the CPM within seven days of completing exterior lighting installation that the lighting is ready for inspection.

REFERENCES

Visual Resources – Final Staff Assessment, Pastoria Energy Facility, Application for Certification [99-AFC-7], September 1, 2000.

Kern County 1994. General Plan.

PEF (Pastoria Energy Facility) 1999a. Application for Certification, Volumes I and II, Pastoria Energy Facility Project (AFC-99-7). Submitted to the California Energy Commission on November 30.

PEFE (Pastoria Energy Facility) 2005, Application for Certification, Pastoria Energy Facility 160 MW Expansion, L L C (05-AFC-1). Submitted to the California Energy Commission on April 23, 2005.

APPENDIX VR-1: STAFF'S VISUAL RESOURCES EVALUATION METHODOLOGY

Visual resources analysis has an inherent subjective aspect. Use of generally accepted criteria for determining environmental impact significance and a clearly described analytical approach aid in developing an analysis that can be readily understood.

Staff's methodology is based on the California Environmental Quality Act (CEQA) Guidelines. The methodology includes an evaluation of the visual characteristics of the existing setting, the visual characteristics of the proposed project, the circumstances affecting the viewer, and the degree of visual impact that the proposed project would cause.

ELEMENTS OF THE METHODOLOGY

Key Observation Points

A proposed project is potentially visible from a number of areas in a viewshed. Energy Commission staff evaluate the visual impact of the project using a Key Observation Point[2], or KOP. One or more KOPs are selected to be representative of the most critical locations from which the proposed project would be seen. A KOP is representative of a location from which to conduct a detailed analysis of the project, and includes an existing condition/setting photograph, and simulation of the proposed project using the existing condition photograph.

Prior to application submittal, staff participates in a site visit to select appropriate KOP(s) for the analysis. Other photos to demonstrate the general landscape character of the project area are also included, as appropriate.

LORS Consistency

Energy Commission staff consider federal, state, and local laws, ordinances, regulations, and standards (LORS) relevant to visual resources. Conflicts with such LORS can constitute significant visual impacts. For example visual staff examines land use planning documents, such as local government General Plans and Specific Plans, 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 the protection or preservation of visual resources.

Visible Water Vapor Plume Frequency

Staff models the estimated turbine plume frequency and dimensions for the cooling tower and turbine exhaust using the Combustion Stack Visible Plume (CSVP) model, and a multi-year meteorological data set obtained for the area where the project is proposed.

[2] The use of KOPs or similar view locations is common in visual resource analysis. The US Bureau of Land Management and the US Forest Service use such an approach.

A plume frequency of 20 percent of seasonal (typically from November through April) daylight no rain/fog high visual contrast (i.e. “clear”) hours is used to determine potential plume impact significance. If it is determined that the seasonal daylight clear hour plume frequency is greater than 20 percent then plume dimensions are determined and a significance analysis is included in the Visual Resources section of the Staff Assessment for the proposed project. Plume frequencies of less than 20 percent have been determined to generally have a less than significant impact.

California Environmental Quality Act Guidelines

The CEQA Guidelines define a “significant effect on the environment” to mean a “substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance” (California Code of Regulations, Title 14, Section 15382).

Appendix G of the Guidelines, under Aesthetics, lists the following four questions to be addressed regarding whether the potential impacts of a project are significant:

1. Would the project have a substantial adverse effect on a scenic vista?

2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

4. Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

The visual analysis typically distinguishes between three different impact durations: temporary impacts, typically lasting no longer than two years; short-term impacts, generally last no longer than five years; and long-term impacts, which are impacts with a duration greater than five years. In general, short-term impacts are not considered significant.

In addition to visiting the project area for personal observation of how and whether a particular view is experienced, staff also searches for other evidence to determine if the local community values a particular view that might be affected by the project. This includes searching the applicable planning documents covering the area produced by local governments and community groups, as well as searches for any other type of evidence showing whether valued scenic vistas exist within the project’s viewshed. Staff relies primarily on personal observation of the project site to make initial determinations of visual character or quality of the area, in comparison with all other landscapes in California, but also gives due deference to official statements by elected governmental bodies concerning the value of visual resources within the project area.

Staff answers each of the four checklist questions for each part of the project both during construction and during operation, including any related facility such as a transmission line or gas pipeline. To answer the first checklist question (Would the project have a substantial adverse effect on a scenic vista?), staff must determine if any

such scenic vista exists within the viewshed of the various aspects of the project, and then determine if the project would have a substantial adverse effect on that vista.

To help make these determinations, visual resource professionals often answer a series of questions developed to help focus the analysis, and examine various ways that the project could create an impact to scenic vistas. The Energy Commission's Visual Resources staff has developed such a list for each of the four CEQA guideline questions, drawing upon published methodologies and academic resources (Smardon, et al.), as well as on past experience with other power plant siting cases. Questions developed to help determine whether the project would significantly affect a scenic vista include:

1. Is the project located in the scenic view of a local/state/federal-designated scenic vista?

2. Is there compelling evidence to show that the view is designated/valued by the local community?

3. Will the project eliminate or block views of valuable visual resources?

4. Would the project create a water vapor plume that could have an adverse effect on a state/federal/local-designated scenic vista?

To help answer the second CEQA checklist question above (Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?), staff developed the following questions:

1. Is the project located in the scenic view from a local/state/federal-designated scenic highway?

2. Does the project site or its immediate vicinity contain scenic resources, such as trees, rock outcroppings, or historic structures that could be damaged by the project?

3. Would the project create a water vapor plume that could have an adverse effect on the view from a local/state/federal-designated scenic highway?

To answer the third question (Would the project substantially degrade the existing visual character or quality of the site and its surroundings?), staff assesses the existing visual character and quality of the project area, and then determines how the project would affect the character and quality of the project viewshed. To assess whether the project has the potential to substantially degrade the present visual character or quality, staff uses personal observation and such tools as visual simulations to determine if an impact is significant and mitigation is required to reduce the impact to a less-than-significant level. To make that determination, staff examines many factors, such as: how many viewers can see a particular view and for how long, collectively called "viewer exposure;" and to what degree would the project change the aspects of a given view, such as whether the project's components would block a particular view.

To help determine how the community rates and values the visual character and quality of a given site, and whether the project would substantially alter the present visual character or quality, staff developed the following questions:

1. How many residential, recreational, and traveling (motorist) viewers would have views of the project?

2. Is the project site properly zoned?

3. Would a conditional use permit and/or height variance have been required from the city/county (if so what conditions would the city/county place on the power plant)?

4. Does the project conform to the clear written declarations of local/state/federal agencies to protect designated visual resources of importance or the valued aesthetic character of a neighborhood (said declaration must be clear, concise, and uncompromised by conflicting declarations, and be an official action of the governing body (City Council/Board of Supervisors) such as a General Plan element, zoning ordinance, or design guideline)?

5. Will the project substantially alter the existing viewshed, including any changes in natural terrain?

6. Does the project substantially change the existing setting?

7. Has the applicant proposed landscaping?

8. Would the project create a water vapor plume that could have an adverse effect on a KOP view?

The process of answering these questions includes an examination of the present views within the project viewshed in terms of aesthetics – i.e., by examining the various aspects that together define the quality of a view – followed by an assessment of how the various aspects of the aesthetics of the view would be affected by the project, which conversely could be described as an analysis of how well the project area can absorb the various aspects of the project into the landscape.

To answer the fourth CEQA Guidelines checklist question (Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?), staff analyzes the project's lighting plans to ensure they fit with established norms for low-impact lighting designs, and then answers the following questions to determine if a potential for impact from night-lighting exists:

1. With the Energy Commission's standard condition of certification for lighting control, would light or glare be reduced to acceptable levels?

2. Will the project result in significant amounts of backscatter light into the nighttime sky?

VISUAL RESOURCES - FIGURE 1

Pastoria Energy Facility Expansion - Existing View to the east from staff's Key Observation Point along Northbound Lanes of I-5

CALIFORNIA ENERGY COMMISSION, SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION, NOVEMBER 2005

SOURCE: Adapted from AFC Figure 5.13-1

WASTE MANAGEMENT

Testimony of Alvin J. Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Waste generated during construction and operation of the Pastoria Energy Facility Expansion project would not result in any significant adverse impacts if the waste management measures contained in the Application for Certification and the proposed Conditions of Certification are implemented per the pertinent laws, ordinances, regulations and standards.

INTRODUCTION

This Final Staff Assessment (FSA) presents an analysis of issues associated with managing wastes generated from constructing and operating the proposed Pastoria Energy Facility Expansion (PEFE). Staff evaluated the proposed waste management plans and mitigation measures designed to reduce the risks and environmental impacts associated with handling, storing, and disposing of project-related hazardous and nonhazardous wastes. The technical scope of this analysis encompasses solid wastes existing on-site and those generated during facility construction and operation. Wastewater is more fully discussed in the **Soil and Water Resources** section of this document.

Energy Commission staff's objectives in its waste management analysis are to ensure that:

- The management of the wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project would be managed in an environmentally safe manner.
- The disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities.
- Upon project completion, the site is remediated such that contaminants would not pose a significant risk to humans or the environment.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

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

Applicable Law	Description
Federal	
42 U.S.C. § 6922 Resource Conservation and Recovery Act (RCRA)	The RCRA establishes requirements for the management of hazardous wastes from the time of generation to the point of ultimate treatment or disposal. Section 6922 requires generators of hazardous waste to comply with requirements regarding: • Record keeping practices which identify quantities of hazardous wastes generated and their disposition, • Labeling practices and use of appropriate containers, • Use of a manifest system for transportation, and • Submission of periodic reports to the EPA or authorized state agency.
Title 40, Code of Federal Regulations, part 260	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.
State	
California Health and Safety Code §25100 et seq. (Hazardous Waste Control Act of 1972, as amended)	This act creates the framework under which hazardous wastes must be managed in California. It mandates the State Department of Health Services (now the Department of Toxic Substances Control (DTSC) under the California Environmental Protection Agency, or Cal EPA) to develop and publish a list of hazardous and extremely hazardous wastes, and to develop and adopt criteria and guidelines for the identification of such wastes. It also requires hazardous waste generators to file notification statements with Cal EPA and creates a manifest system to be used when transporting such wastes. The Kern County Environmental Health Services Department along with EPA and DTSC enforce this Act.
Title 14, California Code of Regulations, §17200 et seq. (Minimum Standards for Solid Waste Handling and Disposal)	These regulations set forth minimum standards for solid waste handling and disposal, guidelines to ensure conformance of solid waste facilities with county solid waste management plans, as well as enforcement and administration provisions.
Title 22, California Code of Regulations, §66262.10 et seq. (Generator Standards)	These sections establish requirements for generators of hazardous waste. Under these sections, waste generators must determine if their wastes are hazardous according to either specified characteristics or lists of wastes. As in the federal program, hazardous waste generators must obtain EPA identification numbers, prepare manifests before transporting the waste off-site, and use only permitted treatment, storage, and disposal facilities. Additionally, hazardous waste must only be handled by registered hazardous waste transporters. Generator requirements for record keeping, reporting, packaging, and labeling are also established.
Title 22, California Code of Regulations, §67100.1 et seq.	Hazardous Waste Source Reduction and Management Review. These sections establish reporting requirements for generators of certain hazardous and extremely hazardous wastes in excess of specified limits. The required reports must indicate the generator's waste management plans and performance over the reporting period.

Title 23, California Code of Regulations, §2510 Article 9 et seq.	The California Porter-Cologne Water Quality Control Act contains requirements for storage or disposal of solid and liquid wastes. These requirements are enforced by the Regional Water Quality Control Board and the State Water Resources Control Board.
Local	
California Fire Code and/or Uniform Fire Code	Enforced by the Kern County Fire Department, and 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.

SETTING

The proposed PEFE project is located on approximately 2 acres within the existing PEF site. A Phase I Environmental Site Assessment (ESA) was conducted on the 31-acre PEF site by URS Greiner Woodward Clyde in 1999 as part of the original proceedings for PEF. A new Phase I ESA was conducted by URS in February 2005. Both ESAs were conducted in accordance with methods prescribed by the American Society for Testing and Materials (ASTM Standard E 1527-00). The 2005 ESA studied the entire PEF plant site (31 acres), the access road, construction laydown area, transmission line, water supply line, and gas pipeline. Both assessments did not identify any "recognized environmental conditions" per the ASTM definition, that is, there was no evidence or record of any use, spillage or disposal of hazardous substances on the site, nor any other environmental concern that would require remedial action (PEFE 2005a Section 5.14.1.2 and URS 2005).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are addressed in Waste Management: potential site contamination and the methods used to handle wastes (Class I hazardous wastes, Class II designed wastes, and Class III municipal solid wastes) during construction and operations. The methods staff uses and the thresholds for determining significance of impacts are different for these two issues.

For any site proposed for the construction of a power plant in California, the applicant must provide sufficient documentation about the nature of any contamination on the site. Staff requires that at the least, a Phase I ESA be prepared and submitted to the Energy Commission for staff's review and evaluation. A Phase I ESA provides a history of use of the site, often as far back as the mid-1800s, and a list of any hazardous waste release within a certain distance of the site. If there is a reasonable potential that the site contains hazardous waste, soil or groundwater would be sampled and analyzed as part of a Phase II ESA.

Staff may utilize either of two metrics to determine if hazardous waste present on the site would pose a risk to on-site workers or the off-site public. The first metric follows standards promulgated by Cal-EPA, principally by the Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Boards (RWQCB), and by the

U.S. EPA. Staff would compare the levels of contaminants found on-site with standards such as U.S. EPA soil screening levels (SSLs) or U.S. EPA Preliminary Remediation Goals (PRGs), or DTSC/RWQCB Total Threshold Limit Concentrations (TTLCs). If metals are suspected of being present at unsafe levels, staff would first compare those levels to levels that occur naturally in soil or water as tabulated by DTSC or other federal agencies.

The second method involves the preparation of a site-specific Human Health Risk Assessment or Ecological Risk Assessment. The human health risk assessment would follow Cal-EPA guidelines and must address all affected populations including the most burdened and compromised receptors. Staff would require the applicant to prepare such an assessment and would require some form of remediation if the human health cancer risk exceeded one-in-one million, the non-cancer hazard index exceeded 1.0, or the ecological risks were significant.

Regarding the management of wastes, staff reviews the applicant's proposed solid and hazardous waste management methods and determines if the methods meet the state standards for waste reduction and recycling. Staff then reviews the available off-site treatment and disposal sites available and determined whether or not the proposed power plant's waste would have a significant impact on the disposal sites allotted daily, yearly, or lifetime volume of waste it is allowed to receive. Staff uses a threshold of less than 10% impact on a waste disposal facility to determine if the impact would be significant.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Contamination

Staff reviewed the ESAs conducted for the PEF site and found that no significant contamination is expected to be encountered in the area proposed for the Expansion. Staff believes that conditions of certification **Waste-1** and **Waste-2** (which require having a Registered Professional Engineer or Geologist with experience in remedial investigation and feasibility studies available for consultation during soil excavation and grading activities) are adequate to address any soil or groundwater contamination contingency that may be encountered.

Construction Impacts and Mitigation

Site construction of the proposed PEFE would last approximately 12 months and generate both nonhazardous and hazardous wastes in solid and liquid forms.

Metal debris from welding/cutting activities, lumber, concrete, packing materials, electrical wiring, and empty non-hazardous chemical containers would be generated during construction. Approximately 10 cubic yards per week of these wastes are anticipated to be generated during construction (PEFE 2005a Table 3.4.9-1). All non-hazardous wastes would be recycled to the extent possible. Non-recyclable wastes would be collected by a licensed hauler and disposed of in a solid waste disposal facility per Title 14, California Code of Regulations, §17200 et seq. (Minimum Standards for Solid Waste Handling and Disposal).

Nonhazardous liquid wastes would be generated during construction, and are discussed in the **Soil and Water Resources** section of this document. Storm water runoff would be managed in accordance with the requirements of the NPDES permits issued for the project, which include an oil-water separator and Storm Water Detention Ponds that discharge to Pastoria Creek under controlled conditions (PEFE 2005a Attachment A Section 3.7.5). Sanitary wastewater would be discharged to an underground septic tank and leaching field (CEC 2000 Page 382).

Hazardous wastes anticipated to be generated during construction may include empty hazardous material containers, solvents, used oils, paint, oily rags, and adhesives. Less than 1 cubic yard per week of empty containers and about 40 gallons of all other hazardous waste streams are expected to be generated during construction (PEFE 2005a Table 3.4.9-1).

The applicant would be considered the generator of hazardous wastes at this site during the construction period. Wastes would be accumulated at satellite locations and then transported daily to the construction contractor's 90-day hazardous waste storage area. The wastes thus accumulated would be properly manifested, transported and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. Staff reviewed the disposal methods described in AFC subsection 3.4.9 and Section 5.14 and concluded that all wastes would be disposed in accordance with California Health and Safety Code §25100 et seq. (Hazardous Waste Control Act of 1972, as amended) and all other applicable regulations (Title 40 of CFR, 42 U.S.C., and Title 22 of CCR).

The amounts of both non-hazardous and hazardous solid and liquid wastes expected to be generated during the construction of the PEFE are minimal and do not require further mitigation beyond the waste management measures implemented at PEF as part of the original project.

Operation Impacts and Mitigation

The proposed PEFE would generate both nonhazardous and hazardous wastes in solid and liquid forms under normal operating conditions.

Nonhazardous solid wastes

Nonhazardous solid wastes anticipated to be generated during operation of the PEFE would consist of small amounts of maintenance wastes and office wastes, which include paper, packing materials, glass, metal, and plastic. These wastes would be recycled to the extent possible. Non-recyclable wastes would be regularly transported offsite to a solid waste disposal facility (PEFE 2005a Section 3.4.9.1.2). In addition, up to 700 used air filters every five years and 180 oily rags per year are expected to be generated by the PEFE. Spent air filters would be recycled and oily rags would be cleaned at an authorized laundry facility (PEFE 2005a Table 3.4.9-2). The PEF facility currently generates approximately 2-4 cubic yards per day of salt cake from the zero liquid discharge system, which is disposed of at an appropriate landfill according to the results of testing and classification (PEFE 2005a Section 5.14.2.2.2). No increase in salt cake waste is expected from the PEFE (PEFE 2005a Table 3.4.9-2).

Nonhazardous liquid wastes

Nonhazardous liquid wastes would be generated during facility operation, and are discussed in the **Soil and Water Resources** section of this document. Storm water runoff would be managed in accordance with an Erosion and Sediment Control Plan. Process wastewaters would be mostly recovered by a zero liquid discharge system after passing through an oil-water separator (CEC 2000 Page 382). No increase in sanitary wastewater is expected from the PEFE (PEFE 2005a Table 3.4.9-2).

Hazardous wastes

Hazardous wastes anticipated to be generated during routine operation of the PEFE include waste lubricating oil, lubrication oil filters, used hydraulic fluid, spent batteries, spent SCR catalyst, and oil absorbents. For a complete list of these wastes, the amounts expected to be generated, and their disposal methods please refer to Table 3.4.9-2 of the AFC (PEFE 2005a). The amounts of hazardous wastes generated during the operation of the PEFE would be minimal, and recycling methods would be used to the extent possible. The remaining hazardous waste would be disposed of by licensed hazardous waste collection and disposal companies in accordance with California Health and Safety Code §25100 et seq. (Hazardous Waste Control Act of 1972, as amended), 42 U.S.C. (Resource Conservation and Recovery Act), Title 40 of CFR (regulations for implementing RCRA), and Title 22 of CCR (requirements for generators of hazardous waste). The minimal quantities of hazardous waste generated would not significantly impact the treatment and disposal resources available in California.

Impact on Existing Waste Disposal Facilities

Nonhazardous solid wastes

Table 5.14-1 of the PEFE AFC lists three class II and III facilities that would accept nonhazardous solid wastes from the PEFE project. The closest of these landfills, and the one currently used by the PEF facility, is the Bena Landfill located approximately 45 miles away, with a remaining capacity of 31.1 million tons and an estimated closure date in 2033. In total, the three listed facilities (that are currently operating) possess a total of over 39 million tons of remaining capacity. The volume of solid nonhazardous waste from the PEFE requiring off-site disposal would be a very small fraction (far less than 1%) of the existing combined capacity of the available Class III landfills, and would not significantly impact the capacity or remaining life of any of these facilities.

Hazardous wastes

Section 5.14.1.2 in Attachment M of the AFC discusses the three Class I landfills in California: the Buttonwillow Landfill in Kern County, the Superstition Hills Landfill in Imperial County, and the Kettleman Hills Landfill in King's County. The Kettleman Hills facility also accepts Class II and Class III wastes. In total, there is an excess of 20 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with up to 16 years of remaining operating lifetimes. In addition, the Kettleman Hills facility is in the process of permitting an additional 15 million cubic yards of disposal capacity, and the Buttonwillow facility is not expected to reach its capacity until 2040 at current disposal rates. The amount of hazardous waste transported to these landfills has decreased in recent years due to source reduction efforts by generators and the

transport of waste out of state that is hazardous under California law, but not federal law. The referenced section of the AFC also notes several waste oil haulers in Kern County that could recycle waste oil from the PEF project (PEFE 2005a Attachment M).

The volumes of hazardous wastes generated during operation of the PEFE would be minimal. All hazardous wastes generated during both construction and operation would be transported offsite to a permitted treatment, storage, or disposal (TSD) facility for appropriate disposition, preferably recycling. The volume of hazardous waste from the PEFE requiring off-site disposal would be a very small fraction (far less than 1%) of the existing combined capacity of the three Class I landfills, and would not significantly impact the capacity or remaining life of any of these facilities. The site already has a hazardous waste generator identification number from the Department of Toxic Substances Control. According to DTSC staff (DTSC 2005), hazardous waste generator identification numbers (either DTSC or EPA) are site specific and there should only be one I.D. Number for each business location that generates a hazardous waste. As long as the business generates hazardous waste at only one site or business address, or on a contiguous part of the property, the business would only need to have one I.D. Number. If the business is changing the amounts or type of hazardous waste that they generate they will want to check to see if those changes will require a new I.D. Number. If the business generates a RCRA waste greater than 100 kg per month, the business will want to have a U.S. EPA I.D. Number. As long as the business generates California-only or non-RCRA wastes, or RCRA wastes less than 100 kg per month, the business may operate with a California EPA I.D. Number issued by DTSC. Staff finds that the amounts of hazardous waste that would be generated by the expansion would be far less than the 100 kg/month (2200 pounds) RCRA threshold and thus not result in the need to revise or re-issue the current generator identification number. However, If it is determined that hazardous wastes are, or will be (a) stored in tanks or containers for more than ninety (90) days, (b) treated on-site, or (c) disposed of on-site, then a permit from the Department of Toxic Substances Control (DTSC) may be required. The project owner shall contact DTSC to initiate pre-application discussions and determine the permitting process applicable to the facility. This requirement is contained in proposed condition of certification **WASTE-5**.

CUMULATIVE IMPACTS AND MITIGATION

As proposed, the quantities of nonhazardous and hazardous wastes generated during construction and operation of the PEFE would add minimal quantities of waste to those generated by the PEF project. Overall, because the wastes would be generated in minimal quantities, recycling efforts would be prioritized wherever practical, and capacity is available in a variety of treatment and disposal facilities, these added waste quantities generated by the PEFE would not result in significant cumulative waste management impacts.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the PEFE would be able to comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during project construction and operation. The applicant is required to dispose of hazardous and non-hazardous wastes at facilities approved by the various departments

within the California Environmental Protection Agency (CalEPA). Because hazardous wastes would be produced during both project construction and operation, the PEFE project would be required to use the existing hazardous waste generator identification number and would be required to properly store, package and label waste, use only approved transporters, prepare hazardous waste manifests, keep detailed records, and appropriately train employees. Pursuant to California Code of Regulations, Title 22, section 67100.1 et seq., a hazardous waste Source Reduction and Evaluation Review and Plan must be prepared for this Expansion or the existing Pastoria Waste Management Plan revised to reflect the expansion.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The California Department of Toxic Substances Control (DTSC) submitted comments on October 25, 2005, affirming their concurrence that the project would not result in any significant adverse impacts if the waste management measures proposed in the Application for Certification and the proposed conditions of certification are implemented. DTSC also requested inclusion of a new condition to address hazardous waste storage on site. Please see condition of certification **WASTE-5**.

CONCLUSIONS

Management of the wastes generated during construction and operation of the PEFE project would not result in any significant adverse impacts if the waste management measures proposed in the Application for Certification and the proposed conditions of certification are implemented per the pertinent LORS.

The applicant would prepare separate Waste Management Plans for the construction and operation of the PEFE, which would include a description of each waste stream and the management methods planed for each waste or revise their existing plan. Proposed condition of certification **WASTE-4** ensures that these plans would be submitted to the Compliance Project Manager (CPM) and to applicable local agencies prior to construction. Staff believes that the project's compliance with all applicable LORS and the Conditions of Certification proposed by staff would adequately insure that no significant adverse environmental impacts would result from the management and disposal of project-related waste.

Staff has proposed Conditions of Certification **WASTE-1** through **4** which require that: 1) the project owner have an experienced Registered Professional Engineer or Geologist available for consultation during soil excavation and grading activities in the event that contaminated soils are encountered; 2) if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling nature, file a written report, and seek guidance from the CPM and the appropriate regulatory agencies; 3) the project owner notify the CPM whenever the owner becomes aware of any impending waste management-related enforcement action; and 4) the project owner prepare and submit waste management plans for all wastes generated during construction and operation of the facility, or a revised plan for the entire Pastoria power plant and submit them to the CPM and the local agency.

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 Compliance Project Manager (CPM) for review and approval. The resume shall show experience in 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 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 contaminated soil is unearthed during excavation at either the proposed site or linear facilities 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 contamination, and file a written report to the project owner and CPM stating the recommended course of action.

Depending on the nature and extent of contamination, 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 Kern County Environmental Health Services Department, the Kern County Fire Department, and the regional office of the Department of Toxic Substances Control 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 5 days of their receipt. The project owner shall notify the CPM within 24 hours of any orders issued to halt construction.

WASTE-3 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the manner in which project-related wastes are managed.

WASTE-4 The project owner shall prepare a Construction Waste Management Plan and an Operations Waste Management Plan for all wastes generated during construction and operation of the facility, respectively, or shall revise the existing Pastoria Energy Facility waste management plan, and shall submit

both plans to the CPM for review and approval, and to the appropriate local agency for review. The plans shall contain, at a minimum, the following:

- A description of all waste streams, including projections of frequency, amounts generated and hazard classifications; and
- Methods of managing each waste, including treatment methods and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans.

Verification: No less than 30 days prior to the start of site mobilization, the project owner shall submit the Construction Waste Management Plan or a revised Pastoria Energy Facility plan to the CPM for approval and to the appropriate local agency for review.

The Operations Waste Management Plan or a revised Pastoria Energy Facility plan shall be submitted to the CPM no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions within 20 days of notification by the CPM.

In the Annual Compliance Reports, the project owner shall document the actual waste management methods used during the year and provide a comparison of the actual methods used to those the planned management methods proposed in the original Operations Waste Management Plan.

WASTE-5 If it is determined that hazardous wastes are, or will be (a) stored in tanks or containers for more than ninety (90) days, (b) treated on-site, or (c) disposed of on-site, then a permit from the Department of Toxic Substances Control (DTSC) may be required. The project owner shall contact DTSC to initiate pre-application discussions and determine the permitting process applicable to the facility.

Verification: No less than seven (7) days after determining that hazardous wastes are, or will be (a) stored in tanks or containers for more than ninety (90) days, (b) treated on-site, or (c) disposed of on-site, the project shall inform the CPM that DTSC has been informed and that discussions have commenced.

REFERENCES

California Energy Commission (CEC) 2000. Final Staff Assessment, Pastoria Energy Facility, (99-AFC-7). September.

DTSC. 2005. E-mail from Maria Gillette dated August 9.

PEFE (Pastoria Energy Facility Expansion) 2005a – Application for Certification. Submitted to the California Energy Commission on April 29, 2005.

URS Corporation. 2005. Phase I Environmental Site Assessment for the Pastoria Energy Facility. February.

WORKER SAFETY AND FIRE PREVENTION

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

SUMMARY OF CONCLUSIONS

Staff concluded that if the Applicant for the proposed Pastoria Energy Facility Expansion project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as described and required by Conditions of Certification **WORKER SAFETY -1, -2**; and fulfills the requirements of Conditions of Certification **WORKER SAFETY -3**, 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 agency before implementation.

The proposed expansion would consist of one combustion turbine generator located within the existing Pastoria Energy Facility site that is currently served by the local fire department. The fire risks associated with the proposed expansion do not pose significant added demands on local fire protection services.

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 these hazards or to minimize the risk through special training, protective equipment and procedural controls.

The purpose of this Final Staff Assessment (FSA) is to assess the worker safety and fire protection measures proposed by the PEFE 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.

WORKER SAFETY AND FIRE PROTECTION Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
29 U.S. Code sections 651 et seq (Occupational Safety and Health Act of 1970)	This Act mandates safety requirements in the workplace with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC § 651).
40 U.S. Code sections 327 et seq (Contract Work Hours and Safety Standards Act)	These sections require employee health and safety standards for construction activities as specified by CCR Title 8, General Construction Safety Orders.
29 CFR sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR sections 1952.170 to 1952.175	These sections provide Federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the Federal requirements found in 29 CFR §1910.1 to 1910.1500.
State	
8 CCR all sections (Cal/OSHA regulations)	Requires that an employer maintain a safe and healthy workplace for both facility construction and operational phases. It describes many regulations including but not limited to requirements for fire prevention plans, confined space rules, lockout/tagout requirements, hazardous materials use, worker personal protection equipment including respiratory protection, and other detailed safety and health items.
24 CCR section 3, et seq.	Incorporates the current addition of the Uniform Building Code
Health and Safety Code section 25500, et seq.	Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	Requires a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.
Local (or locally enforced)	
Uniform Fire Code, 1997 And NFPA 1 (2005)	Contain standards of the American Society for Testing and Materials (ASTM) and the National Fire Protection Association (NFPA). It is the United State's premier model fire code. It is updated annually as a supplement and published every third year by the International Fire Code Institute to include all approved code changes in a new edition. The Kern County Fire Department is the administrating agency for the UFC.
Applicable Law	**Description**
1998 Edition of California Fire Code and all applicable NFPA standards (24	NFPA standards are incorporated into the California Uniform 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

CCR Part 9)	precautions; 6) storage of combustible materials; 7) exits and emergency escapes; and 8) fire alarm systems. The California Fire Code incorporates current editions of the UFC standards. The Kern County Fire Department is the administering agency for the CFC standards.
Kern County Zoning Ordinance, Development Standards section 19.80.030.	Contains safety setbacks required by the Kern County Fire Department.
NFPA 850	Contains industry standards for fire prevention, detection, and suppression for power plant construction and operation including testing and maintenance of systems.

SETTING

The proposed expansion would be located on the site of the completed and operational Pastoria Energy Facility (PEF). The proposed 160-MW simple cycle power plant would be located in the northwest quadrant of the site and the construction laydown area would be located in the current contractor parking lot located immediately outside the south side perimeter security fence.

Fire support services to the site are now under the jurisdiction of the Kern County Fire Department (KCFD). The closest KCFD station by distance and primary responder to Pastoria Energy Facility Expansion (PEFE) is Mettler Station 55, currently located approximately 16 miles northwest of the PEFE site with a response time of about 15 minutes. This station, however, is currently being relocated to the Tejon Industrial Complex being constructed east of Interstate-5, where it would be about 7 miles from the PEFE site with a response time of 6 to 8 minutes. This relocation is projected to be complete by December 2005 (KCFD 2005a). The second and third closest stations by distance are Lebec Station 56 with a response time of about 13 to14 minutes and Arvin Station 54 with a response time of about 30 minutes (PEFE 2005a Attachment N and CEC 2000 Page 80). Equipment and personnel at these stations and at two additional KCFD stations that can provide backup support are presented in **WORKER SAFETY AND FIRE PROTECTION Table 1**. Emergency medical services including ambulance and helicopter services would be provided by the Westside District Hospital in Taft (45 miles), and/or five other hospitals in the vicinity of Bakersfield (25-30 miles), (PEFE 2005a Attachment N). In the event of a chemical spill, Landco Station 66, located approximately 30 miles north of the project site with a response time of about 30 minutes, will provide hazardous materials response. Staff has determined that the fire suppression, HazMat, and Emergency Medical Services response times are either consistent with or better than at other rural power plant locations previously certified by the Energy Commission.

WORKER SAFETY AND FIRE PROTECTION Table 1
Equipment and Personnel at KCFD*

SFFD Station	Response Time	Distance to PEF	Equipment	Staff per shift
Mettler Station 55 **Current location:** 1801 Mettler Road, West Mettler **New location (After Dec 2005):** Tejon Industrial Complex	Approx. 15 minutes Approx. 6-8 minutes	Approx. 16 miles northwest of the project site Approx. 7 miles west of the project site	1 Type-1 engine 1 Type-4, FWD watershed patrol 1 Type-1 engine 1 Type-4, FWD watershed patrol	1 Captain 1 Engineer 1 Captain 1 Engineer
Lebec Station 56 1548 Golden State Hwy, Lebec	Approx. 13 to 14 minutes	Approx. 16 miles south of project site	2 Type-1 engines 1 Type-4, FWD watershed patrol	1 Captain 1 Engineer 1 Firefighter
Arvin Station 54 301 Campus Dr. Arvin	Approx. 30 minutes	Approx. 30 miles north of project site	2 Type-1 engines 1 Type-4, FWD watershed patrol	1 Captain 1 Engineer 1 Firefighter
Landco Station 66 3000 Landco Dr. Bakersfield	Approx. 30 minutes	Approx. 30 miles north of project site	2 Type-1 engines 1 Type-4, FWD watershed patrol 1 Hazmat unit	1 Captain 1 Engineer 3 Firefighters
Virginia Colony Station 41 2214 Virginia Ave. Bakersfield	Approx. 30 minutes	Approx. 30 miles north of project site	1 Type-1 engines 1 Type-4, FWD watershed patrol 1 Ladder truck	2 Captain 2 Engineers 2 Firefighters 1 Battalion Chief

*Sources: CEC 2000 Page 82, PEFE 2005a Section 5.18.2.1, and KCFD 2005a.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are assessed in Worker Safety and Fire Protection:

1. The potential for impacts on the safety of workers during demolition (if applicable), construction, and operations activities; and
2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition (if applicable), construction, and operations.

Worker safety issues are a matter of adhering to the spirit and intent of the Cal-OSHA regulations. This is essentially a LORS compliance matter and if all LORS are followed, workers will be adequately protected. Thus, the standard for staff's review and determination of significant impacts on 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 protection 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 HazMat emergency at the proposed power

plant site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates the local fire department capabilities in each area and the response time. It interviews the local fire officials to determine if they feel adequately trained, manned, and equipped to respond to the needs of a power plant with its regular use of hazardous materials. Staff then determines if the presence of the power plant would cause a significant impact on a local fire department. If it does, staff will recommend that the applicant mitigate this impact by providing increased resources to the fire department.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Worker Safety

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed project will 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 for the PEFE to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

A Safety and Health Program was prepared by the applicant to minimize worker hazards during construction of the Pastoria Power Plant in 2001 and for operation of the plant in 2005. Staff uses the phrase “Safety and Health Program” to refer to the measures that will be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

The PEFE encompasses construction and operation of one additional natural gas-fired combustion turbine generator and some auxiliary equipment. Workers will be exposed to hazards typical of construction and operation of a gas-fired simple cycle facility and in addition, to the hazards of an existing operating combined-cycle power plant that currently has on-site energized components and acutely hazardous materials.

Construction Safety Orders are published at 8 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 will include the following major components:

- Construction Injury and Illness Prevention Program (8 CCR § 1509)
- Construction Fire Prevention Plan (8 CCR § 1920)
- Personal Protective Equipment Program (8 CCR §§ 1514 - 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) will include:

- Electrical Safety Program
- Motor Vehicle and Heavy Equipment Safety Program;
- Forklift Operation Program;
- Excavation/Trenching Program;
- Fall Protection Program;
- Scaffolding/Ladder Safety Program;
- Articulating Boom Platforms Program;
- Crane and Material Handling Program;
- Housekeeping and Material Handling and Storage Program;
- Respiratory Protection Program;
- Employee Exposure Monitoring Program;
- Hand and Portable Power Tool Safety Program;
- Hearing Conservation Program;
- Back Injury Prevention Program;
- Hazard Communication Program;
- Heat and Cold Stress Monitoring and Control Program;
- Pressure Vessel and Pipeline Safety Program;
- Hazardous Waste Program;
- Hot Work Safety Program;
- Permit-Required Confined Space Entry Program; and
- Demolition Procedure (if applicable).

The applicant has stated that the PEFE does not change or add to the worker safety impacts associated with the existing PEF facility, and therefore no new mitigation beyond what is already implemented at the site is necessary. Attachment N of the PEFE AFC contains the original PEF Worker Safety section (Section 5.17 from 99-AFC-7), which includes adequate outlines of each of the above programs (PEFE 2005a, Attachment N). Staff has already reviewed and approved the construction health and safety programs submitted pursuant to Conditions of Certification for the PEF project. However, due to the unique nature of building an additional power plant that will tie-in at many points to an existing power plant (e.g., electrical, water, acutely hazardous materials, fire prevention, etc.), the project owner will be required to revise and update the construction safety and health program. Additionally, this project would be built in the future and it is possible that future LORS may have changed or that another project owner and/or contractor who does not have the current project owner's commitment to

safety would have the responsibility for worker safety. Therefore, it is necessary to provide a construction safety plan that reflects current laws, ordinances, regulations, and standards prior to the start of construction of the PEFE and which includes detailed programs and plans addressing the specific work environment. Staff thus proposes Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the operation of PEFE project, the existing PEF Operations and Maintenance Safety and Health Program would be revised and updated to reflect the proposed expansion and any applicable updated LORS. This operational safety program would include many safety and health programs and specifically the following programs and plans that would be reviewed and approved by the CPM:

- Injury and Illness Prevention Program (8 CCR § 3203);
- Fire Prevention Program (8 CCR § 3221);
- Personal Protective Equipment Program (8 CCR §§ 3401 to 3411); and
- Emergency Action Plan (8 CCR § 3220).

Attachment N of the AFC includes adequate outlines of the Injury and Illness Prevention Program, Emergency Action Plan, Fire Prevention Program, and Personal Protective Equipment Program (PEFE 2005a Attachment N). Staff has already reviewed and approved these programs submitted pursuant to Conditions of Certification for the PEF project. Once construction and commissioning are complete, the same operational safety and health plan for the existing PEF project can be used for the entire site, including the expansion, with minor revisions and updated LORS. Therefore, if it is necessary as determined by the CPM, the applicant will be required to revise, update, and submit for approval their existing operations health and safety program pursuant to Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

As mentioned above, the applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. The major items required in both Safety and Health Programs are as follows:

Injury and Illness Prevention Program (IIPP)

The Applicant will submit an expanded Construction and Operations Illness and Injury Prevention Programs to the CPM for review and approval 30 days prior to construction and operation of the project, respectively.

The IIPP will include the following components as presented in the AFC (PEFE 2005a Attachment N):

- written safe practices for construction and operation activities
- the identity of person(s) with authority and responsibility for implementing the program;

- system for ensuring that employees and contractors 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;
- a training program for employees, supervisors, and contractors; and
- methods for documenting inspections, training, and maintaining records.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 CCR § 3220), which typically contains the following features:

- 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 system 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.

Table 5.17-3 of Attachment N (PEFE 2005a) provides a sample outline of an appropriate Emergency Action Plan.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 CCR § 3221). The AFC describes the fire protection and prevention measures that were proposed to be implemented for the original PEF project (PEFE 2005a Attachment N). These measures include a “Program Fire Protection Station Order” that will include the following topics:

- persons responsible for maintaining equipment and controlling accumulation of flammable or combustible materials;
- procedures for dealing with fires;
- alarms and protection equipment;
- system and equipment maintenance;

- monthly and annual inspections;
- develop good housekeeping practices and proper materials storage; and
- establish training and instruction requirements.

Staff proposes that the applicant submit final revised and updated Fire Prevention Plans to the California Energy Commission Compliance Project Manager (CPM) for review and approval and to the KCFD for review and comment through proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2** (if necessary as determined by the CPM).

Personal Protective Equipment Program

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are present that due to process, environment, chemicals or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation or physical contact (8 CCR sections 3380 to 3400). The PEFE operational environment will require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and will carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information pertaining to the protective clothing and equipment:

- proper use, maintenance, and storage;
- when the protective clothing and equipment are to be used;
- benefits and limitations; and
- when and how the protective clothing and equipment are to be replaced.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

Written Safety Program

In addition to the specific plans listed above, additional LORS apply to the project, called "safe work practices." Both the Construction and the Operations Safety Programs will address safe work practices under a variety of programs. The components of these programs were listed previously in the Construction Safety and Health Protection section of this analysis.

Safety Training Programs

Employees will 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 hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer worksites typical of large complex industrial type projects such as the construction of 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 has been evident in the audits of power plants under construction recently conducted by the Energy Commission staff. The Federal Occupational Safety and Health Administration has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors to improve their safety and health performance; to assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections; to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and to recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal-OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal-OSHA regulations do, however, require that safety be provided by an employer and the term “Competent Person” is used in many OSHA and Cal-OSHA standards, documents, and directives. A “Competent Person” is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, 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.

Fire Hazards

During construction and operation of the proposed PEFE there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, insulating fluid at the 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 will be adequate to assure prevention from all fire hazards.

The project will rely on both the existing PEF onsite fire prevention systems and local fire protection services. The onsite fire prevention systems provide 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 KCFD (PEFE 2005a, Attachment I Section 5.10.1.7 and Attachment N Section 5.17.2.1.1). Staff has determined that the fire suppression and HazMat response times by the KCFD would be either consistent with or better than at other rural power plant locations previously certified by the Energy Commission. With the relocation of the Mettler Station to Tejon Ranch, the fire suppression response and HazMat first response will be enhanced.

Construction

Construction of the proposed PEFE will be carried out at the existing PEF facility, which is currently operating and equipped with a fire prevention system that would provide adequate protection during construction of the proposed expansion. Safety procedures and training will be implemented during construction to prevent fire risks. The KCFD, which services the PEF site, will also provide backup support during construction of the PEFE (PEFE 2005a Section 4.1.2.2.1 and Attachment N).

Operation

The PEFE will not require any changes to the existing fire protection systems and equipment, which cover the entire facility including the area in which the expansion is proposed. Information provided in the original AFC (99-AFC-7) indicates that the existing PEF meets the fire protection and suppression requirements of the California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal-OSHA requirements. Fire suppression elements existing at PEF include both fixed and portable fire extinguishing systems and the power plant was certified for occupancy by the KCFD.

A CO_2 fire protection system would be provided for the new combustion turbine generators and accessory equipment. The generator transformers and auxiliary power transformer would also be equipped with a deluge spray system. Smoke detectors, flame detectors, temperature detectors, and appropriate class of service portable extinguishers, fire hydrants, and sprinklers are located throughout the facility. The fire detection sensors activate alarms that indicate the location of a fire by zone (PEFE 2005a Section 3.4.12.3). These systems are standard requirement by the NFPA and the UFC and staff concludes that they would ensure adequate fire protection for the PEFE.

The fire water is supplied primarily from the Wheeler Ridge-Maricopa Water Storage District through an underground water system. A tank capable of holding 500,000 gallons of water stores the firewater that is pumped into the firewater loop servicing the entire facility at a rate of up to 3,000 gpm (PEFE 2005a Attachment N and CEC 2000 Page 83).

The applicant will be required to provide the final Fire Prevention Program to the KCFD prior to construction and operation of the Expansion project, to comment on the adequacy of the proposed fire protection measures. It will also be given to the CPM for review and approval.

Emergency Medical Response

A state-wide survey was conducted by staff to determine the frequency of emergency medical response (EMS) and off-site fire-fighter 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 fire-fighting staff. However, staff has determined that the potential for both work-related and non-work related heart attacks exists at power plants. In fact, staff's research on the frquency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work related incidences, including visitors. The need for prompt response within a few minutes is well documented in the medical literature.

Staff believes that the quickest medical intervention can only be achieved with the use of on-site cardiac defibrillator equipment; the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that with the advent of modern cost-effective cardic defibrillation devices, it is proper in a power plant environment to maintain such a device on-site in order to convert cardiac arrythmias resulting from industrial accidents or other non-work related causes. The existing Pastoria Power plant has a cardiac defibrillator located in the control room. PEF has implemented a training and maintenance program to ensure that properly trained employees are available to use the defibrillator in an emergency and that the batteries are fresh and the unit tested per the manufacturer's specifications. Therefore, no additional requirement for this device for the proposed expansion is needed (PEF 2005).

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of the PEFE combined with existing industrial facilities and expected new facilities to result in impacts on the fire and emergency service capabilities of the KCFD. Projects that may contribute to a cumulative impact are listed in Table 5.18-1 of the AFC and discussed in Section 5.18.2 (PEFE 2005a). Staff concludes that the PEFE contribution to cumulative impacts would be insignificant. Given the lack of unique fire hazards associated with a simple cycle gas-fired combustion turbine generator and accessory equipment, staff concludes that the PEFE will not have a significant incremental burden on the department's ability to respond to a fire or medical emergency at the PEF site.

COMPLIANCE WITH LORS

Staff concludes that construction and operation of the PEFE would be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of Worker Safety and Fire Prevention.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Two letters were received from KCFD Deputy Chief Kevin Scott (July 25 and November 14, 2005) noting that mitigation measures aimed at minimizing the impacts of the original PEF facility on the Kern County Fire Department had not been completed by the applicant. Deputy Chief Scott stated that the remote location of the PEF project required mitigation measures that would allow the KCFD to adequately respond with Emergency Medical Services (EMS), fire, and HazMat teams to this facility and for wildland firefighting in the hills and fields surrounding the power plant. According to Deputy Chief Scott, this mitigation included a helicopter pad and hanger to be constructed at the new Tejon Station. Staff discussed this matter with the applicant and with Deputy Chief Scott and believes that this is a compliance matter to be addressed by staff and not a matter of mitigation for the expansion project.

CONCLUSIONS

Staff concludes that if the Applicant for the proposed PEFE provides a revised and updated Project Construction Safety and Health Program and a revised and updated Project Operations and Maintenance Safety and Health Program (if necessary as determined by the CPM) as required by Conditions of Certification **WORKER SAFETY -1**, and **-2**; and fulfills the requirements of **WORKER SAFETY-3**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that the proposed project would not have significant impacts on local fire protection services and that fire suppression, HazMat, and Emergency Medical Services response times are either consistent with or better than at other rural power plant locations previously certified by the Energy Commission.

PROPOSED CONDITIONS OF CERTIFICATION

WORKER SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the PEF Project Construction Safety and Health Program revised and updated to address the unique safety and health hazards associated with construction at an active power plant, any current LORS, and containing the following revised and updated programs:

- A Construction Personal Protective Equipment Program;
- A Construction Injury and Illness Prevention Program;
- A Construction Emergency Action Plan; and
- A Construction Fire Prevention Plan.

The Personal Protective Equipment Program and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Kern County 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 revised and updated Project Construction Safety and Health Program. The project owner shall provide a letter from the Kern County Fire Department providing 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 revised and updated Project Operations and Maintenance Safety and Health Program, if necessary as determined by the CPM, containing the following:

- An Operation Injury and Illness Prevention Plan;
- An Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Program (8 CCR § 3221); and
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

The Operation Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Kern County Fire Department for review and comment.

Verification: At least 30 days prior to the first start-up of the combustion turbine or the energization of any part of the project, the project owner shall submit to the CPM for approval a copy of the revised and updated Project Operations and Maintenance Safety & Health Program, if necessary as determined by the CPM. The project owner shall provide a letter from the Kern County Fire Department containing their comments on the Operations Fire Prevention Plan and the Emergency Action Plan.

WORKER SAFETY-3 The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards, is capable of identifying workplace hazards relating to the construction activities, and has authority to take appropriate action to assure compliance with applicable worker safety requirements and mitigate workplace 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 & federal regulations related to power plant projects;
- Assure that all construction and commissioning workers and supervisors receive adequate safety training;
- Conduct accident and safety-related incident investigations prepare emergency response reports for injuries, and inform the CPM of safety-related incidents; and
- Assure that all the plans identified in **WORKER SAFETY-1 and 2** are implemented.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the CSS. The contact information of any replacement CSS shall be submitted to the CPM the next business day after the replacement.

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.

REFERENCES

California Energy Commission (CEC) 2000. Final Staff Assessment, Pastoria Energy Facility, (99-AFC-7). September 2000.

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.

Kern County Fire Department (KCFD) 2005a. Personal communication with Captain Don Barnett, Mettler Station 55, July 21.

Kern County Fire Department (KCFD) 2005b. Letter received from the KCFD, July 25.

Kern County Fire Department (KCFD) 2005c. Personal communication with Deputy Chief Kevin Scott, August 9.

PEFE (Pastoria Energy Facility) 2005. Personal communication with Mr. Gary Fuller, Plant Manager. September 14.

PEFE (Pastoria Energy Facility Expansion) 2005a – Application for Certification. Submitted to the California Energy Commission on April 29, 2005.

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.

USOSHA (United States Occupational Safety and Health Administration). 1993. Process Safety Management / Process Safety Management Guidelines For Compliance. U.S. Department of Labor, Washington, DC.

ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Shahab Khoshmashrab and Steve Baker

SUMMARY OF CONCLUSIONS

Staff concludes that the design, construction and eventual closure of the project and its linear facilities would likely comply with applicable engineering laws, ordinances, regulations and standards. The proposed Conditions of Certification, below, would ensure compliance with these laws, ordinances, regulations and standards.

INTRODUCTION

Facility Design encompasses the civil, structural, mechanical and electrical engineering design of the project. The purpose of the Facility Design analysis is to:

- verify that the laws, ordinances, regulations and standards (LORS) applicable to the engineering design and construction of the project have been identified;
- verify that the project and ancillary facilities have been described in sufficient detail, including proposed design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all applicable engineering LORS, and in a manner that assures public health and safety;
- determine whether special design features should be considered during final design to deal with conditions unique to the site which could influence public health and safety; and
- describe the design review and construction inspection process and establish Conditions of Certification that will be used to monitor and ensure compliance with the engineering LORS and any special design requirements.

Subjects discussed in this analysis include:

- Identification of the engineering LORS applicable to facility design;
- Evaluation of the applicant's proposed design criteria, including the identification of those criteria that are essential to ensuring public health and safety;
- Proposed modifications and additions to the Application for Certification (AFC) that are necessary to comply with applicable engineering LORS; and
- Conditions of Certification proposed by staff to ensure that the project will be designed and constructed to assure public health and safety and comply with all applicable engineering LORS.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical and electrical) are described in the AFC (PEFE 2005a, Appendices C through F). The 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	2001 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations).
Local	Kern County Ordinances
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

SETTING

The Pastoria Energy Facility Expansion (PEFE) area will comprise approximately two acres, located entirely within the existing Pastoria Energy Facility (PEF) 31-acre site boundary, approximately 30 miles south of downtown Bakersfield in Kern County. The site will lie in seismic 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 Application for Certification (AFC), in Appendices C through F (PEFE 2005a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project is built to the applicable engineering codes in order to ensure public health and life safety. The analysis verifies that the applicable engineering LORS have been identified and that the project and ancillary facilities have been described in sufficient detail. It also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes Conditions of Certification to monitor and ensure compliance with the engineering LORS and any special design requirements. These conditions allow the 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. Staff has assessed the criteria for designing and constructing linear support facilities such as natural gas and electric transmission interconnections. The applicant proposes to use accepted industry standards (see PEFE 2005a Appendices C through F for a representative list of applicable industry standards), design practices and construction methods in preparing and developing the

site. Staff concludes that the 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 compliance.

MAJOR STRUCTURES, SYSTEMS AND EQUIPMENT

Major structures, systems and equipment are defined as those structures and associated components or equipment that are necessary for power production and are costly or time consuming to repair or replace, that are used for the storage, containment, or handling of hazardous or toxic materials, or may become potential health and safety hazards if not constructed according to the applicable engineering LORS. Major structures and equipment will be identified through compliance with proposed Condition of Certification **GEN-2** (below).

The AFC contains lists of the civil, structural, mechanical and electrical design criteria that demonstrate the likelihood of compliance with applicable engineering LORS, and that staff believes are essential to ensuring that the project is designed in a manner that protects public health and safety.

The project shall be designed and constructed to the 2001 edition of the 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 at the time design and construction of the project actually commences. In the event the initial designs are submitted to the Chief Building Official (CBO) for review and approval when the successor to the 2001 CBSC is in effect, the 2001 CBSC provisions, identified herein, shall be replaced with the applicable successor 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 using the appropriate lateral force procedure, staff has included Condition of Certification **STRUC-1** (below), which in part, requires review and approval by the CBO of the project owner's proposed lateral force procedures prior to the start of construction.

PROJECT QUALITY PROCEDURES

The AFC (PEFE 2005a, § 4.3.5) describes a project Quality Program that will be used on the project to maximize confidence that systems and components will be designed, fabricated, stored, transported, installed and tested in accordance with the technical codes and standards appropriate for a power plant. Compliance with design requirements will be verified through an appropriate program of inspections and audits. Employment of this quality assurance/quality control (QA/QC) program would ensure that the project is actually designed, procured, fabricated, and installed as contemplated in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the building official is authorized and directed to enforce all the provisions of the CBC. For all energy facilities certified by the Energy Commission, the Energy Commission is the building official and has the responsibility to enforce the code. In addition, the Energy Commission has the power to render interpretations of the CBC and to adopt and enforce rules and supplemental regulations to clarify the application of the CBC's provisions.

The Energy Commission's design review and construction inspection process is developed to conform to CBC requirements and to ensure that all facility design Conditions of Certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to carry out the design review and construction inspections and act as delegate CBO on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to cover technical expertise not provided by the local official. The applicant, through permit fees as provided by CBC Sections 107.2 and 107.3, pays the costs of the reviews and inspections. While building permits in addition to the Energy Commission certification are not required for this project, in lieu permit fees are paid by the applicant consistent with CBC Section 107, to cover the costs of reviews and inspections.

Engineering and compliance staff will invite the local building authority, the County, or a third party engineering consultant, to act as CBO for the project. When an entity has been identified to perform the duties of CBO, Energy Commission staff will complete a Memorandum of Understanding (MOU) with that entity that outlines 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 applicant's engineers responsible for the design and construction of the project (proposed Conditions of Certification **GEN-1** through **GEN-8**). Engineers responsible for the design of the civil, structural, mechanical and electrical portions of the project are required to be registered in California, and to sign and stamp each submittal of design plans, calculations and specifications submitted to the CBO. These conditions require that no element of construction subject to CBO review and approval shall proceed without prior approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written to require that no element of construction of permanent facilities subject to CBO review and approval, which would be difficult to reverse or correct, may proceed without prior approval of plans by the CBO. Those elements of construction that are not difficult to reverse are allowed to proceed without approval of the plans. The applicant shall bear the responsibility to fully modify those elements of construction to comply with all design changes that result from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service, or decommissioning, as a result of the project reaching the end of its useful life, may range from “mothballing” to removal of all equipment and appurtenant facilities and restoration of the site. Future conditions that may affect the decommissioning decision are largely unknown at this time.

In order to assure that decommissioning of the facility will be completed in a manner that is environmentally sound, safe and will protect public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval prior to the commencement of decommissioning. The plan shall include a discussion of:

- proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
- all applicable LORS, local/regional plans and the conformance of the proposed decommissioning activities to the 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.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure plan.

CONCLUSIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents are those applicable 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 are likely to comply with applicable engineering LORS.

3. The Conditions of Certification proposed will ensure that the proposed facilities are designed and constructed in accordance with applicable engineering LORS. This will occur through the use of design review, plan checking and field inspections, which are to be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

4. Whereas future conditions that may 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 the commencement of decommissioning, the decommissioning procedure is likely to occur in compliance with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The Conditions of Certification proposed herein be adopted to ensure that the project is designed and constructed to assure public health and safety, and to ensure compliance with all applicable engineering LORS;

2. The project be designed and built to the 2001 CBSC (or successor standard, if such is in effect when the initial project engineering designs are submitted for review); and

3. The CBO shall review the final designs, conduct plan checking and perform 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 2001 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations), which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval. (The CBSC in effect is that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously.) The project owner shall insure that all the provisions of the above applicable codes be enforced during any construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility [2001 CBC, Section 101.3, Scope]. All transmission facilities (lines, switchyards, switching stations and substations) are handled in 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 a successor to the 2001 CBSC is in effect, the 2001 CBSC provisions identified herein 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 insure that all contracts with contractors, subcontractors and suppliers shall clearly specify that all work performed and materials supplied on this project comply with the codes listed above.

Verification: Within 30 days after 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 [2001 CBC, Section 109 – 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 which may require CBO approval for the purpose of complying with the above stated codes. The CPM will then determine the necessity of CBO approval on the work to be performed.

GEN-2 Prior to submittal of the initial engineering designs for CBO review, the project owner shall furnish to the CPM and to the CBO a schedule of facility design submittals, a Master Drawing List and a Master Specifications List. 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 when requested.

Verification: At least 60 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the Master Drawing List and the Master Specifications List of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures and equipment listed in **Facility Design Table 2** below. Major structures and equipment shall be added to or deleted from the table only with CPM approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

Facility Design Table 2
Major Structures and Equipment List

Equipment/System	Quantity (Plant)
Combustion Turbine (CT) Foundation and Connections	1
CT Generator Foundation and Connections	1
SCR Stack Structure, Foundation and Connections	1
CT Main Transformer Foundation and Connections	1
Excitation Transformer Foundation and Connections	1
Packaged Electrical and Electronic Control Center Foundation and Connections	1
CT Auxiliary Package Foundation and Connections	1
CT Air Inlet Filter Structure, Foundation and Connections	1
Generator Breaker Foundation and Connections	1
Air Fogging System Foundation and Connections	1
Fuel Gas Coalescing Filters Foundation and Connections	1
CEMS/HR Controls/Deluge Building Structure, Foundation and Connections	1
LCI/Generator Excitation Compartment Foundation and Connections	1
DC Link Reactor Foundation and Connections	1
Fire Protection CO2 Skid Foundation and Connections	1
Electrical Manhole Foundation and Connections	1
Ammonia Injection Skid Foundation and Connections	1
Fuel Gas Scrubber Foundation and Connections	1
CO2 and Hydrogen Bottle Racks	1
Circuit Breaker	1
Drainage Systems (including sanitary drain and waste)	1 Lot
High Pressure and Large Diameter Piping and Pipe Racks	1 Lot
HVAC and Refrigeration Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
Building Energy Conservation Systems	1 Lot
Switchyard, Buses and Towers	1 Lot
Electrical Duct Banks	1 Lot

GEN-3 The project owner shall make payments to the CBO for design review, plan check and construction inspection 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 2001 CBC [Chapter 1, Section 107 and Table 1-A, Building Permit Fees; Appendix Chapter 33, Section 3310 and Table A-33-A, Grading Plan Review Fees; and Table A-33-B, Grading Permit Fees], 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 as otherwise agreed 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 the 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 a resident engineer (RE), to be in general responsible charge of the project [Building Standards Administrative Code (Cal. Code Regs., tit. 24, § 4-209, Designation of Responsibilities)]. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical and electrical portions of the project, respectively. A project may be divided into parts, provided each part is clearly defined as a distinct unit. Separate assignment of general responsible charge may be made for each designated part.

The RE shall:

1. Monitor construction progress of work requiring CBO design review and inspection to ensure compliance with LORS;

2. Ensure that construction of all the facilities subject to CBO design review and inspection conforms in every material respect to the applicable LORS, these Conditions of Certification, approved plans, and specifications;

3. Prepare documents to initiate changes in the approved drawings and specifications when directed by the project owner or as required by conditions on the project;

4. Be responsible for providing the project inspectors and testing agency(ies) with complete and up-to-date set(s) 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 as not conforming to the approved plans and specifications.

The RE shall have the authority to halt construction and to require changes or remedial work, if the work does not conform to applicable requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) are 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-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) a civil engineer; B) a soils engineer, or a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; and C) 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: D) 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; E) a mechanical engineer; and F) an electrical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 requires 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 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 (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 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 [2001 CBC, Section 104.2, Powers and Duties 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 Report, Geotechnical Report or Soils Report 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 design, stamp, and sign all plans, calculations and specifications for proposed site work, civil works and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and

3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes in 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 Report, Geotechnical Report or Soils Report containing field exploration reports, laboratory tests and engineering analysis detailing the nature and extent of the soils that may be susceptible to liquefaction, rapid settlement or collapse when saturated under load [2001 CBC, Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations];

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2001 CBC, Appendix Chapter 33; Section 3317, Grading Inspections (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both); and

4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations [2001 CBC, section 104.2.4, Stop orders].

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare 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 2001 CBC, Appendix Chapter 33; Section 3317, Grading Inspections (depending on the site conditions, this may be the responsibility of either the soils engineer or engineering geologist or both).

D. The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;

2. Provide consultation to the RE during design and construction of the project;

3. Monitor construction progress to ensure compliance with engineering LORS;

4. Evaluate and recommend necessary changes in design; and

5. Prepare and sign all major building plans, specifications and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform with all of the mechanical engineering design requirements set forth in the Energy Commission's Decision.

F. The electrical engineer shall:

1. Be responsible for the electrical design of the project; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of construction, the project owner shall submit to the CBO for review and approval, resumes and registration numbers of the responsible design engineer, mechanical engineer and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, the project owner shall assign to the project, qualified and certified special inspector(s) who shall be responsible for the special inspections required by the 2001 CBC, Chapter 17 [Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection)]; and Section 106.3.5, Inspection and observation program. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;

2. Observe the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action [2001 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]; and

4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans and specifications and the applicable provisions of the applicable edition of the CBC.

   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).

Verification: At least 15 days (or project owner and CBO approved alternative timeframe) 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 the corrective action required [2001 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 be submitted to the CBO for review and approval. The discrepancy documentation shall reference this Condition of Certification and, if appropriate, the applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next Monthly Compliance Report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications and calculations (including all approved changes) at the project site or at another accessible location during the operating life of the project [2001 CBC, Section 106.4.2, Retention of Plans]. 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 final approved engineering plans, specifications and calculations as described above, the project owner shall submit to the CPM a letter stating that the above documents have been stored and indicate the storage location of such documents.

Within 90 days of the completion of construction, the project owner shall provide to the CBO three sets of electronic copies of the above documents at the project owner's expense. These are to be provided in the form of "read only" adobe .pdf 6.0 files, with restricted printing privileges (i.e. password protected), 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 Report, Geotechnical Report or Foundation Investigations Report required by the 2001 CBC [Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations].

Verification: At least 15 days (or project owner and CBO approved alternative timeframe) 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 [2001 CBC, Section 104.2.4, Stop 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 2001 CBC, Chapter 1, Section 108, Inspections; Chapter 17, Section 1701.6, Continuous and Periodic Special Inspection; and Appendix Chapter 33, Section 3317, Grading Inspection. 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 [2001 CBC, Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. 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 [1998 CBC, Section 3318, Completion of Work].

Verification: Within 30 days (or project owner and CBO approved alternative timeframe) 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, 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 commence 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 (i.e., 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 [2001 CBC, Section 108.4, 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 [2001 CBC, Section 106.4.2, Retention of plans; and Section 106.3.2, Submittal documents];

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 [2001 CBC, Section 106.3.4, Architect or Engineer of Record]; and

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to the applicable LORS [2001 CBC, Section 106.3.4, Architect or Engineer of Record].

Verification: At least 60 days (or project owner and CBO approved alternative timeframe) 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 are in compliance with the requirements set forth in the applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);

2. Concrete pour sign-off sheets;

3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the 2001 CBC, Chapter 17, Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection); Section 1702, Structural Observation and Section 1703, Nondestructive Testing.

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 [2001 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]. The NCR shall reference the Condition(s) of Certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the 2001 CBC, Chapter 1, Section 106.3.2, Submittal documents and Section 106.3.3, Information on plans and specifications, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

Verification: On a schedule suitable to the CBO, the project owner shall notify the CBO of the intended filing of design changes, and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the Monthly Compliance Report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in Chapter 3, Table 3-E of the 2001 CBC shall, at a minimum, be designed to comply with the requirements of that Chapter.

Verification: At least 30 days (or project owner and CBO approved alternate timeframe) 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 said construction [2001 CBC, Section 106.3.2, Submittal Documents; Section 108.3, Inspection Requests; Section 108.4, Approval Required; 2001 California Plumbing Code, Section 103.5.4, Inspection Request; Section 301.1.1, Approval].

The responsible mechanical engineer shall stamp and sign all plans, drawings and calculations for the major piping and plumbing systems subject to the CBO design review and approval, and submit a signed statement to the CBO when the said proposed piping and plumbing systems have been designed, fabricated and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards [Section 106.3.4, Architect or Engineer of Record], which may include, but not be limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);
- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- Specific City/County code.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency [2001 CBC, Section 104.2.2, Deputies].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) 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 the 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 the 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 said installation [2001 CBC, Section 108.3, 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 project owner and CBO approved alternative timeframe) 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 said 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 [2001 CBC, Section 108.7, Other Inspections; Section 106.3.4, Architect or Engineer of Record].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) 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 electrical equipment and systems 480 volts and higher, listed 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 [CBC 2001, Section 106.3.2, 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 [2001 CBC, Section 108.4, Approval Required, and Section 108.3, 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 to 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 to 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 project owner and CBO approved alternative timeframe) 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

PEFE (Pastoria Energy Facility Expansion). 2005a. Application for Certification. Submitted to the California Energy Commission on April 29, 2005.

GEOLOGY AND PALEONTOLOGY

Testimony of Dal Hunter, Ph.D., C.E.G.

SUMMARY OF CONCLUSIONS

With the exception of strong ground shaking during an earthquake, the Pastoria Energy Facility Expansion site lies in an area that generally exhibits low geologic hazards. The effects of strong ground shaking must be mitigated through structural design as required by the California Building Code (2001). There are no known viable geologic or mineralogic resources. Paleontological Resources have been documented in the general area of the project, though no significant fossils were found during construction of the much larger, initial phase of the Pastoria Energy Facility. The potential impacts to paleontological resources due to construction activities will be mitigated as required by Conditions of Certification.

Based on this information, it is staff's opinion that the potential for significant adverse cumulative impacts to the project from geologic hazards, and to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project, is low. It is Energy Commission staff's opinion that the Pastoria Energy Facility Expansion can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that protects environmental quality and assures public health and safety.

INTRODUCTION

In this section, Energy Commission staff discusses potential impacts of the proposed Pastoria Energy Facility Expansion (PEFE) regarding geologic hazards, geologic (including mineralogic), and paleontologic resources. Staff's objective is to ensure that there will be no significant adverse impacts to important geological and paleontological resources during project construction, operation, and closure. A brief geological and paleontological overview of the project is provided. The section concludes with staff's proposed monitoring and mitigation measures with respect to geologic hazards and geologic, mineralogic, and paleontologic resources, with the inclusion of Conditions of Certification.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

The applicable LORS are listed in the Application for Certification (AFC), in Section 5.3, 5.5, and 5.8 (PEFE 2005a). The following is a brief description of the current laws, ordinances, regulations, and standards (LORS) for geologic hazards and resources, and mineralogic and paleontologic resources.

Geology and Paleontology Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	The proposed PEFE is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
State	
CBSC, 2001 (particularly Part 2, CBC)	The CBC includes a series of standards that are used in project investigation, design and construction (including grading and erosion control).
Local	
SVP, 1995	The "Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic 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 Society for Vertebrate Paleontology, a national organization of professional scientists.

SETTING

The proposed PEFE site is a two acre parcel within the limits of the existing Pastoria Energy Facility (PEF) site, which is operational. The proposed expansion consists of a single, natural-gas-fired, simple cycle turbine generator producing an additional 160MW.

The existing PEF site is approximately 31 acres in size and is located about 30 miles south of Bakersfield, California. The PEFE is proposed to be constructed on a 2-acre portion of the 31-acre PEF site. The proposed PEFE will also use 25 acres of the 40-acre construction laydown area approved as part of 99-AFC-7. No additional ancillary facilities will be required by the proposed expansion.

REGIONAL SETTING

The Pastoria Energy Facility (PEF) is located in the mouth of Pastoria Canyon which sits in an area of the southern margin of the San Joaquin Valley, known as the Tejon Embayment. The PEF is constructed on alluvial and fanglomerate deposits generated by erosion. The alluvium is Pleistocene in age and is made up of silty sands and gravels. Fanglomerates, made up of dense sands, gravels, and cobbles, are present locally, but are restricted to areas of the alluvial fan that have experienced high velocity water discharge (flash floods) in the past.

Three other geologic units exist in the vicinity of the site and/or beneath the fanglomerate and alluvium. These units include: the Vaqueros Formation, the Santa Margarita Formation, and the Chanac Formation. The Vaqueros Formation is Oligocene to Miocene in age. The formation contains marine sediments made up of massive sandstones and conglomerates and is considered to be highly sensitive since it is known to contain vertebrate fossils outside of the project area in a subunit called the Teyuca Beds.

The Santa Margarita Formation is Miocene in age and is made up of marine and non-marine sands and gravels. Both terrestrial and marine vertebrate fossils have been reported in this unit.

The Chanac Formation is a Miocene age continental and marine formation in the Tejon Hills. The unit is made up of poorly sorted and poorly bedded detritus from the nearby mountains, claystone, and rhyolite. Terrestrial vertebrate fossils have been reported in this unit.

PROJECT SITE DESCRIPTION

The original grade at the energy facility footprint was shallow (4 percent). The 30-acre site gradually varies in elevation from a low of 1,058 feet above mean sea level to a high of 1,088 feet above mean sea level. Cut and fill operations have modified the uniform natural slope into a series of stepped construction pads. No permanent surface water bodies are located on or adjacent to the PEFE; however, there is an ephemeral stream drainage (Pastoria Creek) located approximately 1,000 feet to the west.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

There are two types of impacts considered in this section. The first are geologic hazards, which could impact proper functioning of the proposed facility and include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, and tsunamis and seiches. The second considers 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 with respect to geologic hazards and geologic and mineralogic resources apply to this project; however, the CBSC and CBC provide geotechnical and geological investigation and design guidelines, which engineers must adhere to when designing a proposed facility. As a result, the criteria used to assess geologic hazard impact significance includes evaluating each potential hazard in relation to being able to adequately design and construct the proposed facility.

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, provides a checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts.

- Section (V) (c) asks if the project will directly or indirectly destroy a unique paleontological resource or site or unique geological feature.
- Sections (VI) (a), (b), (c), (d), and (e) pose questions that are focused on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) pose questions about the project's effect on mineral resources.

With respect to impacts the proposed facility may have on existing geologic and mineralogic resources, geologic and mineral resource maps for the surrounding area have been reviewed, in addition to any site-specific information provided by the applicant, to determine if geologic and mineralogic resources are present in the area. When available, operating procedures of the proposed facility, in particular ground water extraction and mass grading, are reviewed to determine if such operations could adversely impact such resources.

Staff reviewed existing paleontologic information for the surrounding area, as well as site-specific information generated by the applicant as Conditions of Certification for the PEF. All research was conducted in accordance with accepted assessment protocol (SVP, 1995) to determine if there are any known paleontologic resources in the general area. If present or likely to exist, Conditions of Certification are applied to the project approval, which outlines procedures required during construction to mitigate impacts to potential resources.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking during an earthquake represents the only known geologic hazard at this site. This potential hazard can be effectively mitigated through facility design. Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section should mitigate these impacts to a less than significant level.

No viable geologic or mineralogic resources are known to exist in the area. Paleontological resources have been documented on the PEF project site, and the native materials exhibit a high sensitivity rating with respect to containing significant paleontologic resources. Since the proposed PEFE 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 moderate in native materials. This assessment is, based on SVP criteria and monitoring reports compiled during PEF construction. 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.

GEOLOGICAL HAZARDS

The AFC (PEFE2005a) provides documentation of potential geologic hazards at the PEFE plant site, in addition to some subsurface exploration information. Review of the AFC, coupled with our independent research, indicates that the potential for geologic hazards to impact the plant site is low.

Our independent research included review of available geologic maps, reports, and related data of the PEFE plant site. Geological information was available from the California Geological Survey (CGS), California Division of Mines and Geology (CDMG), and other governmental organizations.

Faulting and Seismicity

Energy Commission staff reviewed the California Division of Mines and Geology publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions*, dated 1994 (CDMG 1994) and aerial photos of the

proposed energy facility footprint (DWR 1990) in 2000. Energy Commission staff visited the proposed PEF site on February 17, 2000, prior to any ground disturbance, and did not observe any surface faulting on the ground or in aerial photos. No active faults are known to cross the PEF proposed 2-acre expansion.

The project is located within seismic zone 4 as delineated on Figure 16-2 of the 2001 edition of the California Building Code. The closest known active fault is the Pleito fault (a thrust fault) which is located 1 kilometer (km) (0.6 miles) south of the proposed energy facility. The Pleito fault dips to the south near the footprint of the energy facility. The proposed energy facility is located on the foot wall side of the Pleito fault. The estimated peak horizontal ground acceleration for the power plant is 0.52g based on a moment magnitude 7 earthquake on the Pleito fault. The potential of surface rupture on a fault at the energy facility footprint is considered to be very low, since no faults are known to have ruptured the ground surface of the proposed energy facility location. The Southern California Edison Pastoria Substation is located approximately 2 km (1.25 miles) south of the PEFE and on the hanging wall side of the projection of the Pleito fault. The substation is the tie-in for the 230kV transmission line from the PEF switchyard.

The 230kV PEF electric transmission line crosses the projected trace of the Pleito fault. The natural gas supply pipeline crosses the Springs fault (route 3) at milepost 6.75. The Springs fault is not currently zoned as an earthquake hazard under the Alquist-Priolo Earthquake Hazard Zone mapping program. The applicant has indicated that the fault may have experienced displacement during the 1952 Bakersfield earthquake, but this is not confirmed. The Springs fault is not considered to be capable of generating a large (magnitude 7 or greater) earthquake since it is fairly short in length; the mapped exposure is less than 15 km (9 miles) (PEF 1999a).

The White Wolf fault is located approximately 16 km (10 miles) north of the proposed PEFE. In July 1952 a magnitude 7.5 earthquake occurred on this fault to the east of the proposed energy facility expansion. In June 1988 a local magnitude 5.2 earthquake occurred 53 km (33 miles) south-southeast of Bakersfield. The fault on which the earthquake occurred was not determined. The Edmonston Pumping Plant is located 1.2 km (0.75 miles) from the proposed PEFE. The level of strong ground shaking from the earthquake was estimated to be 0.08g at the plant. Even though this level of strong ground shaking was low, some equipment damage and ground cracking of the access road leading to the Edmonston Pumping Plant were reported (Schiff 1989). Staff did not see any surface evidence of soil failures that could have been attributed to strong ground shaking from either Bakersfield earthquake.

Liquefaction

Liquefaction is a condition in which a cohesionless soil may lose shear strength due to a sudden increase in pore water pressure. Because the alluvium under the site is dense and the depth to ground water is in excess of 100 feet below existing grade, the potential for liquefaction at the power plant site is negligible.

Dynamic Compaction

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase in soil density). The decrease in volume can result in settlement of overlying structural improvements.

The potential for dynamic compaction is considered very low since geotechnical exploration borings indicate a dense soils profile.

Hydrocompaction

Hydrocompaction is the process of the loss of soil volume upon the application of water. The soils at the site are coarse and dense enough that hydrocompaction is not considered to be a potential problem at the PEFE.

Subsidence

Ground subsidence is typically caused by petroleum or ground water withdrawal such that the effective unit weight of the soil profile is increased, which increases the effective stress on the deeper soils. This results in consolidation/settlement of the underlying soils. Since the project site alluvium and engineered fill are dense and the applicant is not proposing to pump ground water, staff has determined that there is no significant potential for subsidence due to ground water withdrawal at the proposed PEFE.

Expansive Soils

Soil expansion occurs when clay-rich soils, with an affinity for water, exist in-place at a moisture content below their plastic limit. The addition of moisture from irrigation, capillary tension, water line breaks, etc. causes the clay soils to collect water molecules in their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to movement of overlying structural improvements. Two soil units are reported to occur within the footprint of the proposed energy facility, the Hesperia sandy loam and the Psamments-Xerolls complex. Both the Hesperia sandy loam and Psamments-Xerolls complex are considered to have a low shrink-swell potential (PEF 1999a). As a result, the potential for expansive soils to impact the project facilities is considered low.

Landslides

No landslides were observed on or adjacent to the proposed energy facility footprint during a staff site visit on February 17, 2000. Landsliding potential at the PEFE site is negligible, since the proposed energy facility is located on a broad, gently sloping (4 percent to the northwest) alluvial fan.

Flooding

The PEFE lies on an alluvium fan complex. Such geomorphic features are predominantly the result of numerous, infrequent but intense flash flood events. The coarser, fanglomerates represent localized, high-energy debris flows. The upstream California Aqueduct structures may reduce the flash flood/debris flow potential at this site.

The Federal Emergency Management Agency has mapped the site as lying within Flood Zone A. Flood Zone A is described as an area where flooding is expected during a 100-year storm, but where base flood elevations have not been determined (FEMA, 1986). It is staff's understanding that the PEF construction included diversion structures to further mitigate flooding hazards that could potentially affect either PEF or PEFE.

Tsunamis and Seiches

The proposed PEFE site is not near any large body of water. As a result, the potential for tsunamis to affect the operation of the facility is considered negligible. There is also no potential for a seiche wave to impact the operation of the facility.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff have reviewed applicable geologic maps and reports for this area (CDC, 2001; CDMG, 1988; CDMG, 1990; CDMG, 1992a and b; CDMG, 1994; CDMG, 1998; CDMG, 1999). No geological resources have been identified at the energy facility location, the natural gas supply line route, or the water supply line route. Mineralogical resources in the vicinity of the project include sand, gravel, oil and gas. There is an active sand and gravel quarry northeast of the power plant footprint. The site is located near the Tejon oil field. Energy Commission staff's review of California Department of Conservation, Division of Mines and Geology Special Report 147 (CDMG 1988) indicates that the proposed energy facility site and linear facilities location are designated by the California Department of Conservation, Division of Mines and Geology as MRZ-2 (areas with known mineral resources (aggregate)) and MRZ-3 (areas containing mineral deposits the significance of which can not be evaluated from the available data). The PEFE site is located in MRZ-2, but it is only a small area within the recently completed PEF. As a consequence, the area has already been excluded as an aggregate resource for the foreseeable future.

Regarding paleontological resources, Energy Commission staff has reviewed the paleontological resources assessments, Attachment G to the AFC (PEFE, 2005a) and the Paleontological Compliance Reports prepared in accordance with Condition of Certification **PAL-6** for the original PEF project (Lawler Associates Geoscience, 2004a; 2004b).

Surficial geology at the energy facility footprint location is made up of Quaternary alluvium and fanglomerate, however, geologic units beneath and adjacent to the alluvium and fanglomerate include the Santa Margarita Formation, the Chanac Formation, and the Vaqueros Formation. No in-situ paleontological resources were reported by the applicant's consultant during their field surveys from July 27 to August 8, 1999. The applicant has indicated that the alluvium has been reported to yield vertebrate fossils in other areas. These fossils suggest that the alluvium has a high sensitivity with respect to paleontological resources.

The Santa Margarita Formation is Miocene in age, and is made up of marine sands and non-marine sands and gravels. The unit is known to have yielded both marine and terrestrial vertebrate fossils near the project site. The proximity of the paleontological

resources location to the project marks this formation with a high sensitivity and high potential with respect to paleontological resources.

The Vaqueros Formation is Oligocene to Miocene in age. The formation contains marine sediments made up of massive sandstones and conglomerates and is considered to be highly sensitive, since it is known to contain vertebrate fossils outside of the project area in a subunit called the Teyuca Beds. The applicant has identified the Vaqueros Formation as highly sensitive, but the potential for encountering significant paleontological resources is considered to be low with the exception of the Teyuca Beds unit. The Teyuca Beds unit is not anticipated to be encountered during construction of the project.

The last formation is the Chanac Formation, which is a Miocene age continental and marine formation in the Tejon Hills. The unit is made up of poorly sorted and poorly bedded detritus from the nearby mountains, claystone, and rhyolite. Terrestrial vertebrate fossils have been recovered from this unit. The fossils include remains of horses, antelope, pig, elephant, and camel (PEF 1999a pp. 5.8-9). This unit is assigned a high sensitivity with respect to paleontological resources.

No fossils were observed by Energy Commission staff at the energy facility during a site visit on February 17, 2000. No significant paleontological resources were reportedly found by the applicant's paleontologist during field surveys of the PEF and its linear facilities. However, significant fossils finds were noted during PEF construction, as documented by the project Paleontological Compliance Reports (Lawler Associates Geoscience, 2004a; 2004b). Staff have proposed Conditions of Certification that will enable the applicant to mitigate impacts upon paleontological resources to a less than significant level should they be encountered during construction, operation, and closure of the project.

Construction Impacts and Mitigation

As noted above, no viable geologic or mineralogic resources are known to exist in the area. Paleontological resources have been documented with 1 mile of the project site, and the native materials exhibit a high sensitivity rating with respect to containing significant paleontologic resources. The Paleontological Compliance Reports, compiled after construction of the PEF, documented few fossils of any significance (Lawler Associates Geoscience, 2004a; 2004b). The PEF was a much larger project and involved substantially more ground disturbance than the proposed PEFE.

Since construction of the proposed project will still include significant grading, foundation excavation, and utility trenching, staff considers the probability that paleontological resources will be encountered to be high in native materials, based on SVP assessment criteria. **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.

Operation Impacts and Mitigation

Operation of the proposed additional turbine generator should not have any adverse impact on geologic, mineralogic, or paleontologic resources.

CUMULATIVE IMPACTS AND MITIGATION

With the exception of strong ground shaking during an earthquake, the PEFE site lies in an area that generally exhibits low geologic hazards and no known viable geologic or mineralogic resources. Strong ground shaking must be mitigated through foundation design as required by the CBC. Paleontological resources have been documented in the general area of the project, although few were found during construction of the PEF. The potential impacts to paleontological resources due to construction activities will be mitigated as required by **Conditions of Certification PAL-1 to PAL-7**.

Based on this information, it is staff's opinion that the potential for significant adverse cumulative impacts to the project from geologic hazards, and to potential geologic, mineralogic, and paleontologic resources from the proposed project is very low.

Based upon the literature and archives search, field surveys and compliance documentation for the PEF project, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the PEFE. Energy Commission staff agree with the applicant that the facility can be designed and constructed to minimize the effect of geologic hazards at the site, and that impacts to vertebrate fossils encountered during construction of the power plant and associated linears would be mitigated to a level of insignificance.

The proposed Conditions of Certification are to allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will ensure compliance with LORS applicable to geologic hazards, and geologic, mineralogic, and paleontologic resources.

FACILITY CLOSURE

A definition and general approach to closure is presented in the General Conditions section of this assessment. Facility closure activities are not anticipated to impact geologic, mineralogic, or paleontologic resources. This is due to the fact that no such resources are known to exist at the power plant location or along its proposed linears. In addition, decommissioning and closure of the power plant should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed in plant decommissioning and closure would have been disturbed during construction and operation of the facility.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were filed by agencies or the public. The applicant filed comments on geology and paleontology recommending elimination of the Conditions of Certification relating to paleontology. Staff has determined that based on the evidence of significant fossil finds and recommendations contained in the reports by the PEF paleontologists, that to not require monitoring through Conditions of Certification **PAL-1** through **PAL-7** would result in significant impacts during construction.

CONCLUSIONS

The applicant will likely be able to comply with applicable LORS, provided that the proposed Conditions of Certification are followed. The project should have no adverse impact with respect to design and construction of the project, and 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 Geology are covered under Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section. Paleontological Conditions of Certification follow.

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, then the project owner shall obtain CPM approval of the replacement PRS. The project owner shall submit to the CPM to keep on file, resumes of the 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 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 and 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 beginning on-site duties.

3. Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction laydown areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements, the project owner shall provide copies to the PRS and CPM. The site grading plan and the 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 can be at a scale of 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the power plant changes, then the project owner shall provide maps and drawings reflecting these changes to the PRS and CPM. Maps and drawings may be limited to the boundaries of the PEFE project.

If construction of the project will proceed 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. Prior to work commencing 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 during the next week, 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 revision, as appropriate, to the Paleontological Resources Monitoring and Mitigation Plan (PRMMP) for the existing PEF to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the revised PRMMP by the CPM shall occur prior to any ground disturbance. The revised 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 a basis for discussion in the event that on-site decisions or changes are proposed. Copies of the revised PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The revised PRMMP shall be developed in accordance with the guidelines of the Society of Vertebrate Paleontology (SVP, 1995) and shall update, as necessary, the following elements of the approved PRMMP for the existing PEF:

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 the 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 the monitoring and sampling;

6. A discussion of the 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 meets the Society of Vertebrate Paleontology standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed to receive any 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 revised PRMMP to the CPM. The revised PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the revised 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 in areas where no previous significant excavation has occurred, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for all recently employed project managers, construction supervisors and workers who are involved with or operate ground disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of an initial in-person PRS training during the project kick-off for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interest or concern. No ground disturbance shall occur prior to CPM approval of the WEAP, unless specifically approved by the CPM.

The revised Worker Environmental Awareness Program (WEAP) shall address the potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such 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 shall be provided 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 Certification of Completion of WEAP form signed by each worker indicating that they have received the training; and

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

Verification:

1. At least 30 days prior to ground disturbance, the project owner shall submit the proposed revised WEAP including the brochure with the set of reporting procedures the workers are 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 on using a video for interim training.

3. If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

4. In the Monthly Compliance Report (MCR) the project owner shall provide copies of the WEAP Certification of Completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the revised PRMMP all construction-related grading, excavation, trenching, and augering in areas where potentially fossil-bearing materials have been identified. In the event that the PRS determines full time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the revised 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 different from the accepted schedule presented in the revised 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 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) keeps a daily log of monitoring 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 immediately 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 when construction has been halted due to a paleontological find.

The project owner shall ensure that the PRS prepares a summary of the monitoring and other paleontological activities that will be placed in the Monthly Compliance Reports (MCR). 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, etc. A section of the report shall include the geologic units or subunits encountered; descriptions of sampling 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 and 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 revised 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 revised 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 the project construction.

Verification: The project owner shall maintain in their 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 completion and approval of the CPM-approved revised Paleontological Resource Report (See **PAL-7**). The project owner shall be responsible to pay 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 revision to the Paleontological Resources Report (PRR) for the existing PEF 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 submitted 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 revised Paleontological Resources Report under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
Pastoria Energy Facility Expansion (Docket #05-AFC-01)

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, Paleontology and Biological Resources for all personnel (i.e., construction supervisors, crews and plant operators) working on-site or at related facilities. By signing below, the participant indicates that they understand and shall abide by the guidelines set forth in the Program materials. Include this completed form in the Monthly Compliance Report.

No.	Employee Name	Title/Company	Signature
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Cultural Trainer: _____ Signature:_____Date: ___/___/____

PaleoTrainer: _____ Signature:_____Date: ___/___/____

Biological Trainer: _____ Signature:_____Date: ___/___/__

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POWER PLANT EFFICIENCY

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

The Pastoria Energy Facility Expansion project would add a nominal 160 MW of peaking, load following and baseload power to the existing 750 MW Pastoria Energy Facility at a project fuel efficiency of 35.1 percent lower heating value at full load. While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

INTRODUCTION

The Energy Commission makes findings as to whether energy use by the Pastoria Energy Facility Expansion Project (PEFE) will result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the PEFE'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 will 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 LORS apply to power plant efficiency.

SETTING

Calpine Corporation (Calpine) proposes to construct and operate the 160 MW (nominal net output)[1] simple cycle PEFE, selling peaking, load following and baseload energy and capacity into the deregulated merchant power market, thus providing capacity to the South-of-Path-15 market. Calpine further hopes to sell power to the nearby California Department of Water Resources (CDWR) Edmonston Pumping Plant under a

[1] Note that this nominal rating of 160 MW is based upon preliminary design information and generating equipment manufacturers' guarantees. The project's actual maximum generating capacity may differ from this figure.

bilateral contract (PEFE 2005a, AFC §§ 1.2, 2.0, 3.1, 3.9.2.1, 3.9.2.1.1, 3.9.2.1.3). The PEFE is intended to run from short-term peaking duty up to 8,000 hours per year if market conditions justify (PEFE 2005a, AFC §§ 1.3.2, 3.1, 3.4.1, 3.9.1, 3.9.2.1.1, 3.9.2.1.3; PEFE 2005i, p. 41).[2] The unit would employ inlet air fogging to maintain power output and efficiency during periods of high ambient temperatures (PEFE 2005a, AFC §§ 3.9.2.1.3, 4.3.2; Table 3.4.1-1; Fig. 3.4-1; PEFE 2005h, data response 37). Natural gas would be transmitted to the plant by the existing 14-mile long pipeline that conducts gas to the currently operating PEF from the Kern River/Mojave Pipeline Company's pipeline (PEFE 2005a, AFC §§ 1.3.3, 3.1, 3.4.7, 3.7.1; Table 1-1).

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 quantities of energy. Under average ambient conditions, the PEFE, at continuous full load, would burn natural gas at a nominal rate of 37,535 million Btu per day, lower heating value (LHV) (PEFE 2005a, AFC Fig. 3.4-1). This is a substantial rate of energy consumption, and holds the potential to impact energy supplies. Under expected ambient conditions at the project site, electricity would be generated at a full load efficiency of approximately 35.1 percent LHV (PEFE 2005a, AFC Fig. 3.4-1).

[2] Calpine's Application for Certification requested a license to operate up to 8,760 hours per year (continuous full load). Calpine later submitted a suggested Condition of Certification that would effectively limit operation to 8,000 hours per year. See Project Configuration, below.

Adverse Effects On Energy Supplies And Resources

Calpine has described its sources of supply of natural gas for the project (PEFE 2005a, AFC §§ 1.3.3, 3.4.7, 4.3.3, 4.3.3.1, 4.3.3.2). Natural gas for the PEFE would be supplied from the Kern River/Mojave Pipeline Company natural gas transmission pipeline that supplies the existing PEF project. This natural gas system has access to gas from the Rocky Mountains and the Southwest. This represents a resource of considerable capacity, adequate for a project of this size. The Energy Commission's Natural Gas Market Assessment (CEC 2003) predicts that adequate supplies of natural gas will be available. 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 fuel would be supplied to the project by the existing 14-mile long 20-inch diameter pipeline that supplies the currently operating Pastoria Energy Facility (PEF) project from the Kern River/Mojave Pipeline Company's 40-inch diameter transmission pipeline (PEFE 2005a, AFC §§ 1.2, 1.3.3, 3.4, 3.4.7, 3.7.1, 3.9.2.6.3, 4.3.3.1; Table 1-1). This is a resource with adequate delivery capacity for a project of this size. There is no real likelihood that the PEFE would require the development of additional energy supply capacity.

Compliance With Energy Standards

No standards apply to the efficiency of the PEFE or other non-cogeneration projects.

Alternatives To Reduce Wasteful, Inefficient And Unnecessary Energy Consumption

The PEFE could be deemed to create significant adverse impacts on energy resources if alternatives existed that would significantly 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's stated objective is to sell peaking and load following energy and capacity into the deregulated merchant power market, providing capacity to the South-of-Path-15 market. Calpine further hopes to sell baseload power to the nearby CDWR Edmonston Pumping Plant under a bilateral contract (PEFE 2005a, AFC §§ 1.2, 2.0, 3.1, 3.9.2.1, 3.9.2.1.1, 3.9.2.1.3). Calpine intends for this facility to operate in peaking and load following duty up to a maximum of 8,000 hours per year (PEFE 2005a, AFC § 1.3.2, 3.4.1; PEFE 2005i, p. 41). The PEFE would be configured as a simple cycle power plant (PEFE 2005a, AFC §§ 1.2, 1.3.2, 3.1, 3.4, 3.4.4, 3.9.1, 3.9.2.1.4, 4.3.1.4; Table 1-1). This configuration, with its short start-up time and fast ramping[3] capability, is well suited to providing peaking and load following power.

[3] Ramping is increasing and decreasing electrical output to meet fluctuating load requirements.

During the Site Visit and Informational Hearing on September 9, 2005, the Committee expressed concern that Calpine requests a license to operate a simple cycle peaking power plant for up to 8,760 hours per year. Such use would amount to base load operation. Employing a simple cycle plant in place of a more fuel efficient combined cycle plant for baseload generation could be seen as a significant waste of energy, in the form of natural gas fuel. In response to this concern, Calpine submitted a suggested condition of certification (PEFE 2005i, p. 41) that could limit project operation to 1,280,000 megawatt-hours per year (MWh/yr).

Calpine's proposed generation limitation of 1,280,000 MWh/yr, from this 160 MW power plant, is equivalent to a capacity factor of 91.3 percent.[4] General Electric, the machine's manufacturer, has published data that show this machine, the Frame 7F operating in simple cycle, typically exhibits an availability factor of 93 percent (GE 2001).[5] The difference between these two numbers (149 hours per year) is inconsequential. In effect, Calpine has not proposed to limit the machine's output at all.

Energy Commission staff believes that unrestricted output from a simple cycle gas turbine power plant such as the PEFE is, in general, acceptable. A simple cycle peaker offers operational flexibility, in the form of short start-up and shutdown times and fast ramping capability, that less flexible combined cycle plants cannot offer. Further, the deregulated power market into which Calpine proposes to sell the output of the PEFE should act to prevent wasteful use of the plant, as its fuel costs would drive up its cost of operation compared to more efficient combined cycle plants. Such more efficient plants would be expected to underbid the PEFE and sell power when the PEFE is uneconomical to operate.

The ability of the PEFE to compete in the market for peaking and load-following power, however, is in question. While the PEFE lies south of Path 15, it would deliver its output into the Big Creek system, a portion of California's transmission grid that is congested and transmission-limited. While some of the congestion in this system is caused by wind turbines at Tehachapi, whose output often does not coincide with peak demand periods, there are still significant transmission barriers to the PEFE's acting as a peaking resource. Absent being able to offer this advantage to the grid, it can be argued that the PEFE should not be built as a simple cycle plant, but rather as a more efficient combined cycle.

In spite of staff's belief that the market, with its bidding processes, will allow more efficient generators to operate while less efficient are idled, the Committee's concerns over fuel efficiency cannot be ignored. While staff does not recommend a condition of certification limiting operation of the PEFE from the standpoint of fuel consumption, staff offers an example of such a condition should the Committee and the Energy Commission deem it desirable to include in the Commission Decision.

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[4] That is, the machine would generate 91.3 percent of the energy that it would have generated had it run at full load, continuously, for one year.

[5] An availability factor of 93 percent means that these machines are typically capable of generating the equivalent of full load power for 93 percent of the year (8,147 hours) when scheduled maintenance and unexpected outages are factored in.

It is impossible to predict how much actual peaking and load-following service the PEFE might see. In order to propose a limit on operation, staff suggests that the PEFE's annual operating hours could be limited in proportion to its fuel efficiency vis á vis that of the PEF, the currently operating combined cycle plant at this site. The PEFE's efficiency is projected at 35.1 percent LHV; the PEF's efficiency is similarly estimated at 54.9 percent LHV (PEF 1999). Multiplying the ratio of these numbers by the number of hours in a year and the unit's generating capacity (160 MW) yields approximately 900,000 MWh/yr, thus:

$$\frac{35.1\%}{54.9\%} \times \frac{8760 \text{ hrs}}{\text{yr}} \times 160 \text{ MW} = 896{,}105 \ \frac{\text{MWh/yr}}{}$$

This represents the energy equivalent of 5,600 hours of full-load operation per year.

See below for staff's suggested Condition of Certification **EFFIC-1**.

Equipment Selection

Modern gas turbines embody the most fuel-efficient electric generating technology available today. The PEFE would employ a General Electric Frame 7F gas turbine generator (PEFE 2005a, AFC §§ 1.2, 1.3.2.3.1, 3.4.4; Fig. 3.4-1; Table 1-1). The gas turbine to be employed in the PEFE represents one of the more modern and efficient such machines now available. This machine is nominally rated at 171.7 MW and 36.5 percent efficiency LHV at ISO[6] conditions (GTW 2005).

Efficiency Of Alternatives To The Project

Alternative Generating Technologies

Alternative generating technologies for the PEFE were considered in the AFC for the PEF (PEF 1999, AFC §§ 3.11.3.1, 3.11.3.2, 3.11.3.3). Fossil fuels (oil and coal), biomass, geothermal, solar, hydroelectric and wind technologies were all considered. Biomass and fossil fuels other than natural gas cannot meet air quality limitations. Renewables require more physical area and are not always available when peaking power is needed. Given the project objectives, location, and air pollution control requirements, staff agrees with Calpine that only natural gas-burning technologies are feasible.

Natural Gas-Burning Technologies

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil-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.

[6] International Standards Organization (ISO) standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure (equivalent to sea level).

Capital cost is also important in selecting generating machinery. Recent progress in the development of gas turbines, incorporating technological advances made in the development of aircraft (jet) engines, combined with the cost advantages of assembly-line manufacturing, has made available machines that not only offer the lowest fuel costs, but at the same time sell for the lowest per-kilowatt capital cost.

Calpine proposes to employ a General Electric Frame 7F gas turbine generator (PEFE 2005a, AFC §§ 1.2, 1.3.2, 3.1, 3.4.4; Fig. 3.4-1; Table 1-1). The gas turbine to be employed in the PEFE represents one of the more modern and efficient such machines now available. This machine is nominally rated at 171.7 MW and 36.5 percent efficiency LHV at ISO conditions (GTW 2005). Alternative machines that can meet the project's objectives are the Siemens SGT6-5000F and the Alstom GT24.

The Siemens SGT6-5000F gas turbine generator in simple cycle configuration is nominally rated at 198.3 MW and 38 percent efficiency LHV at ISO conditions (GTW 2005).

The Alstom GT24 gas turbine generator in simple cycle configuration is nominally rated at 187.7 MW and 36.9 percent efficiency LHV at ISO conditions (GTW 2005).

Machine	Generating Capacity (MW)	ISO Efficiency (LHV)
GE Frame 7F	**171.7**	**36.5 %**
Siemens	198.3	38.0 %
Alstom GT24	187.7	36.9 %

Source: GTW 2005

While the Frame 7F exhibits a slight disadvantage in fuel efficiency compared to the alternative machines, any differences among the three in actual operating efficiency will be relatively insignificant. Other factors such as generating capacity, cost, the ability to meet air pollution limitations, and parts commonality with the other three Frame 7F machines that constitute the PEF are some of the factors considered in selecting the turbine model.

Inlet Air Cooling

A further choice of alternatives involves the selection of gas turbine inlet air-cooling methods.[7] The two commonly used techniques are the evaporative cooler or fogger, and the chiller; both devices increase power output by 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, 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.

[7] A gas turbine's power output decreases as ambient air temperature rises.

Calpine proposes to employ fogging (PEFE 2005a, AFC §§ 3.9.2.1.3, 4.3.2; Table 3.4.1-1; Fig. 3.4-1; PEFE 2005h, data response 37). Given the relative lack of clear superiority of one system over the other, staff agrees that Calpine's approach will yield no significant adverse energy impacts.

In conclusion, the generating equipment chosen appear to represent the most efficient feasible combination to satisfy the project objectives. There are no simple cycle alternatives that could significantly reduce energy consumption.

CUMULATIVE IMPACTS

Staff knows of no nearby projects that could combine with the PEFE to yield cumulative fuel supply impacts.

Staff believes that construction and operation of the project would not bring about indirect impacts, in the form of additional fuel consumption, that would not have occurred but for the project. Older, less efficient power plants consume more natural gas to operate than new, more efficient plants such as the PEFE (CEC 2003, CEC 2004rr). The high efficiency of the proposed PEFE should allow it to compete favorably, running at a high capacity factor, replacing less efficient power generating plants, and therefore having no impact on, or even reducing, the cumulative amount of natural gas consumed for power generation.

CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 160 MW of peaking and load following electric power, at a fuel efficiency of 35.1 percent LHV at full load. 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, with incorporation of the proposed limitation on operation, the project would present no significant adverse impacts upon energy resources. No cumulative impacts on energy resources are likely.

PROPOSED CONDITION OF CERTIFICATION

While staff does not recommend a condition of certification for this project, it offers the following Condition as a suggestion, should it be deemed necessary by the Energy Commission.

EFFIC-1 In the event the project operates 900,000 megawatt hours or more per year for two consecutive years, the project owner will, at its option, do one of the following to ensure that the project will not continue to operate at that level of energy production:

a. File an application with the Energy Commission to convert the project to a combined-cycle plant; or

b. File an application with the Energy Commission to construct a new combined-cycle plant.

If an application under items a or b is not filed within six months after the end of the second consecutive year, the project is prohibited from operating at more than thirty percent of its maximum annual energy production until this condition is satisfied.

Verification: The project owner shall include in its Annual Compliance Report, or in a separate report filed at a time agreed to by the CPM, a summary of the megawatt hours of operation for the project for the prior year. If the project operates 900,000 megawatt hours or more for two consecutive years, the project owner shall file its application to the Energy Commission under item a. or b. above within six months after the end of the second consecutive year.

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POWER PLANT RELIABILITY

Testimony of Steve Baker

SUMMARY OF CONCLUSIONS

Calpine Corporation predicts an overall availability factor of 95 percent or greater, which staff believes is achievable. Based on a review of the proposal, staff concludes that the plant will 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.

INTRODUCTION

In this analysis, Energy Commission staff addresses the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would likely not degrade the overall reliability of the electric system it serves (see **Setting** 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 reliability of power generation. While Calpine has predicted an overall availability factor of 95 percent or greater for the Pastoria Energy Facility Expansion Project (PEFE) (see below), staff uses typical industry norms as a benchmark, rather than Calpine's projection, to evaluate the project's reliability.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

No federal, state of local 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 (CAISO), that purchase, dispatch, and sell electric power throughout the State. How the CAISO and other control area operators will ensure system reliability has only recently been determined. 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 being employed to ensure an adequate supply of reliable power.

The CAISO also requires those power plants selling ancillary services, as well as those holding reliability must-run contracts, to fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the Cal-ISO.

The CAISO's mechanisms to ensure adequate power plant reliability apparently have been 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 is 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 exhibit individual reliability sufficiently lower than this historical level, the assumptions used by CAISO to ensure system reliability will prove invalid, with potentially disappointing results. Until the restructured competitive electric power system has undergone a thorough shakeout period, and the effects of varying power plant reliability are thoroughly understood and compensated for, staff will recommend that power plant owners continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

Calpine plans to employ the PEFE to sell peaking, load following, and baseload energy and capacity into the deregulated merchant power market, providing capacity to the South-of-Path-15 market. Calpine further hopes to sell power to the nearby California Department of Water Resources Edmonston Pumping Plant under a bilateral contract (PEFE 2005a, AFC §§ 1.2, 2.0, 3.1, 3.9.2.1, 3.9.2.1.1, 3.9.2.1.3). Calpine expects the PEFE to exhibit an overall availability of 95 percent or greater, and to exceed 98 percent availability over a 12-month period (PEFE 2005a, AFC §§ 1.3.2, 3.4.1, 3.9.2.6). The plant is intended to run from short-term peaking duty up to 8,760 hours per year (continuous full-load) if market conditions justify (PEFE 2005a, AFC §§ 1.3.2, 3.1, 3.4.1, 3.9.1, 3.9.2.1.1, 3.9.2.1.3).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Commission must make findings as to the manner in which the project is to be designed, sited and operated to ensure safe and reliable operation (Cal. Code Regs., tit. 20, § 1752(c)). Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if the project exhibits reliability at least equal to that of other power plants on that system.

The *availability* of a power plant is the percentage of the time that it is available to generate power; both planned and unplanned outages subtract from its availability. Measures of power plant *reliability* are based on its actual ability to generate power when it is considered available and are based on starting failures and unplanned, or forced, outages. For practical purposes, reliability can be considered a combination of these two industry measures, so that a reliable power plant is one that is available when called upon to operate. Throughout its intended 30-year life (PEFE 2005a, AFC § 3.9.1), the PEFE will be expected to perform reliably. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If they compare favorably, staff can conclude that the PEFE will be as reliable as other power plants on the electric system, and will therefore not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will be ensured by use of appropriate quality assurance/ quality control (QA/QC) programs during design, procurement, construction and operation of the plant, and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

Quality Control Program

The Applicant describes a QA/QC program (PEFE 2005a, AFC §§ 3.9.2.6.2, 4.3.1.1, 4.3.5.1, 4.3.5.2) typical of the power industry. Equipment will be purchased from qualified suppliers, based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs and quality history will be evaluated. The project owner will perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility called on to operate for long periods of time must be capable of being maintained while operating. A typical approach for achieving this is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The Applicant plans to provide appropriate redundancy of function for the project (PEFE 2005a, AFC §§ 3.4.6.4, 3.4.6.5, 3.9.2.5, 3.9.2.6.1, 4.3.2). The fact that the Pastoria Energy Facility (including the PEFE) will consist of four combustion turbine-generators and two steam turbine-generators configured as independent equipment trains provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to continue to generate (at reduced output). Further, all plant ancillary systems are also designed with adequate redundancy.

With this opportunity for continued operation in the face of equipment failure, staff believes that equipment redundancy will be sufficient for a project such as this.

Maintenance Program

The Applicant proposes to establish a plant preventive maintenance program typical of the industry (PEFE 2005a, AFC §§ 3.9.2.1.2, 3.9.2.6.1, 3.9.2.6.2, 4.3.1.1, 4.3.1.3, 4.3.1.4). Equipment manufacturers provide maintenance recommendations with their products; the applicant will base its maintenance program on these recommendations. The program will encompass preventive and predictive maintenance techniques. Maintenance outages will be planned for periods of low electricity demand. In light of these plans, staff expects that the project will be adequately maintained to ensure acceptable reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

Fuel Availability

The PEFE will burn natural gas from the Kern River/Mojave pipeline system. Natural gas fuel will be supplied to the project by the existing 14-mile long 20-inch diameter line that conducts gas to the existing Pastoria Energy Facility (PEF) from the Kern River/ Mojave 42-inch diameter pipeline (PEFE 2005a, AFC §§ 1.3.3, 3.1, 3.4.7, 3.7.1; Table 1-1). The Kern River/Mojave pipeline transmits natural gas from Wyoming and Texas (PEFE 2005a, AFC §§ 4.3.3.1, 4.3.3.2). This system represents an adequate and reliable source of fuel for the PEFE. The Energy Commission's own predictions (CEC 2003) regard the supply of natural gas to be adequate for more than 20 years to come. Staff agrees with Calpine's prediction that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The PEFE will obtain water for turbine inlet air cooling and turbine auxiliary cooling from the Wheeler Ridge/Maricopa Water Storage District (WRMWSD) line 14-G via the existing 0.15-mile 24-inch diameter pipeline that supplies the PEF (PEFE 2005a, AFC §§ 1.2, 1.3.4, 3.1, 3.4, 3.4.8.1, 3.7.2, 4.3.4; Table 1-1). Utility and plumbing system water will be provided by the existing PEF water systems.

PEFE water consumption is projected not to exceed 66,000 gallons per day (PEFE 2005a, AFC §§ 1.3.4, 3.1, 3.4.8.1). The WRMWSD has committed to meeting this demand (PEFE 2005a, AFC § 1.3.4). Should instantaneous total plant water consumption exceed the makeup capacity of the WRMWSD connection, as could occur on a hot day when all turbine are operating at full load, on-site storage tanks will provide adequate interim water supply (PEFE 2005a, AFC § 4.3.4).

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. Tsunamis (tidal waves), seiches (waves in inland bodies of water), and flooding will not likely represent a hazard for this project, but seismic shaking (earthquake) and high winds, dust and heat may present credible threats to reliable operation (PEFE 2005a, AFC § 4.1.1; Attachment A § 4).

Seismic Shaking

The site lies within Seismic Zone 4 (PEFE 2005a, AFC § 3.5.1); see that portion of this document entitled **Geology, Mineral Resources, and Paleontology**. The project will be designed and constructed to the latest applicable LORS (PEFE 2005a, AFC §§ 3.5.1, 4.1.1, 4.1.1.1; Attachment A § 4). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking compared to older facilities, due to the fact that these LORS have been periodically and continually upgraded. By virtue of being built to the latest seismic design LORS, this project will likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see that portion of this document entitled **Facility Design**. In light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no special concern with power plant functional reliability affecting the electric system's reliability due to seismic events.

High Winds, Dust and Heat

The PEFE will be subject to strong winds, wind-blown dust and high ambient temperatures. Structures will be designed and built to the current codes and standards regarding structural integrity and building climate control, as were the PEF facilities (PEFE 2005a, AFC §§ 4.1.1.1, 4.1.1.2; Attachment A § 4). This will ensure adequate protection from these hazards.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as many other related reliability data) are kept by the North American Electric Reliability Council (NERC). NERC continually polls utility companies throughout the North American continent on project reliability data through its Generating Availability Data System (GADS), and periodically summarizes and publishes the statistics on the Internet (http://www.nerc.com). NERC reports the following summary generating unit statistics for the years 1999 through 2003 (NERC 2005):

For Gas Turbine units (All MW sizes)

Equivalent Availability Factor = 88.37 percent

The gas turbines that will be employed in the project have been on the market for several years now, and can be expected to exhibit typically high availability. The applicant's prediction of an overall availability factor of 95 percent (PEFE 2005a, AFC §§ 1.3.2, 3.4.1, 3.9.2.6) appears reasonable compared to the NERC figure for similar plants throughout North America (see above). 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, maintenance will be scheduled during those times of year when the plant's 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

Calpine proposes to sell peaking and load following energy and capacity into the South-of-Path-15 market (PEFE 2005a, AFC §§ 1.2, 2.0, 3.1, 3.9.2.1, 3.9.2.1.1, 3.9.2.1.3). A reliable supply of power to this market can be regarded as a benefit.

CONCLUSION

Calpine predicts an overall availability factor of 95 percent or greater, 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

CEC (California Energy Commission). 2003. Natural Gas Market Assessment, August 2003. Document No. 100-03-006.

McGraw-Hill (McGraw-Hill Energy Information Services Group). 1994. Operational Experience in Competitive Electric Generation, an Executive Report, 1994.

NERC (North American Electric Reliability Council). 2005. 1999-2003 Generating Availability Report.

PEFE (Pastoria Energy Facility Expansion). 2005a. Application for Certification. Submitted to the California Energy Commission on April 29, 2005.

TRANSMISSION SYSTEM ENGINEERING

Testimony of Sudath Arachchige and Mark Hesters

SUMMARY OF CONCLUSIONS

- The proposed Pastoria Energy Facility Expansion Project switchyard, outlet lines, and terminations are acceptable and would comply with all applicable laws, ordinances, regulations, and standards, contingent on following assumptions:
- No additional new or modified interconnection transmission facilities, other than those proposed by the applicant for the outlet configuration, are required for the interconnection of the 157 MW Pastoria Energy Facility Expansion Project.
- Staff proposed conditions of certification TSE-1 through TSE-8 in this staff assessment should be implemented.
- The Pastoria Energy Facility Expansion exacerbates forecasted overloads on the SCE transmission system and a Facility Study is required to determine both the appropriate mitigation and the parties responsible for the mitigation.
- The System Impact Study shows that many pre-project or transmission overloads forecasted without the proposed project are exacerbated by the Pastoria Energy Facility Expansion Project. Because mitigation of pre-project overloads is expected to occur even without the presence of the proposed project, the potential mitigation measures are not a reasonably foreseeable consequence of the Pastoria Energy Facility Expansion Project.
- The System Impact Study identifies one overload resulting from the interconnection of the Pastoria Energy Facility Expansion Project. However, the Antelope-Cottonwind 230 kV transmission line is a facility planned as part of the transmission upgrades needed to deliver wind generation in the Tehachapi region to loads in California and does not exist. Mitigation of an overload on this planned facility is not a reasonably foreseeable consequence of the proposed generating project.

INTRODUCTION

The Transmission System Engineering (TSE) analysis identifies whether or not the transmission facilities associated with the proposed project conform to all applicable laws, ordinances, regulations, and standards (LORS), required for safe and reliable electric power transmission, and assesses whether or not the applicant has accurately identified all interconnection facilities required for the project.

Staff's analysis evaluates the power plant switchyard, outlet lines, termination and downstream facilities identified by the applicant proposes conditions of certification to ensure the project complies with applicable LORS during the design review, construction, operation and potential closure of the project.

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 (Cal. Code Reg., tit. 14, §15378). Therefore, the Energy Commission must identify and evaluate the environmental effects of construction and operation of any new or modified transmission facilities required for the project's interconnection to the electric grid, this evaluation must include any facilities beyond the project's interconnection with the existing transmission system, though such facilities are not under the permit authority of the Energy Commission, that are required as a result of the power plant addition to the California transmission system.

The California Independent System Operator (CAISO) is responsible for ensuring electric system reliability for all participating transmission owning utilities and determines both the standards necessary to achieve reliability and whether a proposed project conforms to those standards. The CAISO will provide testimony on these matters at the Energy Commission's hearings.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

TSE Table 1 provides a brief list of the Laws, Ordinances, Regulations and Standards that apply to this analysis. A detailed description of these LORS is provided in TSE Attachment 1.

TSE Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
North American Electric Reliability Council (NERC Planning Standards)	Principles designed to insure the adequacy and security of the transmission network.
National Electric Safety Code 1999 (NESC)	Provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
Regional	
Western Electricity Coordinating Council (WECC) Reliability Criteria	Insure continuity of load service and protection of the interconnected grid.
State	
California Public Utilities Commission (CPUC) General Order (GO) 95 and 98	Rules for overhead and underground line construction
CA ISO Reliability Criteria	Incorporate NERC and WECC standards and some additional requirements.

FACILITY DESCRIPTION

The proposed Pastoria Energy Facility Expansion Project (PEFE) will add a nominal 157 MW to the existing Pastoria Energy Facility. The PEF Expansion project

incorporates one additional natural gas-fired, F-class combustion turbine generator (CTG) operating in simple cycle mode into the original three-unit Pastoria Energy Facility, for a total of four CTG units. The PEFE project would be connected to the recently constructed Lebec 230 kV substation. The PEF Expansion project will utilize the existing Pastoria Energy Facility's 1.38-mile long, 230 kV transmission line connecting to the existing Southern California Edison (SCE) Pastoria substation.

FACILITY LOCATION

The existing Pastoria Energy Facility site is approximately 31 acres in size and is located approximately 30 miles south of downtown Bakersfield, and approximately 6.5 miles east of Interstate 5 at the base of the Tehachapi Mountains in Kern County, California. The PEF Expansion will use a two-acre portion of the same 25-acre construction lay down area identified in 99-AFC-7. Construction is proposed to begin June 2006 and last 12 months. Operation of the expansion is expected in June 2007.

SWITCHYARD FACILITIES

The generator output passes through two winding, oil filled, 18 kV to 230 kV, 150/250 MVA step-up transformer where the voltage is increased to a transmission level of 230 kV. The step-up transformer is connected to the grid through the existing 230 kV switchyard at the SCE Pastoria substation. Surge arrestors are installed on the High Voltage bushings of the transformer to protect the transformer from surges due to lighting strikes, switching or other disturbances on the 230 kV system. The PEF Expansion adds one 230 kV SF6 circuit breaker to the existing switchyard using one bay of the existing Lebec substation.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHEOLD FOR DETERMINING SIGNIFICANCE

For interconnecting a proposed generating unit to the grid, a System Impact Study (SIS) and a Facility Study (FS) are generally performed to determine the alternate and preferred interconnection methods. The studies also determine the downstream transmission system impacts of the proposed project, and the mitigation measures needed to insure system conformance with performance levels required by utility reliability criteria, NERC planning standards, WECC reliability criteria, and CA ISO reliability criteria. The studies determine both positive and negative impacts and for the reliability criteria violations, determine the alternate and preferred additional transmission facilities or other mitigation measures. The studies are conducted with and without the new generation project and its interconnection facilities. The studies normally include a Load Flow study, Transient Stability study, Post-transient Load Flow study, and Short Circuit study. 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. The studies must be conducted under the normal condition (N-0) of the system and also for all credible contingency/emergency conditions, which includes the loss of a single system element (N-1) such as a transmission line, transformer, or a generator and the simultaneous loss of two system elements (N-2), such as two transmission lines or a transmission line and a generator. Equipment that is loaded beyond 100 percent of its

rating constitutes a violation of the reliability criteria. Generally voltages must be within 95 percent and 105 percent of the base level. In addition to the above analysis, the studies may be performed to verify whether sufficient active or reactive power is available in the area system or area sub-system to which the new generator project would be interconnected.

New or modified downstream facilities that are a reasonably foreseeable consequence of the proposed project are analyzed from an engineering and environmental perspective but are not licensed by the Commission.

ANALYSIS AND IMPACTS

SYSTEM RELIABILITY

The interconnecting utility, in this case, SCE, performs a System Impact Study to determine the alternate and preferred interconnection facilities to the grid, downstream transmission system impacts and their mitigation. The SIS is conducted in conformance with system performance levels as required in utility reliability criteria, NERC/WECC and CA ISO planning standards.

Scope of System Impact Study

The System Impact Study (SIS) performed by SCE identified the transmission system impacts caused by the PEFE project on the SCE system. The SIS included a Power Flow Study, Short Circuit Study, and Dynamic Stability Analysis (PEF2005c). The study modeled the proposed PEFE with a net output of 157 MW. The base case included all approved SCE, PG&E and LADWP transmission projects, modeled major transmission system path flows, and the proposed queue of generation projects. The detailed assumptions are included in the SIS. The transmission grid at was analyzed using 2006 Heavy Summer and 2007 Heavy Spring base cases under normal (N-0), Cal-ISO Category B (N-1) and Category C (N-2) contingency conditions. The Power Flow study assessed the project's impact on the thermal loading of the transmission lines and equipment. Dynamic stability studies were conducted using the 2006 Heavy Summer base case to determine whether the PEFE would create instability in the system following certain selected outages. Short circuit studies were conducted with and without the PEFE to determine if the PEFE would result in overstressed substation facilities.

Power Flow Study Results

Based on the SIS results there are no adverse reliability impacts directly attributable to the PEFE under normal or contingency conditions. The PEFE does exacerbate existing overloads on the SCE transmission system and a Facility Study is required to determine both the appropriate mitigation and the parties responsible for the mitigation. The SIS provided a summary of the overload violation under the required criteria (PEF2005c).

Normal (N-0) Conditions

Under Heavy Summer conditions with the PEFE;

- Antelope-Mesa 230kV T/L loading was marginally increased from 100-percent to 115-percent.
- Antelope-Cottonwind 230kV T/L loading was marginally increased from 98-percent to 102-percent.

Under Light Spring conditions with the PEFE:

- Antelope-Mesa 230kV T/L loading was marginally increased from 109-percent to 114-percent.
- Antelope-Cottonwind 230kV T/L loading was marginally increased from 107-percent to 112-percent.
- Pardee-Pastoria-Warne 230kV T/L was marginally increased from 105-percent to 110-percent.

Contingency N-1/Cal-ISO Category B Conditions

The System Impact Study identified a total of eight single contingency overloads under heavy summer conditions and nine single contingency overloads under Light Spring conditions:

- Under Heavy Summer conditions, five different 230 kV transmission line overloads were increased by the PEFE (See Table 7-1 in the System Impact Study, PEF2005c).
- Under Light Spring conditions, the pre-project overloads on eight different 230 kV transmission lines was increased by the PEF Expansion (See Table 7-2 in the System Impact Study, PEF2005c).

Contingency N-2/CA ISO Category C Conditions

The SIS identified a total of fourteen double contingencies under heavy summer conditions and thirteen double contingencies under light spring conditions which resulted in thermal overload problems on transmission facilities.

- Under Heavy Summer conditions, the PEFE exacerbates overloads on ten different 230 kV transmission lines (See Table 7-1 in the System Impact Study, PEF2005c).
- Under Light spring conditions, the PEFE exacerbates overloads on nine different 230 kV transmission lines (See Table 7-3 in the System Impact Study, PEF2005c).

Potential Mitigation Measures

The System Impact Study forecasts many pre-project overloads that are exacerbated by the PEF Expansion. The SIS discusses mitigation measures but specific measures will only be identified in the Facility Study and approved through a subsequent CAISO concurrence letter.

Potential Mitigation Measures identified by the SIS:

1. The CA ISO review of the System Impact Study indicates that modification of the existing Special Protection Scheme (SPS) or any new SPS would not be approved as mitigation because the SPS generation would exceed the CA ISO Planning Standards (1,150 MW for N-1 contingency and 1,400 MW for N-2 contingency).

2. Build a new 230kV transmission line from Pastoria to Pardee substations.

3. Rebuild the existing Antelope-Mesa 230kV Transmission Line with 500kV single-circuit construction between Antelope and Rio Hondo substations, and 230kV double-circuit construction with a single bundled 1590 ACSR conductor between Rio Hondo and Mesa substations.

4. Rebuild the Antelope-Magunden No.2 230kV Transmission Line south of the proposed Cottonwind 230kV substation with bundled 1590 ACSR conductor.

5. Reconductor the existing Pastoria-Pardee-Warne 230kV Transmission Line with new ACSS/TW class conductor to avoid a tear-down and rebuild of the existing tower structures.

6. If reconductoring the existing Pastoria-Pardee-Warne 230kV Transmission Line with new ACSS/TW class conductor is not feasible, develop the cost estimates for the tear-down and rebuild of the Pastoria-Pardee-Warne 230kV transmission line with bundled 1590 ACSR conductor.

Transient Stability Study Results

Dynamic Stability studies were conducted by SCE for the PEFE using 2006 Heavy Summer and 2006 Heavy Spring base cases. These studies determine whether or not the PEFE would create any adverse impacts on the stable operation of the transmission grid following selected Cal-ISO category B (N-1) & C (N-2) outages. Transient stability simulations were run for ten-second duration. The results indicate that the system remained stable under both single and double contingency conditions with the existing Big Creek and Pastoria Energy Facility SPS. As a result, the PEFE will need to participate in a SPS that requires the entire PEFE to be tripped to mitigate the incremental contribution to thermal overload problems. Transient stability studies did not identify a violation of the recently WECC approved Generator Electric Grid Fault Ride-Through Capability Criteria.

Short Circuit Study Results

Short circuit studies were conducted by SCE to determine fault current increases in the SCE system and the adjacent utility power systems. Three-phase (3-Ph) and line-to-ground (L-G) fault conditions were simulated. The study results indicate that the PEFE addition increases short-circuit duties by an amount equal or greater than 0.1 kA at seven locations. Breakers at the following seven locations should be evaluated for replacement; Lugo 500 kV, Mammoth 230 kV, Magunden 230 kV, Pardee 230 kV, Pastoria 230 kV, Sylmar 230 kV, and Vincent 230 kV. The Facility Study will evaluate the breaker replacements.

Compliance with LORS

The project will comply with the NERC, WECC, and Cal-ISO planning standards and reliability criteria. The proposed PEFE interconnection facilities include transmission lines, substation and switchyard facilities involving underground and overhead equipment. The applicant will design, build and operate the proposed facilities according the provisions of GO 95 and 128 or the NESC, Title 8, NEC, applicable interconnection and related industry standards.

FACILITY CLOSURE

Planned closure occurs in a designed and orderly manner for instance at the end of its useful economic or mechanical life or due to gradual obsolescence. Under these conditions, the owner is required to provide a plan 12 months prior to closure. The planned closure will be in conformance with all applicable LORS and will be adequate to provide safety and system reliability. For example, a planned closure provides time for the project owner to prevent the STG, CTGs and their respective GSU transformers from being energized through the switchyard. Alternatively, the owner may maintain power service using the switchyard to supply critical station service equipment or other loads.

Unexpected temporary closure occurs when the facility is closed suddenly for a short term due to unforeseen situations such as a natural or other disaster or emergency. During these situations the facility cannot insert power into the utility system. An unexpected temporary closure is one of the situations that is required to be addressed in an on-site contingency plan can accommodate the unexpected temporary closure (see **General Conditions Including Compliance Monitoring and Closure Plan**).

Unexpected permanent closure occurs when the project owner abandons the facility. This is considered to be a permanent closure. The owner remains accountable for implementing the on-site contingency plan. It also includes unexpected closure where the owner is unable to implement the contingency plan and the project is essentially abandoned. An on-site contingency plan will be developed to assure safety and reliability (see **General Conditions Including Compliance Monitoring and Closure Plan**). This plan will be approved by the Energy Commission's Compliance Project Manager (CPM) prior to the beginning of commercial operation of the facility.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments related to the TSE have been received.

CONCLUSIONS

- The proposed Pastoria Energy Facility Expansion Project switchyard, outlet lines, and terminations are acceptable and would comply with all applicable laws, ordinances, regulations, and standards, contingent on following assumptions:

- No additional new or modified interconnection transmission facilities, other than those proposed by the applicant for the outlet configuration, are required for the interconnection of the 157 MW Pastoria Energy Facility Expansion Project.
- Staff proposed conditions of certification TSE-1 through TSE-8 in this staff assessment should be implemented.
- The Pastoria Energy Facility Expansion exacerbates forecasted overloads on the SCE transmission system and a Facility Study is required to determine both the appropriate mitigation and the parties responsible for the mitigation.
- The System Impact Study shows that many existing transmission overloads, or overloads forecasted without the proposed project are exacerbated by the Pastoria Energy Facility Expansion Project. Because mitigation of pre-project overloads is expected to occur even without the presence of the proposed project, the potential mitigation measures are not a reasonably foreseeable consequence of the Pastoria Energy Facility Expansion Project.
- The System Impact Study identifies one overload that results from the interconnection of the Pastoria Energy Facility Expansion Project. However, the Antelope-Cottonwind 230 kV transmission line, is a facility planned as part of the transmission upgrades needed to deliver wind generation in the Tehachapi region to loads in California and does not exist. Mitigation of an overload on this planned facility is not a reasonably foreseeable consequence of the proposed generating project.

PROPOSED CONDITIONS OF CERTIFICATION

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
Take off facilities
Electrical Control Building
Switchyard Control Building
Transmission Pole/Tower
Grounding System

TSE-2 Prior to the start of construction the project owner shall assign an electrical engineer and at least one of each of the following to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or D) a mechanical engineer. (Business and Professions Code Sections 6704 et seq., require state registration to practice as a civil engineer or structural engineer in California.)

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical or civil and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes; if site conditions are unsafe or do not conform to predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (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 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", Cal-ISO standards, National Electric Code (NEC) and related industry standards.

   i) The existing power plant switchyard shall include an additional 230kV circuit breaker due to the addition of the PEFE project.

b) Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized 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 SCE interconnection standards.

f) The project owner shall provide to the CPM:

   i) The final Facility Study (FS) including a description of facility upgrades, operational mitigation measures, and/or Special Protection System (SPS) sequencing and timing if applicable,

   ii) The executed project owner and Cal-ISO Facility Interconnection Agreement

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"[1] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", NEC, applicable interconnection standards, and related industry standards.

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.

d) The final Facility Study, including a description of facility upgrades, operational mitigation measures, and/or SPS sequencing and timing if applicable, shall be provided concurrently to the CPM.

TSE-6 The project owner shall inform the CPM and CBO of any impending changes, which may not conform to the requirements of **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 which may not conform to requirements of **TSE-5** and request approval to implement such changes.

TSE-7 The project owner shall provide the following Notice to the California Independent System Operator (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

[1] Worst case conditions for the foundations would include for instance, a dead-end or angle pole.

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 the, "High Voltage Electric Safety Orders", applicable interconnection standards, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

a) "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", and applicable interconnection standards, NEC, related industry standards, 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

PEF2001a – Application for Certification, Volume 1, Sections 1.0-8.0 Application for Certification Pastoria Energy Facility 250MW Expansion. Submitted to CEC/Larson/Dockets on 02/16/2001

PEF2005b - Application for Certification, Volume 1, Section 1.0-3.0 Application for Certification Pastoria Energy Facility 160MW Expansion. Submitted to CEC/ Dockets on 04/2005

PEF2005c – System Impact Study, submitted by the SCE May 13, 2005
PEF2005d-Responses to CEC Staff Data Adequacy Request. Submitted to CEC/Dockets on 06/09/05.

CA ISO2005a – California Independent System Operator. Cal-ISO review of the System Impact Study for the 157MW Pastoria Expansion, June 29,2005.

TSE ATTACHMENT 1 LORS

- North American Electric Reliability Council (NERC) Planning Standards provide policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCC's Criteria for Transmission System Contingency Performance. The NERC planning standards provide for acceptable system performance under normal and contingency conditions. The NERC planning standards apply not only to interconnected system operation but also to individual service areas (NERC 1998).
- Western Systems Coordinating Council (WSCC) Reliability Criteria provide the performance standards used in assessing the reliability of the interconnected system. These Reliability Criteria require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. The WSCC Reliability Criteria include the Reliability Criteria for Transmission System Planning, Power Supply Design Criteria, and Minimum Operating Reliability Criteria. Analysis of the WSCC system is based to a large degree on WSCC Section 4 "Criteria for Transmission System Contingency Performance" which requires that the results of power flow and stability simulations verify established performance levels. Performance levels are defined by specifying the allowable variations in voltage, frequency and loading that may occur on systems other than the one in which a disturbance originated. Levels of performance range from no significant adverse effect outside a system area during a minor disturbance (loss of load or facility loading outside emergency limits) to a performance level that only seeks to prevent system cascading and the subsequent blackout of islanded areas. While controlled loss of generation, load, or system separation is permitted in extreme circumstances, their uncontrolled loss is not permitted (WSCC 1998).
- 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, operation, or use of overhead electric lines and to the public in general.
- National Electric Safety Code 1999 provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
- Cal-ISO's Reliability Criteria also provide policies, standards, principles, and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WSCCs Criteria for Transmission System Contingency Performance and the NERC Planning Standards. The Cal-ISO Reliability Criteria incorporate the WSCC Criteria and NERC Planning Standards. However, the Cal-ISO Reliability Criteria also provide some additional requirements that are not found in the WSCC Criteria or the NERC Planning Standards. The Cal-ISO Reliability Criteria apply to all existing and proposed facilities interconnecting to the Cal-ISO controlled grid. It also applies when there are any impacts to the Cal-ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the Cal-ISO.

TSE ATTACHMENT 2 DEFINITION OF TERMS

AAC	All Aluminum conductor.
ADR	Alternative Dispute Resolution
Ancillary Services Market	The market for services other than scheduled energy that is required to maintain system reliability and meet WSCC/NERC operating criteria. Such services include spinning, non-spinning, replacement reserves, regulation (AGC), voltage control and black start capability.
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 measure of electric current; specifically, a measure of the rate of flow of electrons past a given point in an electric conductor such as a power line.
Available Transmission Capacity (i.e., ATC)	Available Transmission Capacity in any hour is equal to Operational Transmission Capacity for that hour minus Existing Transmission Contracts for that same hour (ATC = OTC - ETC). (See the other definitions below).
Breaker	Circuit breaker - An automatic switch that stops the flow of electric current in a suddenly overloaded or otherwise abnormally stressed electric circuit.
Bundled Conductor	Two or more wires, connected in parallel through common switches, that act together to carry current in a single phase of an electric circuit.
Bus	Conductors that serve as a common connection for multiple transmission lines.
Cal-ISO	California Independent System Operator - The Cal-ISO is the FERC regulated control area operator of the Cal-ISO transmission grid. Its responsibilities include providing non-discriminatory access to the grid, managing

	congestion, maintaining the reliability and security of the grid, and providing billing and settlement services. The Cal-ISO has no affiliation with any market participant.
Cal-ISO Controlled Grid	The combined transmission assets of the Participating Transmission Owners (PTOs) that are collectively under the control of the Cal-ISO.
Cal-ISO Reliability Criteria	Reliability standards established by the NERC, WSCC, and the ISO, as amended from time to time, including any requirements of the NRC.
Cal-ISO Planning Process	Annual studies conducted by the PTO's and Cal-ISO in an open stakeholder process. These studies determine the future transmission reinforcements necessary to enable the ISO Controlled Grid to meet the ISO Reliability Criteria. The Cal-ISO Planning Process also includes studies of new resource connections and third party proposals for new additions to the ISO Controlled Grid.
Cal-ISO Tariff	Document filed with the appropriate regulatory authority (FERC) specifying lawful rates, charges, rules, and conditions under which the utilities provide services to parties. A tariff typically includes rate schedules, list of contracts, rules, and sample forms.
Capacitor	An electric device used to store charge temporarily, generally consisting of two metallic plates separated by a dielectric.
Cogeneration	The consecutive generation of thermal and electric or mechanical energy.
Conductor	The part of the transmission line (the wire) which carries the current.
Congestion	The condition that exists when market participants seek to dispatch in a pattern which would result in power flows that cannot be physically accommodated by the system. Although the system will not normally be operated in an overloaded condition, it may be described as congested based on requested/desired schedules.

Congestion Management	Congestion management is a Cal-ISO scheduling protocol that is used to resolve Congestion.
Contingency	Disconnection or separation, planned or forced, of one or more components from the electric system.
Day-Ahead Market	The forward market for the supply of electrical power at least 24 hours before delivery to Buyers and End-Use Customers.
Demand	Load plus any exports from an electric system.
Demand Forecast	An estimate of demand (electric load) over a designated period of time.
Dispatch	The operating control of an integrated electric system to: (i) assign specific generators and other sources of supply to effect the supply to meet the relevant area Demand taken as Load rises of falls; (ii) control operations and maintenance of high voltage lines, substations, and equipment, including administration of safety procedures; (iii) operate interconnections (iv) manage energy transactions with other interconnected Control Areas; and (v) curtail Demand.
dV/dQ	The partial derivative of the voltage at a bus with respect to the reactive injection at that bus. (See any elementary college calculus text for further discussion of partial derivatives.) The point at which dV/dQ approaches infinity is defined as the point of voltage collapse.
Emergency Condition	The system condition when one or more system elements are forced (not scheduled) out of service.
Emergency Overload	Loading of a transmission system element above its Emergency Rating during an Emergency Condition.
Emergency Rating	A special rating established for short-term use in the event of a forced line or transformer outage (e.g., an emergency). An emergency rating may be expressed as a percentage of the normal rating (e.g., 115 percent of normal) or as an

	elevated current rating. For example, the normal rating for a conductor may be 1000 amperes and the emergency rating may be 1100 amperes.
Excessive Voltage Deviation	A sudden change in voltage at any substation as a result of a Contingency that exceeds established allowable levels of change.
Existing Transmission Contract (i.e., ETC)	A contract for transmission services that was in place prior to the start of ISO operations.
Fault Duty	The maximum amount of short-circuit current which must be interrupted by a given circuit breaker.
FERC	Federal Energy Regulatory Commission
General Order 95	California Public Utilities Commission (CPUC) General Order which specifies transmission line clearance requirements.
Generation Outlet Line	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation to the main grid.
Generation Tie	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation to the main grid.
Generator	A machine capable of converting mechanical energy into electrical energy.
Heat Rate	The amount of energy input to an electric generator required to obtain a given value of energy output. Usually expressed in terms of British Thermal Units per kilowatt hour (Btu/kWh).
Hour-Ahead Market	The electric power futures market that is established 1-hour before delivery to End-Use Customers.
Imbalance Energy	Energy not scheduled in advance that is required to meet energy imbalances in real-time. This energy is supplied by Participating Generators under the Cal-ISO's control, providing spinning and non-spinning reserves, replacement reserves, and regulation, and other

	generators able to respond to the Cal-ISO's request for more or less energy.
Interconnected System Reliability	See Reliability.
Kcmil or kcm	One thousand circular mils. A unit of the conductor's cross sectional area which, when divided by 1,273, gives the area in square inches.
Kv	Kilovolt - A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.
Load	The rate expressed in kilowatts, or megawatts, at which electric energy is delivered to or by a system, or part of a system to end use customers at a given instant or averaged over an designated interval of time. (Also see Demand.)
Load Factor	The average Load over a given period (e.g., one year) divided by the peak Load in the period.
Loop	An electrical connection where a line is opened and a new substation is inserted into the opening. A looped configuration creates two lines, one from each of the original end points to the new substation. A looped configuration is more reliable than a tap configuration because the looped configuration provides two lines into the substation rather than just one in a tap configuration. Also, see Tap below.
Low Voltage	Voltage at any substation that is below the minimum acceptable level.
Marginal Unit	The Generator (or Load) that sets the market clearing price in the ISO's Ancillary Services Market (or the Power Exchange's energy market). The marginal unit is the Generator or Load that had the highest accepted bid for energy or Demand reduction.
MVAr	Megavar - One megavolt ampere reactive (a measure of reactive power). Reactive power demand is generally associated with motor loads and generation units or static reactive sources

	must supply this demand in the system.
MVA	Megavolt ampere - A unit of apparent power: equal to the product of the line voltage in kilovolts, the current in amperes, and the square root of 3 divided by 1000.
MW	Megawatt - A unit of power equivalent to 1,341 horsepower.
NERC	North American Electric Reliability Council
Nominal Voltage	Also known as Normal Voltage. The voltage at which power can be delivered to loads without damage to customer equipment or violation of Cal-ISO Reliability Criteria when the system is under Normal Operation.
Normal Operation	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.
NRC	Nuclear Regulatory Commission
N-1 Contingency	A forced outage of one system element (e.g., a transmission line or generator).
N-2 Contingency	A forced outage of two system elements usually (but not exclusively) caused by one single event. Examples of an N-2 Contingency include loss of two transmission circuits on a single tower line or loss of two elements connected by a common circuit breaker due to the failure of that common breaker.
Operational Transfer Capability (i.e., OTC)	The maximum amount of power which can be reliably transmitted over an electrical path in conjunction with the simultaneous reliable operation of all other paths. This limit is typically defined by seasonal operating studies, and should not be confused with a path rating. Also referred to as OTC.
Outlet	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation to the main grid.
Participating Generator	A generator that has signed an agreement with the Cal-ISO to abide by the rules and conditions

	specified in the Cal-ISO Tariff.
Participating Transmission Owner (i.e., PTO)	A Participating Transmission Owner is an electric transmission owning company that has turned over operational control of some or all of their electric transmission facilities to the Cal-ISO. Currently, the three Participating Transmission Owners are PG&E, SCE, and SDG&E.
Path Rating	The maximum amount of power which can be reliably transmitted over an electrical path under the best set of conditions. Path ratings are defined and specified in the WSCC Path Rating Catalog.
PG&E	Pacific Gas & Electric Company
PG&E Interconnection Handbook	Detailed instructions to new customers (either load or generation) on how to interconnect to the PG&E electric system.
Post-Transient Voltage Deviation	The change in voltage from pre-contingency to post-contingency conditions once the system has had time to readjust.
Power Flow	A generic term used to describe the type, direction, and magnitude of actual or simulated electrical power flows on electrical systems.
Power Flow Analysis	A power flow analysis is a forward looking computer simulation of all major generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment as well as system voltage levels under both Normal and Emergency Conditions.
Pump	A hydroelectric generator that acts as a motor and pumps water stored in a reservoir to a higher elevation.
Q/V Curve	A graphical representation of the voltage a given substation bus as a function of the reactive injection at that bus.
RAS	Remedial Action Scheme - An automatic control provision (e.g., trip a generation unit to mitigate a circuit overload).

Reactive Power	The portion of apparent power that does no work in an alternating current circuit but must be available to operate certain types of electrical equipment. Reactive Power is most commonly supplied by generators or by electrostatic equipment, such as shunt capacitors.
Reactive Margin	Reactive Power must be available at all load buses to prevent voltage collapse. Reactive margin is the amount of additional reactive load, usually measured in MVAR's, which may be added at a particular bus before the system experiences voltage collapse.
Reactor	An electric device used to store electric current temporarily, generally consisting of a coil of wire wound around a magnetic core.
Real Power	Real power is the work-producing component of apparent power and is required to operate any electrical equipment that performs energy conversion. Examples of this electrical equipment would be a heater, a lamp, or a motor. Real power is usually metered in units of kilowatt-hours (kWh).
Real-Time Market	The competitive generation market controlled and coordinated by the Cal-ISO for arranging real-time imbalance power.
Reconductor	The removal of old conductors on a transmission or distribution line followed by replacement of these conductors with new higher capacity conductors.
Reliability	The degree of performance of the elements of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired. May be measured by the frequency, duration, and magnitude of adverse effects on the electric supply.
Reliability Criteria	Principals used to design, plan, operate, and assess the actual or projected reliability of an electric system.
Reliability Must-Run (i.e., RMR)	The minimum generation (number of units or MW output) required by the Cal-ISO to be on

	line to maintain system reliability in a local area.
SCE	Southern California Edison Company
SDG&E	San Diego Gas and Electric Company
Sensitivity Study	An analysis to determine the impact of varying one or more parameters on the results of the original analysis.
Series Capacitor	A static electrical device that is connected in-line with a transmission circuit that allows for higher power transfer capability by reducing the circuit's overall impedance.
Shunt Capacitor	A static electrical device that is connected between an electrical conductor and ground. A shunt capacitor normally will increase the voltage on a transmission circuit by providing reactive power to the electrical system.
Single Contingency	See N-1 Contingency.
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.
Source or Sink of Reactive Power	A source of Reactive Power is a device that injects reactive power into the power system (e.g., a Generator or a Capacitor). A sink of Reactive Power absorbs reactive power from the power system. Examples of reactive power sinks are shunt Reactors and motor loads.
Static Compensator	StatCom - a shunt connected power system device that includes Capacitors and Reactors controlled by solid state electronic devices as opposed to mechanically operated switches.
Substation	An assemblage of equipment that switches, changes, or regulates voltage in the electric transmission and distribution system.
Switchyard	A substation that is used as an outlet for one or more electric generators.
Switched Reactive Devices	A shunt Capacitor or shunt Reactor controlled by mechanically operated switches.

Switching Station	Similar to a substation, but there is only one voltage level.
Synchronous Condenser	A rotating mechanical device very similar to a Generator. The Synchronous Condenser has no mechanical power input and cannot produce Real Power. It can only produce or absorb Reactive Power.
System Reliability	See “Reliability”.
Tap	An electrical connection where a new line is connected to an intermediate point on an existing transmission line and a new substation is connected to the end of the new line. A tapped configuration creates a single transmission circuit with more than two end points (for example, a “T”). A tapped configuration is less reliable than a looped configuration because a fault on any portion of the tapped circuit causes a complete loss of power to the new substation. Also, see Loop above.
Tap Changing Transformer	A Transformer that has the ability to change the number of windings in service. By changing the number of windings in service (by moving to a different tap), the Tap Changing Transformer has the ability to maintain a nearly constant voltage at its output terminals even though the input voltage to the Transformer may vary.
Thermal Loading Capability	The current-carrying capacity (in Amperes) of a conductor at specified ambient conditions, at which damage to the conductor is non-existent or deemed acceptable based on economic, safety, and reliability considerations.
Thermal overload	A thermal overload occurs when electrical equipment is operated in excess of its current carrying capability. Overloads are generally given in percent. For example, a transmission line may be said to be loaded to 105 percent of its rating.
Thermal rating	See Ampacity.
Transformer	A device that changes the voltage of alternating

	current electricity.
Transformer Loading Capability	The current-carrying capacity (in Amperes) of a transformer at specified ambient conditions, at which damage to the transformer is non-existent or deemed acceptable based on economic, safety, and reliability considerations.
TSE	Transmission System Engineering.
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.
Undercrossing	A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.
VAr	One Volt ampere reactive. Also see the definition for MVAr.
Voltage	Electromotive force or potential difference.
Voltage Collapse	The point at which the reactive demand at a substation bus exceeds the reactive supply at that bus. When the reactive demand is greater than the supply, the voltage at that point in the system will drop. Eventually, the voltage will drop to a point at which it is no longer possible to serve load at that bus.
Wheeling	A service provided by an entity, such as a utility, that owns transmission facilities whereby it receives electric energy into its system from one party and then uses its system to deliver that energy to a third party. The wheeling entity is usually paid a fee for this service.
WECC	Western Electricity Coordinating Council

ALTERNATIVES

Testimony of James W. Reede, Jr., Ed.D

PURPOSE OF THE ALTERNATIVES ANALYSIS

The California Environmental Quality Act (CEQA) allows a state agency, such as the California Energy Commission, to utilize its own "regulatory program" review process in lieu of the "environmental impact report" (EIR) review process specified in CEQA. However, to do so the agency's regulatory program must be "certified" by the Secretary of the Resources Agency. (Public Resources Code Section 21080.5). The Energy Commission's Power Plant Siting Regulatory Program is such a "certified regulatory program" under CEQA.

With regard to the "Alternatives" analysis required in a certified siting proceeding such as the Calpine Corporation's Pastoria Energy Facility Expansion (PEFE) application, the CEQA Guidelines (Cal. Code Regs., tit. 14, Section 15252) state that:

"The document used as a substitute for an EIR or negative declaration in a certified program shall include at least the following items:

(b) Either:

1. Alternatives to the activity and mitigation measures to avoid or reduce any significant or potentially significant effects that the project might have on the environment, or

2. A statement that the agency's review of the project showed that the project would not have any significant or potentially significant effects on the environment and therefore no alternatives or mitigation measures are proposed to avoid or reduce any significant effects on the environment. This statement shall be supported by a checklist or other documentation to show the possible effects that the agency examined in reaching this conclusion."

The Warren-Alquist Act specifies that a party filing an "Application for Certification" for a natural gas fired power plant "modification" (such as the PEFE project) is not required to provide any information *in its application* on alternative *sites* for the proposed facility. (Public Resources Code Section 25540.6(a) and (b)). However, the Energy Commission's Siting Regulations (Cal. Code Regs., tit. 20, Section 1765) require that:

"At the hearings . . . on an application exempt from the [Notice Of Intent] requirements pursuant to Public Resources Code section 25540.6, the parties shall present information on the feasibility of available site and facility alternatives to the applicant's proposal which substantially lessen the significant adverse impacts of the proposal on the environment. . . ."

In light of these provisions, staff presents information in this section on the "feasibility of available site and facility alternatives to the applicant's proposal that substantially lessen the significant adverse impacts of the proposal on the environment" (Cal. Code Regs.,

tit. 20, §1765). Staff also analyzes whether there are any feasible alternative designs or alternative technologies, including the "no project alternative," that may be capable of reducing or avoiding any potential impacts of the proposed project while achieving its major objectives.

SCOPE AND METHOD FOR THIS ALTERNATIVE ANALYSIS

The "Guidelines for Implementation of the California Environmental Quality Act" (CEQA), Title 14, California Code of Regulations Section 15126(d), provide 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 project objectives...". In addition, the analysis must address the "no project" alternative. (Cal. Code Regs., tit. 14, §15126(d).)

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 of which the effect cannot be reasonably ascertained and of which the implementation is remote and speculative. (Cal. Code Regs., tit. 14, §15125(d)(5).) However, if the range of alternatives is defined too narrowly, the analysis may be inadequate. (*City of Santee v. County of San Diego* (4th Dist. 1989) 214 Cal.App. 3d 1438.)

To prepare this alternatives analysis, the staff used the methodology summarized below:

- Identify the basic objectives and potential significant impacts of the project.
- Determine whether there are any feasible *site alternatives* for analysis by evaluating the extent to which most of the project objectives can be achieved at alternative sites and the degree to which any significant impacts of the project would be substantially lessened at such alternative sites.
- Identify and evaluate *facility design and related facilities alternatives* to the project as proposed.
- Identify and evaluate *technical alternatives* to the project. The principle project alternatives examined that do not require the construction of a natural gas-fired facility are increased energy efficiency (or demand side management) and the construction of alternative technologies (e.g. wind, solar, or geothermal).
- Evaluate the feasibility and impacts of not constructing the project (the "*no project*" *alternative*).

STAFF'S ALTERNATIVES ANALYSIS

Staff's alternatives analysis begins by identifying the basic objectives of the project, describing the project and project setting, and listing potential significant impacts from the project as currently proposed. The analysis then turns to a consideration of various alternatives to the proposed Pastoria Expansion project. These alternatives were

developed in response to information received from the Energy Commission's staff and from other agencies.

BASIC OBJECTIVES OF THE PROJECT

After studying the Applicant's Application for Certification (AFC), Energy Commission staff has determined the PEFE project's objectives to be:

- A project that could obtain all required permits on an expedited basis due to a lack of significant adverse environmental impacts.
- A location that offers access to the Southern California/greater Los Angeles market for the sale of much needed peaking capacity and electric energy through the California Independent System Operator (CAISO).
- A site that has access to existing fuel and water lines.
- A site that is located near an existing transmission line and substation.
- A location for engaging in a long term bi-lateral sale of electricity to a large customer (the State of California, Southern California Edison, and/or Department of Water Resources Edmonston Pumping Station).
- A project that will provide a fair return on the project investment.
- A project that will be sufficiently attractive to the investment community so that the required construction funds can be obtained at reasonable rates.

PROJECT DESCRIPTION AND SETTING

A more complete description of the project and its setting is in the **Project Description** section of this Final Staff Assessment (FSA).

POWER PLANT

Located in the southern Kern County region, this section of the Tejon Ranch property is undeveloped, vegetated with non-native grassland, and is used primarily for cattle raising. The two existing parcels on which the proposed PEFE project would be located are zoned as industrial land.

The proposed PEFE involves one natural gas-fired, F-Class combustion turbine generator (CTG) operating in simple-cycle mode with the original three-unit 750 MW PEF for a total of 910 MW. The plant will use Best Available Control Technology (BACT) to minimize gas turbine emissions. The PEFE intends to use Selective Catalytic Reduction (SCR) emission control technology. The applicant will use anhydrous ammonia as the reagent in the catalytic reduction process. The PEFE will not require the upgrade of either fuel or water supplies, but may require upgrading of the transmission system.

The proposed facility expansion will be constructed on approximately 2 acres of the total 31-acre site, of which the entire Pastoria Energy Facility is comprised. PEFE will use the previously approved and built infrastructure to support the additional 160 MW turbine

generator. The power plant site is located in a historic land grant area (El Tejon Ranch). The proposed site is located 0.75 miles north of the California Department of Water Resources' Edmonston Pumping Plant which conveys water from the California Aqueduct over the Tehachapi Mountains to southern California (PEFE 2005a, p. 1-4). See **PROJECT DESCRIPTION Figure 1** for a map of the location of the proposed project site and related facilities.

RELATED FACILITIES

Transmission Line

Electricity generated by the PEFE would be transmitted to the SCE Pastoria Substation approximately 1.4 miles south of the plant site. The transmission interconnection was installed during construction of the PEF in 2004 and is operational.

Water Supply

PEF will use two existing contracts with the Wheeler Ridge-Maricopa Water Storage District (WRMWSD or District) and the Kern Water Bank Authority for its water supply under a rate for large industrial customers. The current contracts are adequate to supply the needs of the proposed Expansion. Supplies from WRMWSD come from the California Aqueduct at a tie-in located about one mile southwest of the PEF site and delivered through an existing District pipeline network and an existing approximately 0.2 mile water supply pipeline (see **PROJECT DESCRIPTION Figure 1**).

Water Disposal

To dispose of process wastewater, PEFE proposes to use the existing wastewater management system which incorporates treatment for zero liquid discharge (ZLD). The ZLD system will process all wastewater streams from the plant except sanitation and stormwater streams. The ZLD process, which concentrates the dissolved and suspended constituents in the wastewater through a combination of evaporation and crystallization, will result in two to eight cubic yards per day of non-hazardous salt cake. Sanitary wastewater from sinks, toilets, and other sanitary facilities will be disposed of onsite using a septic system and leach field. Stormwater will be collected onsite using surface and underground drainage, and discharged to an onsite storm water detention pond.

Natural Gas Supply Pipeline

The proposed PEFE project will use natural gas supplied through an existing 14.01 mile interconnection pipeline (built for the PEF project) to the existing supply pipeline jointly owned by the Kern River Gas Transmission Company and the Mojave Pipeline Company. The pipeline runs north and east of the plant site. The project will utilize up to an estimated 40 million standard cubic feet per day of pipeline quality natural gas. The gas line is shown on **PROJECT DESCRIPTION Figure 2**.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS

No technical areas are identified in this FSA that had potentially significant unmitigated environmental impacts. It is staff's opinion that mitigation measures proposed for PEFE will reduce any potential significant environmental impacts to less than significant levels.

ALTERNATIVES TO THE PROJECT

As discussed above, the Energy Commission siting regulations require the parties in a siting case exempt from the Notice of Intention proceedings to present "information on the feasibility of available site and facility alternatives to the applicant's proposal which substantially lessen the significant adverse impacts of the proposal on the environment" (Cal. Code Regs., tit. 20 §1765).

SITE ALTERNATIVES

Consistent with the CEQA Guidelines, the scope of staff's consideration of alternative sites was guided by consideration of whether most project objectives could be accomplished at alternative sites, and whether locating the project at an alternative site would substantially lessen any identified significant impacts of the project (Cal. Code Regs., tit. 14 §15126.6(a)). As discussed below, staff has determined that locating the project at an alternative site would not achieve most of the major objectives of the project. Furthermore an alternative site location would not substantially lessen currently identified potential significant transmission impacts of the project. Under these circumstances, staff has applied the "rule of reason" and decided that it need not perform a detailed analysis of alternative sites.

Meeting Major Objectives of the Project

Calpine's basic objectives are to provide economically competitive electricity in Southern California while minimizing impacts and costs by making use of an existing power plant site and related infrastructure to the extent feasible. The project as proposed in the AFC would make use of all of the infrastructure of the existing site, including the existing water supply, gas pipeline, ZLD system, and access to the adjacent switchyard to connect to the transmission grid. The project will include the addition of one simple-cycle power plant.

Based on this analysis, staff has determined that the proposed project makes substantial use of the existing infrastructure. A "stand-alone" simple cycle power plant at an alternative site that makes no use of the infrastructure at the existing site is possible. However, this alternative would not achieve one of the major objectives of this project, namely the avoidance of the significant impacts and costs of the project by using existing on-site infrastructure to the extent feasible.

Staff also analyzed the feasibility of a combined-cycle plant as an alternative to the proposed simple-cycle plant. While a combined-cycle plant would also use all of the existing infrastructure, it would require construction of four additional cooling tower cells, greatly increasing water consumption, additional transmission line and equipment upgrades, removal and replacement of a steam turbine generator with a larger one and expansion of the existing site with increased environmental impacts. While a combined-

cycle more efficiently uses natural gas, this alternative would also not achieve the major objectives of this project, such as the avoidance of the significant impacts, installation of peaking capabilities, and the attractiveness of investment in the project by using existing on-site infrastructure to the extent feasible.

Reducing Significant Environmental Impacts

Staff's review of the proposed project has not identified any potentially significant unmitigated impacts. Staff's analysis of these impacts is discussed below. Staff's assessment has not identified any significant impacts that would be substantially lessened by locating the project at an alternative site.

"Site" Alternatives Conclusion

Staff's analysis of alternative sites, presented above, is based on a review of the major objectives of the project, and the significant impacts identified in this document. Staff first considered whether the project's objectives could be accomplished at alternative sites. Staff found that while developing a similar project at an alternative site is possible, this would not minimize impacts and costs by making use of the existing site and infrastructure, which is one of the major objectives of the project. Staff also considered whether locating the project at an alternative site would substantially lessen any identified significant impacts of the project. Locating a similar project at an alternative location would not substantially reduce any of the significant impacts of the project identified to date. Staff also considered a combined-cycle configuration and determined that it would not meet the project objectives. Based on these three factors, staff has applied the "rule of reason" and determined that a detailed alternative sites analysis is not needed.

GENERATION TECHNOLOGY ALTERNATIVES

One alternative to meeting California's electricity demand with new generation is to reduce that demand for electricity. Such "demand side" measures include programs that increase energy efficiency, reduce electricity use, or shift electricity use away from "peak" hours of demand[1].

In California there is a considerable array of demand side programs. At the federal level, the Department of Energy adopts 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 adopts comprehensive energy efficiency standards for most building occupancies, appliance standards for specific appliances not subject to federal appliance standards, and load management standards. The Energy Commission also provides grants for energy efficiency development through the Public Interest Energy Research (PIER) program. The California Public Utilities Commission, along with the Energy Commission, oversees investor-owned utility demand side management programs financed by the utilities and its ratepayers.

[1] Although Public Resources Code Section 25305 provides that demand side alternatives are not to be considered as project alternatives for power plant siting cases, air districts are required to consider alternatives generally prior to issuing Prevention of Serious Deterioration (PSD) permits pursuant to the Federal Clean Air Act. Air districts normally rely on the Energy Commission to perform the alternatives analysis for siting cases; these analyses are then relied on for the issuance of the PSD permit. For this reason, Commission staff includes this analysis in its environmental documents for consideration by the air districts.

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, 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 measure requirements for older buildings.

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 much more aggressive demand side programs could accomplish this at the economic and population growth rates of the last ten 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.

Staff compared various alternative technologies with the proposed project, scaled to meet the project's objectives. Technologies examined were those principal electricity generation technologies which do not burn fossil fuels such as natural gas: solar, wind, and biomass[2]. Both solar and wind generation can be credited with the absence or reduction in air pollutant emissions, visible plumes, and need for emissions control. In the case of biomass, however, emissions are substantially greater. In addition, the water consumption for both wind and solar generation are substantially less than for a natural gas fired plant because there is no thermal cooling requirement.

However, solar and wind resources require large land areas in order to generate 160 megawatts of electricity. Specifically, central receiver solar thermal projects require approximately 5 acres per megawatt; 160 megawatts would require approximately 800 acres, or over 400 times the amount of land area taken by the proposed PEFE site and linear facilities. Parabolic trough solar thermal technology requires similar acreage per megawatt. Wind generation "farms" generally require about 4.5 acres per megawatt, with 160 megawatts requiring 720 acres, nearly 360 times the amount of space taken by the proposed plant site and linear facilities. More land requirements in the southern San Joaquin Valley have the potential for significant biological impacts on sensitive species and habitat areas. Need for extensive acreage would also add the complexities of local (Kern County) discretionary actions for land use modifications. While there would be no visible plumes, other visual impacts of the solar and wind generation must be considered in an area that has many broad views of the Tehachapi Mountains from Interstate 5.

For biomass generation a fuel source such as wood chips (the preferred source) or agricultural waste is necessary. Neither is available in large quantities close to the

[2] There are no geothermal or hydroelectric resources in this section of southern San Joaquin Valley (California Geological Data Map Series #4 (1980); CDWR, California Water Plan Update: Bulletin 160-98, Vol.2, pp. 8-43-54.

PEFE plant. In addition, biomass plants are typically under 10 MW, which is substantially smaller than the expected capacity of the 160 MW PEFE project.

Looking outside the San Joaquin Valley, the development uncertainties and the potential for impacts at remote resource areas are significant constraints. Furthermore, because of the typically lower efficiencies of alternative generation technologies, they do not fulfill a basic objective of this plant: to provide power from a peaking facility to meet the growing demands for reliable power in Southern California. Consequently, staff does not believe that geothermal, hydroelectric, solar, wind or biomass technologies present feasible alternatives to the proposed project.

RELATED FACILITIES ALTERNATIVES

The following related facilities pertain only to those associated with the applicant's preferred power plant site.

WATER SUPPLY

A detailed analysis of water supply alternatives is presented in the Soil and Water Resources section of this FSA. Alternatives to the proposed water supply plan include the use of hybrid (wet /dry) or dry cooling systems for the cooling towers. These alternatives, which can help to reduce the water consumption of power plants, are presented in the **Soil and Water Resources** section.

WASTEWATER DISPOSAL

The AFC proposes to use the existing Zero Liquid Discharge (ZLD) system. The staff agrees that ZLD is the most environmentally sound option for PEFE's disposal of wastewater because it avoids the potentially more significant environmental impacts of wastewater well injection. This option involves the recycle and reuse of approximately 85 to 90 percent of PEFE's total water consumption.

NATURAL GAS SUPPLY PIPELINE

Natural gas will be supplied through an existing 20-inch diameter underground pipeline whose source is the Kern River/Mojave Pipeline. The existing connection to the transmission pipeline, travels about 14 miles from the tie-in point.

THE "NO PROJECT" ALTERNATIVE

CEQA Guidelines and Energy Commission regulations require consideration of the "no project" alternative. This alternative assumes that the project is not constructed, and is compared to the proposed project. A determination is made whether the "no project" alternative is superior, equivalent, or inferior to the proposed project.

Staff has not identified any potentially significant unmitigated impacts.

Staff views the "no project" alternative as feasible. If this project is not built, the same market conditions that encouraged it to be proposed will encourage other similar projects. It is quite feasible that a substantial amount of additional generating capacity

will be proposed even in the absence of this project. Staff can reasonably expect California's need for new plants to be filled with or without the proposed project. There is no reason to assume that the total amount of capacity actually built would differ with or without this project.

It follows then, that the extent to which nuclear and older fossil generation resources will be replaced by new resources can be expected to be the same with or without this project. The extent to which generation from existing power plants would consume fuel and emit pollutants would be the same with or without this project. And whatever effect new plants might have insulating ratepayers and taxpayers from risk will occur whether or not the proposed plant is included among the new plants actually built.

The "no project alternative would eliminate the expected economic benefits that the proposed project would bring to Kern County, including increased property taxes, employment, sales taxes, and sales of services, manufactured goods, and equipment. (See the **Socioeconomics** chapter.)

Staff has determined that the "no project" alternative is environmentally superior to the project as originally proposed. This is because the original proposal could have had significant environmental impacts on air resources and the transmission system. Not constructing and operating an (unmitigated) power plant would avoid these impacts. However, as stated above, staff believes that use of the mitigation described in the various sections will reduce any impacts to less than significant levels. In addition, staff recognizes potential economic benefits will be derived from the project. Therefore, staff believes that, overall, the "no project" alternative is not the preferred alternative.

CONCLUSIONS AND RECOMMENDATION

Staff has analyzed in detail alternatives to the project design and related facilities, alternative technologies, and the "no project" alternative. Staff did not analyze in detail alternative sites for the project. Staff determined that developing the project at an alternative site would not allow Calpine to make use of infrastructure at the existing site, one of the major objectives of the project, and would not substantially lessen the significant impacts of the project identified in the staff's assessment.

Staff has determined that the preferable alternative is the proposed project using suggested mitigation. Staff does not believe that energy efficiency measures and alternative technologies (geothermal, solar, wind, and hydroelectric) present any feasible alternatives to the proposed project.

REFERENCES

PEF (Pastoria Energy Facility) 1999a. Application for Certification, Volumes I and II, Pastoria Energy Facility Project, (99-AFC-7). Submitted to the California Energy Commission, November 30, 1999.

PEFE (Pastoria Energy Facility Expansion) 2005a – Application for Certification Volumes I and II. Submitted to the California Energy Commission on April 29, 2005.

California Energy Commission, Electricity Outlook: Summer 2005 and Beyond: February 2005.

California Department of Conservation, Division of Mines and Geology, California Geological Data Map Series, Geothermal Resources of California #4, 1980

California Department of Water Resources (CDWR), California Water Plan Update, Bulletin 160-98, Volume 2, November 1999.

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Nancy Tronaas

INTRODUCTION

The project General Conditions 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:

1. set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;

2. set forth the requirements for handling confidential records and maintaining the compliance record;

3. state procedures for settling disputes and making post-certification changes;

4. 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;

5. establish requirements for facility closure plans; and

6. specify conditions of certification that follow each technical area contain the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure to an insignificant level. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

DEFINITIONS

The following terms and definitions are used to establish when Conditions of Certification are implemented:

PRE-CONSTRUCTION SITE MOBILIZATION

Site mobilization is limited preconstruction activities at the site to allow for the installation of construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities is considered part of site mobilization. Fencing for the site is also considered part of site mobilization. Walking, driving or

parking a passenger vehicle, pickup truck and light vehicles is allowable during site mobilization unless more restrictive measures are specified in the Conditions of Certification.

CONSTRUCTION GROUND DISTURBANCE

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site and for access roads and linear facilities.

CONSTRUCTION GRADING, BORING, AND TRENCHING

Construction-related grading, boring, and trenching refers to activities that result in subsurface soil work at the site and for access roads and linear facilities, e.g, alteration of the topographical features such as leveling, removal of hills or high spots, moving of soil from one area to another, and removal of soil.

CONSTRUCTION

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. Construction does **not** include the following:

1. the installation of environmental monitoring equipment;
2. a soil or geological investigation;
3. a topographical survey;
4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; or
5. any work to provide access to the site for any of the purposes specified in "Construction" 1, 2, 3, or 4 above.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, "commercial operation" begins after the completion of start-up and commissioning, where the power plant has reached reliable steady-state production of electricity at the rated capacity. For example, at the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The CPM will oversee the compliance monitoring and shall be responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision;
2. resolving complaints;
3. processing post-certification changes to the conditions of certification, project description, and ownership or operational control;

4. documenting and tracking compliance filings; and

5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission when handling disputes, complaints and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management.

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

The CPM usually schedules pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings will be to assemble both the Energy Commission's and the project owner's technical staff to review the status of all pre-construction or pre-operation requirements contained in the Energy Commission's conditions of certification to confirm that they have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight, and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

ENERGY COMMISSION RECORD

The Energy Commission shall maintain as a public record, in either the Compliance file or Docket 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; and

4. all petitions for project or condition of certification changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that the general compliance conditions and all of the other conditions of certification that appear in the staff assessment sections are satisfied. The general 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 general 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 General Conditions

of Certification is included as **Compliance Table 1** at the conclusion of this section. The designation after each of the following summaries of the General Compliance Conditions (**COMPLIANCE-1, COMPLIANCE-2,** etc.) refers to the specific General Compliance Condition contained in **Compliance Table 1.**

GENERAL CONDITIONS OF CERTIFICATION

Construction Milestones, Compliance Condition of Certification 1 (COMPLIANCE-1)

Within 30 days after project certification, the project owner shall submit to the CPM project milestones that specify: (a) that project construction will commence 12 months after the project has been certified and after all accompanying project permits are final and administrative and judicial appeals have been completed, and (b) the scheduled project commercial operation date [ref: section 25534(c) of the Public Resources Code]. After establishment of the project milestones, the project owner shall provide the CPM with a monthly progress report on achieving the milestones, and shall notify the CPM of any possible changes to the milestones.

The CPM will negotiate the milestones with the project owner based on an expected schedule of construction. The CPM may agree to modify the final milestones at any time prior to or during construction if the project owner demonstrates good cause for not meeting the originally-established milestones.

The staff may extend the start of construction milestone if any of the following findings can be made:

1. The change in any milestone does not change the established commercial operation date milestone.

2. The milestone will be missed due to circumstances beyond the project owner's control.

3. The milestone will be missed, but the project owner demonstrates a good-faith effort to meet the project milestone.

4. The milestone will be missed due to unforeseen natural disasters or acts of God that prevent timely completion of the milestones.

5. The milestone will be missed due to requirements of the California ISO.

[ref: section 25534(e) Public Resources Code]

Unrestricted Access (COMPLIANCE-2)

The CPM, responsible Energy Commission staff, and delegate agencies or consultants shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on site, for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

Compliance Record (COMPLIANCE-3)

The project owner shall maintain project files onsite or at an alternative site approved by the CPM, for the life of the project unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all “as-built” drawings, all documents submitted as verification for conditions, and all other project-related documents.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files.

Compliance Verification Submittals (COMPLIANCE-4)

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, and in most cases without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

1. reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;

2. providing appropriate letters from delegate agencies verifying compliance;

3. Energy Commission staff audits of project records; and/or

4. Energy Commission staff inspections of mitigation or other evidence of mitigation.

Verification lead times (e.g., 90, 60 and 30-days) associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters. **The cover letter subject line shall identify the involved condition(s) of certification by condition number and include a brief description of the subject of the submittal**. The project owner shall also identify those submittals **not** required by a condition of certification with a statement such as: “This submittal is for information only and is not required by a specific condition of certification.” When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All submittals shall be addressed as follows:

Compliance Project Manager
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

If the project owner desires Energy Commission staff action by a specific date, they shall so state in their submittal cover letter and include a detailed explanation of the effects on the project if this date is not met.

Pre-Construction Matrix and Tasks Prior to Start of Construction (COMPLIANCE-5)

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner's **first** compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be in the same format as the compliance matrix referenced above.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times (e.g., 30, 60, 90 days) for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

If the project owner anticipates starting project construction as soon as the project is certified, it may be necessary for the project owner to file compliance submittals prior to project certification. This is important if the required lead-time for a required compliance event extends beyond the date anticipated for start of construction. It is also important that the project owner understand that the submittal of compliance documents prior to project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change based upon the Final 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-6)

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 compliance conditions in a spreadsheet format. The compliance matrix must identify:

1. the technical area;

2. the condition number;

3. a brief description of the verification action or submittal required by the condition;

4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);

5. the expected or actual submittal date;

6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable; and

7. the compliance status of each condition, e.g., “not started,” “in progress” or “completed” (include the date).

Satisfied conditions do not need to be included in the compliance matrix after they have been identified as satisfied in at least one monthly or annual compliance report.

Monthly Compliance Report (COMPLIANCE-7)

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date upon which the project was approved, unless otherwise agreed to by the CPM. The first Monthly Compliance Report shall include an initial list of dates for each of the events identified on the **Key Events List. The Key Events List Form is found at the end of this section.**

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and five copies of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. a summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;

2. documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, and should be submitted as attachments to the Monthly Compliance Report;

3. an initial, and thereafter updated, compliance matrix showing the status of all conditions of certification and pre-construction and construction milestones (fully

satisfied conditions do not need to be included in the matrix after they have been reported as closed);

4. a list of conditions and milestones 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 or milestones;

9. a listing of the month's additions to the on-site compliance file;

10. any requests to dispose of items that are required to be maintained in the project owner's compliance file; and

11. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolved complaints, and the status of any unresolved complaints.

Annual Compliance Report (COMPLIANCE-8)

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project unless otherwise specified by the CPM. Each Annual Compliance Report shall identify the reporting period and shall contain the following:

1. an updated compliance matrix showing the status of all conditions of certification (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);

2. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;

3. documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter, and should be 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 General 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 complaints, and the status of any unresolved complaints.

Confidential Information (COMPLIANCE-9)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Docket 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-10)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner is required to pay an annual fee which will be adjusted annually. This initial payment of $15,987.00 is due on the date the Energy Commission adopts the final decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

Reporting of Complaints, Notices, and Citations (COMPLIANCE-11)

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with date and time stamp recording. All recorded complaints shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to the CPM who will post it on the Energy Commission's web page at:

http://www.energy.ca.gov/sitingcases/power_plants_contacts.html

Any changes to the telephone number shall be submitted immediately to the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies to the CPM of all complaint forms, notices of violation, notices of fines, official warnings, and citations, within 10 days of receipt,. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A).

FACILITY CLOSURE

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

There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure and unplanned permanent closure**.**

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs at the end of a project's life, when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner remains accountable for implementing the on-site contingency plan. It can also include unplanned closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned.

GENERAL CONDITIONS FOR FACILITY CLOSURE

Planned Closure (COMPLIANCE-12)

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 prior to commencement of closure activities (or other period of time agreed to by the CPM). 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 Energy Commission approval of the facility closure plan is obtained.

Unplanned Temporary Closure/On-Site Contingency Plan (COMPLIANCE-13)

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less that 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be

in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of Hazardous Materials Management and Waste Management.)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, 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-14)

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 unlikely 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.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

Energy Commission staff may also seek the cooperation of state, regional and local agencies that have an interest in environmental protection when conducting project monitoring.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.
Moreover, to ensure compliance with the terms and conditions of certification and applicable LORS, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1230 et seq., 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 current law or regulations.

The Energy Commission has established a toll free compliance telephone number of **1-800-858-0784** for the public to contact the Energy Commission about power plant construction or operation-related questions, complaints or concerns.

Informal Dispute Resolution Procedure

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This procedure may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1230 et seq., but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The procedure encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be referred to the full Energy Commission for consideration via the complaint and investigation process. The procedure for informal dispute resolution is as follows:

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter and within seven working days of the CPM's request, provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to provide an initial report, within 48 hours, followed by a written report filed within seven days.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures proposed or undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;

2. secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;

3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner; and

4. after the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum that fairly and accurately identifies the positions of all parties and any conclusions reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230 et seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

If either the project owner, Energy Commission staff, or the party requesting an investigation is not satisfied with the results of the informal dispute resolution process, such party may file a complaint or a request for an investigation with the Energy Commission's General Counsel. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1230 et seq.

The Energy Commission Chair, upon receipt of a written request stating the basis of the dispute, may grant a hearing on the matter, consistent with the requirements of noticing provisions. The Energy Commission shall have the authority to consider all relevant facts involved and make any appropriate orders consistent with its jurisdiction (Cal. Code Regs., tit. 20, §§ 1232-1236).

POST CERTIFICATION CHANGES TO THE ENERGY COMMISSION DECISION: AMENDMENTS, OWNERSHIP CHANGES, INSIGNIFICANT PROJECT CHANGES AND VERIFICATION CHANGES (COMPLIANCE 15)

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. **It is the responsibility of the project owner to contact the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769.** Implementation of a project modification without first securing Energy Commission or Energy Commission staff approval may result in enforcement action that could result in civil penalties in accordance with section 25534 of the Public Resources Code.

A petition is required for **amendments** and for **insignificant project changes** as specified below. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should be submitted to the CPM, who will file it with the Energy Commission's Docket 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.

AMENDMENT

The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769, when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed modification results in deletion or change of a condition of certification, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations or standards, the petition will be processed as a formal amendment to the final decision, which requires public notice and review of the Energy Commission staff analysis, and approval by the full Commission. This process takes approximately two to three months to complete, and possibly longer for complex project modifications.

CHANGE OF OWNERSHIP

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769 (b). This process takes approximately one month to complete, and requires public notice and approval by the full Commission.

INSIGNIFICANT PROJECT CHANGE

Modifications that do not result in deletions or changes to conditions of certification, and that are compliant with laws, ordinances, regulations and standards may be authorized by the CPM as an insignificant project change pursuant to section 1769(a) (2). This process usually takes less than one month to complete, and it requires a 14-day public review of the Notice of Insignificant Project Change that includes staff's intention to approve the modification unless substantive objections are filed.

VERIFICATION CHANGE

A verification may be modified by the CPM without requesting an amendment to the decision if the change does not conflict with the conditions of certification and provides an effective alternate means of verification. This process usually takes less than five working days to complete.

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	
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	

GENERAL CONDITIONS TABLE 1
COMPLIANCE SECTION
SUMMARY of GENERAL CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Construction and Operation Milestones	The project owner shall establish specific performance milestones for start of construction and commercial operation phases of the project.
COMPLIANCE-2	Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-3	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-4	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-5	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-6	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-7	Monthly Compliance Report including a Key Events List	During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Energy Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-8	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.
COMPLIANCE-9	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit.
COMPLIANCE-10	Annual fees	Payment of Annual Energy Facility Compliance Fee
COMPLIANCE-11	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-12	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-13	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-14	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-15	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

DECLARATION OF
James W. Reede, Jr., Ed.D

I, James W. Reede, Jr., Ed.D, declare as follows:

1. I am presently employed by the California Energy Commission in the Facilities Siting Office of the Systems Assessments and 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 **Executive Summary, Introduction, Project Description and Alternatives** for the Pastoria Energy Facility Expansion 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: November 14, 2005 Signed: _____

At: Sacramento, California

JAMES W. REEDE, JR., Ed. D

6008 Wynnewood Way - Sacramento, CA 95823
(916) 399-1133(v) - (916) 399-1137(f)
j.reede@att.net

EDUCATION

General Engineering	U.S. Military Academy		1971
Electrical & Electronics Technology	Community College of the Air Force	Certificate	1973
Organizational Behavior	University of San Francisco	BS	1979
Public Policy & Administration	California State University – Sacramento	MPPA	1998
Organization & Leadership in Public Mgmt.	University of San Francisco	Ed.D	2003

PROFESSIONAL TRAINING

Process Control Engineering	General Electric Technical Training Services	1974-1976
Manufacturing Management	General Electric Management Training Services	1978-1980
	Professional Designation - American Management Assoc.	1980
Boardsmanship Academy	California School Boards Association	1982-1987
Contract Management	U.S. Air Force Institute of Technology at WPAFB	1986-1988
	Professional Designation - National Contract Mgmt Assoc.	1988
Federal Managers Training Institute	Office of Personnel Mgmt., U.S. Government	1986-1989
City Management Academy	City of Sacramento	1995
Adjunct Faculty Academy	University of San Francisco	1999
California Environmental Quality Act	UC Davis Extension	2000-2003
Planning for Higher Education Facilities	UC Davis Extension	2002

PROFESSIONAL EXPERIENCE

ENERGY FACILITY SITING PROJECT MANAGER II
California Energy Commission Feb 2000-Present

I manage the state permitting process for thermal electric power plants from the initial filing of the Application for Certification through the issuance of the final operating permit. Coordinate the efforts of other agencies and twenty-three technical discipline staff for project certification, compliance and permitting related to the California Environmental Quality Act requirements. Recommend actions, policies, and procedures affecting the licensing of projects and commission program direction. Performed legislative analysis on Commission-related legislation.

PUBLIC UTILITIES REGULATORY ANALYST III
California Public Utilities Commission Aug 99-Jan 2000

Performed technical and analytical research as well as consultative and advisory services in the areas of economics, finance and policy. Analyzed, evaluated, developed and recommended research methodologies and alternatives on energy related regulatory issues. Reviewed utilities' applications for revenue in various proceedings. Evaluated proposed legislation and advised Commission on potential impacts. Provided expert advice on Electric deregulation issues and testimony in support of and on behalf of the Commission.

ADJUNCT PROFESSOR
CSU Sacramento, University of San Francisco & National University Feb 99-Present

I instruct both undergraduate and graduate students in Environmental Science, Human Resources, Operations and Production Management, State & Local Government, Public Administration, Land Use and Public Policy courses.

SACRAMENTO MUNICIPAL UTILITY DISTRICT Jan 92-Jan 99

A. Senior Contract Administrator

Developed and issued a variety of construction and professional services solicitations and evaluated responses. Negotiate, award and manage contracts. Review and approve invoices. Developed the database to track Energy Services contracts. Responsible for all General Services, Facilities and construction contracts and budgets. Reviewed pending legislation to determine impact on District activities.

B. Key Accounts Contract Specialist (Temp Assignment) Feb 98-Oct 98

Develop customized power contracts for use with the District's medium and large Commercial and Industrial customers. Negotiated customer rate agreements and implemented deregulation requirements into customer service contracts. Identify potential customers for Key Account targeting and develop profiles for retention in the District's base load. Functioned as a Key Account Rep for small customers.

EDUCATION & MANAGEMENT CONSULTANT (*Self-Employed*) June 90-June 99
Provided statewide technical assistance for the California Department of Education Gender Equity Section at various school districts in the areas of minority populations, non-traditional careers, entrepreneurship, and At-Risk Youth. Successfully wrote grant proposals for Carl D. Perkins Vocational & Applied Technology Education Act funding. Developed a Manufacturing Studies curriculum for the Vocational Education Division of the California State Department of Education. Served on the CDE Editorial Advisory Board for the textbook "Visions: Rites of Passage for Young African-American Men." Advised and assisted small businesses in the development and submittal of bids and aided in contract and business management.

DEFENSE LOGISTICS AGENCY March 87-May 90
A. Chief, Production & Industrial Resources
Managed the Production and Industrial Resources Branch in San Diego, which monitored 835 contractors and 6,400 contracts worth $28 Billion. Responsible for production related matters such as contract performance, pre-award surveys, technical analysis of cost proposals, and progress payment reviews. Supervised the work of 27 staff that included 18 Industrial Engineers and Specialists, 7 Contract Mgmt. Assistants and 2 clerks. Interfaced with the Pricing, Engineering, Property, Contract Administration, and Transportation Branches on a daily basis. Reviewed a wide range of technical reports and analyzed data to identify production trends. Performed employee appraisals. Developed annual budget for staff and operations. Collateral duties were to establish the new San Diego Headquarters. Responsible for the site search, solicitation of lessors, the office layout, procurement of furniture, coordination of utilities installation, and logistics of the agency move.
B. Industrial Specialist Nov 85-Mar 87
Managed the contracts at the GTE residency office in Mt. View, CA. Performed in-plant production surveillance, witnessed RADAR & SONAR Systems testing, analyzed cost proposals, performed pre-award surveys, reviewed progress payment requests, verified proper use of Government owned equipment, and was part of the contract negotiation team.

CALIFORNIA PUBLIC UTILITIES COMMISSION Jun 84-Dec 84
QA Engineer - SEA Consultants
Reviewed a utility's electricity rate hike request to determine costs to be borne by users from a QA/QC cost avoidance perspective. The contract involved review of a utility's construction documents for 2 nuclear plants and determining what costs could have been avoided had QA/QC and management oversight activities been timely or properly implemented.

GE3 CORPORATION May 81-Nov 85
Project Manager / VP Projects / Principal
Planned, budgeted and installed Wind-Farm projects valued in excess of $30 million. Negotiated utility contracts for the sale of electricity. Supervised the Architect-Engineer for the site civil and electrical project requirements. Responsible for land leasing, planning, development, governmental interface, construction bids and contracts, procurement, and public relations. Responsible for compliance with regulatory requirements of CEQA and other state and federal laws.

GENERAL ELECTRIC NUCLEAR DIVISION Jun 74-May 81
Process Control Engineer / Supervising
Responsibilities were in the fields of electrical/electronic nuclear control and instrumentation manufacture and test. Duties included writing Quality Plans, Inspection & Test Instructions, Material Review Board Chair, Process Monitoring, Test Technician training and liaison with the Nuclear Regulatory Commission staff during audit to verify compliance with 10CFR50. Beginning in 1978, supervised 79 electro-mechanical inspectors, electrical/electronic testers and 2 test directors. This three-year assignment was for the assembly, factory test, shipment and on-site start-up testing of the control rooms for the Perry Nuclear Power Stations I & II (Ohio) and the Clinton Nuclear Generating Station (Illinois).

U. S. AIR FORCE Honorable Discharge May 10, 1974 Service-Connected Disabled Veteran

PAPERS PRESENTED

2003 DOCTORAL DISSERTATION "*Environmental Obstacles to Construction of Educational Facilities in California.*" University of San Francisco, May 2003, San Francisco, CA.

1998 MASTER'S THESIS "*A Comparative Case Study of the Response by the Sacramento Municipal Utility District to the Deregulation of the California Electric Utility Industry.*" California State University - Sacramento, Fall 1998, Sacramento, CA.

1998 *"California Special Districts, - History, Policies and Future Problems."* California State University - Sacramento, Spring 1998, Graduate Studies Symposium, Sacramento CA.

1997 "*The Best Kept Secret in America - The Genius of the African-American Inventor.*" National Alliance of Black School Educators, Workshop Presenter, National Convention, Reno, Nevada.

1997 "*Black Creativity and Science-The Genius of the African-American Inventor.*" International Conference on Black Creativity, Presenter, Morgan State University, Baltimore MD.

1997 "*African-American Contributions to Railroad Development in the US."* California State Railroad Museum, Guest Lecture Series, Sacramento, CA.

1997 "*The Best Kept Secret in America - The Genius of the African-American Inventor.*" Portland Community College, Black History Month Guest Lecturer, Portland, OR.

1997 " *Black Inventors Won the West."* Black Cowboy Museum, Guest Lecturer, Denver, CO.

1996 "*African-American Women Inventors.*" Annual Convention of the National Postal Women's Network, Oakland, CA.

1996 "*African-American Inventors - The Legacy.*" University of the Pacific, Black History Month Lecturer, Stockton, CA.

1992 "*The 1991 Redistricting Project, Reapportionment Success in Sacramento County.*" UC Berkeley, Guest Lecturer, Berkeley, CA.

1989 "*Production Management Techniques for Monitoring of Large Defense Contractors.*" Defense Logistics Agency, Alexandria, VA.

1982 "*Utilization of a Public Domain Design in the Manufacture of Wind Electric Generators.*" American Wind Energy Association, National Convention, Portland, OR.

1981 "*Blacks in Energy-In or Out?"* Congressional Black Caucus Energy Braintrust, Washington, DC.

1981 "*Blacks in Energy-In or Out?"* American Assoc. of Blacks in Energy, National Convention, Denver, CO.

1978 "*Process Control Techniques in the Manufacture of Nuclear Control Rooms.*" American Society for Quality Control, Portland, OR.

1977 "*Compliance with 10CFR50 in the Manufacture of Nuclear Controls and Instrumentation.*" American Society for Quality Control, Los Angeles, CA

AWARDS

2003 Outstanding Doctoral Student	University of San Francisco	May 2003
1996 Community Service Award	Sacramento Urban League	Oct. 1996
1995 Human Rights Award	Human Rights / Fair Housing Comm., City & County of Sacto.	Sept.1995
1994 Outstanding Community Leader	Sacramento County	Feb. 1994
1993 Alumni Achievement Award	Kappa Alpha Psi Fraternity	Mar. 1993
1992 NAACP Achievement Award	Region IX NAACP Annual Conference	Oct. 1992

COMMUNITY SERVICE

Planning Advisory Council	Sacramento County	2000-Present
Vice Chairman	Franklin-Laguna Planning Area	
Committee Member	Teacher Recruitment Committee	1999-Present
	Elk Grove Unified School District	
Advisory Board	Manufacturing & Product Technology Academy	1994-1996
	Elk Grove Unified School District	
Board of Directors	North Laguna Creek Neighborhood Association	1994-Present
Board of Directors	FamiliesFirst Foster Care Agency	1993-Present
Board of Directors	Habitat for Humanity	1993-1995
Vice-President	Sacramento NAACP	1994-1996
Chairman	Dance Theater of Harlem	1992 & 1994
	U.C. Davis Community Outreach Campaign	
Member	Vocational Education Advisory Council	1992-1997
	Sacramento City Unified School District	
Member	Minority Advisory Council	1992-1998
	KCRA-3, KXTV-10, & KOVR-13	
Commissioner &	Human Rights/Fair Housing Commission	1992-1994
Vice-Chair	City & County of Sacramento	
Chairman	Community Advisory Committee	1992-1996
	Sacramento Regional Transit South Line	
Co-Chairman	Black College Faire	1992-2000
Advisor/Consultant	Gender Equity Division	1991-1995
	California Dept. of Education	
Co-Chairman	No. Calif. African-American Young Male	1991-1997
	Conference	
Chairman	United Negro College Fund	1992-2000
	Northern California Campaign	
Chairman	African-American Student	1991-1996
	Career Conference	
Co-Chairman	1991 Redistricting Project	1991-1993
Board of Directors	Western Province	1991-1994
	Kappa Alpha Psi Fraternity	
Polemarch (President)	Kappa Alpha Psi Fraternity	90/96-00/01
Political Action Chair	Sacramento Branch NAACP	1990-1994
Chairman, Member	Relocation Appeals Hearing Board	1985-1987
	City of San Jose	
Committee Member	California School Boards Association	1983-1987
	Legislative & Small School Districts Committee	
Director & Officer	California Coalition of Black School Board Members	1982-1987
Board Member	Mt. Pleasant School District	1982-1987
	San Jose, Calif.	
Housing Commissioner	City of San Jose	1981-1987

INSTRUCTIONAL HISTORY
COURSES TAUGHT

COLLEGE LEVEL COURSES

1. Operations & Production Management	National University	Mar 99, Oct 00 & Jan 01
2. Performance Measurement Systems	National University	April 1999
3. Training for Organizations	National University	June 1999
4. Public Policy Analysis	University of San Francisco	June/Aug 1999
5. Personnel Procurement & Placement	National University	July 1999
6. State & Local Government	National University	Sept 99, Apr 01 & May 01
7. Government & Community Relations	National University	Oct 1999
8. Public Finance & Grants Admin	National University	Feb & Nov 2000
9. Managing for Productivity & Quality	National University	Mar & May 2000
10. Urban Planning & Technology	National University	Sept 00 & May 01
11. Seminar in Urban Affairs	National University	Sept 99, May 00 & Apr 01
12. Intro to Environmental Science	CSU – Sacramento	Fall 2003 & 2004

WORKSHOPS AND TEACHER IN-SERVICE

1. Inclusion of Black Inventors into Social Science, History and Science curricula.	1994 - Present
2. Teaching the Patent and Trademark Process to Students.	1994 - Present
3. Inclusion of Careers in Technology into Life Skills lesson plans.	1991 - 1995
4. Non-Traditional Careers	1991 - 1995
5. Organizing Non-Traditional Career Fairs	1991 - 1995
6. The Integration of Career and Life Planning with academics.	1991 - 1995
7. Understanding the Young African-American Male in the School Environment	1991 - 1995

PROFESSIONAL TRAINING COURSES TAUGHT

1. Basic & Advanced Contract Administration	1988 - 1990
2. Principles of Contract Pricing	1988 - 1990
3. Basic & Advanced Defense Contract Negotiations	1987 - 1990
4. Operations and Production Management I & II	1987 - 1990
5. Operating Costs, Budgets & Measurements	1987 - 1990
6. Developing a Permitting Process for Wind Generators.	1981 - 1984
7. Nuclear Control Room Testing	1974 - 1981
8. Inspection techniques for Nuclear Control and Instrumentation	1974 - 1981

California CBEST Passed	**February 1999**
USF Adjunct Academy	**Oct / Dec 1999**

DECLARATION OF
Testimony of William Walters, P.E.

I, **William Walters,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as a senior associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Air Quality**, for the **Pastoria Energy Facility Expansion project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 15, 2005 Signed: _____

At: Agoura Hills, California

WILLIAM WALTERS, P.E.
Air Quality Specialist

ACADEMIC BACKGROUND
B.S., Chemical Engineering, 1985, Cornell University

PROFESSIONAL EXPERIENCE

Mr. Walters has over 19 years of technical and project management experience in environmental compliance work, including environmental impact reports, RCRA/CERCLA site assessment and closure, site inspection, source monitoring, emissions inventories, source permitting, and energy and pollution control research.

Aspen Environmental Group — 2000 to present

Responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Preparation of the Air Quality sections for two separate Department of Water Resources Santa Ana Valley Pipeline Repairs Project CEQA Categorical Exemption Memorandums.
- Assistance in the preparation of the Air Quality Sections for the Department of Water Resources Tehachapi Second Afterbay Project Initial Study and EIR.
- Preparation of the Air Quality Inventory for the Los Angeles Department of Water and Power River Supply Pipeline Project EIR.
- Project management and preparation of the Air Quality Section for the Los Angeles Department of Water and Power Valley Generating Station Stack Removal IS/MND support project.
- Preparation of the Air Quality Section and General Conformity Analysis for the Matilija Dam Ecosystem Restoration Project EIS/R for the United States Army Corps of Engineers (Corps).
- Preparation of emission inventory and General Conformity Analysis of the Murrieta Creek Flood Control Project and the Joint Red Flag exercise to be conducted in the Nevada Test and Training Range for the Corps.
- Emission inventory for the construction activities forecast for the San Jose/Old San Jose Creeks Ecosystem Restoration project for the Corps.
- Preparation and project management of the air quality section of the Staff Assessment and/or Initial Study and the visual plume assessment for the following California Energy Commission (CEC) licensing projects: Hanford Energy Park; United Golden Gate, Phase I; Huntington Beach Modernization Project (including Expert Witness Testimony); Woodland Generating Station 2; Ocotillo Energy Project, Phase I; Magnolia Power Project; Colusa Power Project; Inland Empire Energy Center; Rio Linda/Elverta Power Plant Project; Roseville Energy Center; Henrietta Peaker Project; Tracy Peaking Power Plant Project (including Expert Witness Testimony); Avenal Energy Project; San Joaquin Valley Energy Center (including expert witness testimony); Salton Sea Unit 6 Project (including expert witness testimony); Modesto Irrigation District Electric Generation Station (including expert

witness testimony); Walnut Energy Center (including expert witness testimony); Riverside Energy Resource Center (including expert witness testimony); and Pastoria Energy Facility Expansion.

- Preparation and project management of the visual plume assessment for the following California Energy Commission (CEC) licensing projects: Metcalf Energy Center Power Project (including Expert Witness Testimony); Contra Costa Power Plant Project (including Expert Witness Testimony); Mountainview Power Project; Potrero Power Plant Project; El Segundo Modernization Project; Morro Bay Power Plant Project; Valero Cogeneration Project; East Altamont Energy Center (including expert witness testimony); Russell City Energy Center; SMUD Cosumnes Power Plant Project (including expert witness testimony); Pico Power Project; Blythe Energy Project Phase II; City of Vernon Malburg Generating Station; San Francisco Electric Reliability Project; Los Esteros Critical Energy Facility Phase II; and Roseville Energy Park (in progress).
- Preparation and project management of the public health section of the Initial Study for the Woodland Generating Station 2 CEC licensing project.
- Preparation of project amendment or project compliance assessments, for air quality or visual plume impacts, for several licensed power plants, including: Metcalf Energy Center; Pastoria Power Plant; Elk Hills Power Plant; Henrietta Peaker Project; Tracy Peaker Project; Magnolia Power Project; Delta Energy Center; SMUD Cosumnes Power Plant; Walnut Energy Center; San Joaquin Valley Energy Center; City of Vernon Malburg Generating Station; Otay Mesa Power Plant; Los Esteros Critical Energy Facility; Pico Power Project; Riverside Energy Resource Center; Blythe Energy Project Phase II; Inland Empire Energy Center; and Salton Sea Unit 6 Project.
- Preparation and instruction of a visual water vapor plume modeling methodology class for the California Energy Commission.
- Assistance in the preparation of the noise assessment section of the Staff Assessment for the Contra Costa Power Plant CEC licensing project.
- Assistance in the aircraft safety review of thermal plume turbulence for the Riverside Energy Resources Center; and the Blythe Energy Power Plant and Blythe Energy Project Phase II (including expert witness testimony) siting cases. Assistance in the aircraft safety review of thermal and visual plumes of the operating Blythe Energy Power Plant.
- Preparation of the air quality section of the staff paper "A Preliminary Environmental Profile of California's Imported Electricity" for the CEC and presentation of the findings before the Commission.
- Preparation of the draft staff paper "Natural Gas Quality: Power Turbine Performance During Heat Content Surge", and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.
- Preparation of the staff paper "Emission Offsets Availability Issues" and preparation and presentation of the Emission Offsets Constraints Workshop Summary paper for the CEC.
- Preparation of the Air Quality section of the PG&E Hydrodivestiture Draft EIR/EIS for the California Public Utilities Commission (CPUC).
- Preparation of permit applications, emission calculation spreadsheets, and an air quality compliance manual for Desa International's Southern California manufacturing facility.
- Preparation of the Air Quality Section of the LAUSD New School Construction Program EIR and provided traffic trip and VMT calculation support for the Traffic and Transportation Section. As part of this project attended two public scoping meetings.

- Management and preparation of the Draft Air Quality Sections for the Reseda Senior High School Portable Addition IS/MND and Wonderland Elementary Addition IS/MND projects for LAUSD.
- Technical review and updating of the Air Quality Section for the Valley High School No. 1 EIR (CSUN), Jefferson No. 6 Primary Center MND, Southern Regional Elementary School #1 MND, and Central Regional Elementary School #16 MND projects for LAUSD.
- Preparation of the Air Quality Sections and/or impacts modeling assessments for the Central Regional Middle School #7 MND and Southern Regional Middle School #6 EIR projects.
- Revision of the Risk Management Plan (RMP) for the SSI Foods Wilder Idaho Facility Ammonia Refrigeration Systems.
- Preparation of a control technology evaluation for the control of nuisance odors from wood-fired pizza ovens for the A16 restaurant in San Francisco, California.
- Preparation of the Air Quality Section of the Environmental Information Document in support of the Coastal Consistency Determinations for the suspension of operation requests for undeveloped units and leases off the Central California Coast.
- Preparation of comments on the Air Quality, Alternatives, Marine Traffic, Public Safety, and Noise section of the Cabrillo Port Liquefied Natural Gas Deepwater Port Draft EIS/EIR for the City of Oxnard.
- Preparation of an odor and health impact study in support of the Ventura County Piru Area Plan Update EIR.

Camp Dresser & McKee, Inc. **1998 to 2000**

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Preparation of emission inventories and dispersion modeling for criteria and air toxic pollutants for the Los Angeles International Airport Master Plan (LAXMP) EIS/EIR.
- Project Manager/Technical lead for the completion of air permit applications and air compliance audits for two Desa International fireplace accessory manufacturing facilities located in Santa Ana, California.
- Air quality audit for a confidential can manufacturing company at two manufacturing sites.
- Project manager/technical lead for the completion of Risk Management Plans (RMPs) for four J.R. Simplot food processing facilities in Oregon, Idaho, and Washington and the Consolidated Reprographics facility located in Irvine, California. Project manager for the concurrent Process Safety Management plan support for the J.R. Simplot Hermiston (Oregon) and Heyburn (Idaho) facilities and the project manager/technical lead for the RMP support for the SSI food processing facility in Wilder, Idaho, and the Atlantic Custom Processors food processing facility in Fort Fairfield, Maine.
- Completion of an environmental tax credit application for the J.R. Simplot Hermiston Oregon food products facility.

Planning Consultants Research **1997 to 1998**

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Project Manager for a stationary source emission audit of the entire Los Angeles International Airport complex for Los Angeles World Airports (LAWA) in support of the LAXMP.
- Review of the Emission Dispersion Modeling System (EDMS) and preparation of a report with findings to the Federal Aviation Administration for LAWA in support of the LAXMP.
- Project manager for the ambient air monitoring and deposition monitoring studies performed for LAWA in support of the LAXMP, including the selection of the monitoring sites and specialty sub-contractor, and review of all monitoring data.
- Completion of intersection "CO Hotspots" modeling, ambient monitoring, and deposition monitoring reports for LAWA in support of the LAXMP.

Aspen Environmental Group/Clean Air Solutions **1995 to 1996**

Mr. Walters was responsible as lead technical and/or project manager of environmental projects. Specific responsibilities and projects include the following:

- Manager of the Portland, Oregon, office of Clean Air Solutions from March 1995 to December 1995, with responsibilities including Project Management, Business Development, and Administration.
- Control technology assessment, engineering support and Notice of Intent to construct preparation for J.R. Simplot's Hermiston, Oregon, food processing facility. Review and revision of an Air Contaminant Discharge Permit application, Title V permit application, and PSD modeling analysis for J.R. Simplot's Hermiston facility.
- Air quality compliance report including an air emission inventory, regulation and permit compliance determination, and recommendations for compliance for Lumber Tech, Inc.'s Lebanon, Oregon, wood products facility.
- Source test methodology and equipment selection for testing inlet and outlet concentrations of total petroleum hydrocarbon and benzene from soil gas extraction/oxidation units for Cascade Earth Sciences, Ltd.
- Preparation of a Tier II (synthetic minor) permit application for the American Fine Foods' Payette, Idaho, food processing facility.
- Emission inventory and compliance evaluation for Simplot's Aberdeen, Idaho, food processing facility.
- Preparation of an Air Contaminant Discharge permit application for Marlette Homes, Inc. Hermiston, Oregon, manufactured housing facility.
- Preparation of a Title V permit application for Simplot's Helm, California, fertilizer manufacturing facility.
- Source test contractor selection and test oversight for J.R. Simplot's food processing plant in Hermiston, Oregon, and Boise Cascade's wood-fired boiler in Willamina, Oregon.

Fluor Daniel, Inc. **1990 to 1995 and 1996 to 1997**

Mr. Walters was responsible as lead technical or project manager for major environmental projects for both government and private clients. His projects included:

- Prepared several air permit applications for the ARCO Los Angeles Refinery Polypropylene Plant Project.

- Phase I environmental assessments for seven properties located in Southern California.
- Prepared Environmental Baseline Reports for 33 sites in Guam for the U.S. Navy.
- Prepared site investigation and RCRA closure plan report for Olin Hunt Specialty Chemical's Vernon, California, hazardous waste storage site.
- Project manager of the Anaconda Smelter site for the U.S. Environmental Protection Agency's (EPA) Alternative Remedial Contract System (ARCS) project during the conclusion of technical activities and project closeout. Prepared a cost recovery report for the project.
- Task manager for nine site investigations under the EPA Region VI ARCS contract. Project activities included data collection, work plan preparation, field sampling, final report preparation, and Hazard Ranking System (HRS) PREscore preparation.
- For the Hanford (Washington) Waste Vitrification Project, prepared an air emission inventory for criteria pollutants, prepared an emission inventory and compliance evaluation of toxic air pollutants, performed compliance review of design drawings and equipment specifications, analyzed failure probability and consequence analysis of design-basis accidents.
- Prepared fugitive and point source VOC emission estimates and performed a "Top-Down" BACT analysis for a 217 MMBtu/hr steam boiler for a proposed ethanol production facility in Great Falls, Montana.
- Performed environmental analysis for the Bonneville Power Authority, including air pollution BACT analysis, wastewater analysis, and evaluation of secondary environmental effects of electric power producing technologies.

Jacobs Engineering Group **1988 to 1990**

Mr. Walters was responsible for a wide range of air pollution regulatory and testing projects, including the following:

- Project manager of air toxic emission inventory reports (under California's AB2588), prepared for U.S. Borax's boron mining and refining facility and the Naval Aviation Depot (North Island Naval Base, San Diego, California).
- Prepared air permit applications and regulatory correspondence for several facilities:
  - U.S. Department of Energy's Feed Material Production Center uranium processing facility in Fernald, Ohio
  - Emission sources at a confidential high technology electronics manufacturing facility
  - Evaluation of a sludge dewatering process at Unocal's Wilmington, California, Refinery
  - United Airlines blade repair facility at the San Francisco Airport
  - Relocation of Kerr-McGee's rocket fuel storage and blending facility to Apex, Nevada.
- Prepared source testing plans, Quality Assurance/Quality Control (QA/QC), and testing oversight for several facilities, including: QA/QC for RCRA air emissions sampling plan for the Department of Defense's Chem-Demil facility on Johnston Atoll; prepared plan and provided QA/QC and field oversight for emissions testing at Baxter Healthcare in Irvine, California; and prepared plan and provided testing oversight for Kerr-McGee's existing ammonium perchlorate manufacturing facility in Henderson, Nevada.
- Completed identification of air permitting regulations and control technology requirements for a proposed 30,000 barrel per day catalytic cracking unit for Coastal Corporation's Pacific Refinery, located in Hercules, California.

- Characterized and quantified air emissions for offshore oil and gas development activities associated with Federal oil and gas Lease Sale 95, offshore southern California, for the U.S. Minerals Management Service.
- Assisted in selection and design of air pollution control equipment for various clients.
- Prepared environmental reports, including waste stream quantification and characterization for several proposed facilities, including:
  - Lake Minerals proposed soda ash plant at Owens Lake, California
  - Minsal's proposed potash facility located on the Salar de Atacama in Chile.

San Joaquin County Air Pollution Control District **During 1987 and 1988**

Mr. Walters served as an air pollution engineer and was responsible for the following: start-up site inspections of air pollution sources; monitoring source tests and evaluating source test reports; permitting minor and major sources of air pollutants; processing emission banking applications; and aiding in the preparation of the District's Best Available Control Technology (BACT) quarterly reports, Reasonable Further Progress reports, and emission inventories.

Adelphi Center for Energy Studies **1985 to 1986**

Mr. Walters served as a combustion facility manager/research engineer and was responsible for the following: management and implementation of all conventional and novel fuel combustion projects, including the preparation of interim and final reports, conducting source tests using EPA methods 1-4 and 17, and the data analysis of all combustion tests; maintenance and repair of all combustion facility equipment; preparation of all combustion project proposals; and implementation and data analysis of fuel atomization studies, fuel rheology research, and bench scale coal ash removal research.

CERTIFICATIONS

- Chemical Engineer, California License 5973
- CARB, Fundamentals of Enforcement Seminar
- EPA Methods 1-8, 17; Training Seminar

AWARDS

- California Energy Commission Outstanding Performance Award 2001

PAPERS

Authored

"Current and Future Air Pollution Emission Offset Requirements, and Impacts to the Pacific Northwest". PNWIS/CPANS Air and Waste Management Chapters Annual Meeting. November 17, 1995.

Co-Authored

"Gas Co-Firing of the CWF for Package Boiler Applications", Presented at the Third Annual Pittsburgh Coal Conference, September 1986.

"Implications of Slurry Fuel Rheology on Atomization," American Society of Engineers.

"Factors Affecting Atomization of CWF", Presented at the Eighth International Symposium of Coal Slurry Fuel Preparation and Utilization. Orlando, FL May 1986.

DECLARATION OF
Testimony of Lisa Blewitt

I, **Lisa Blewitt,** 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 associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Air Quality**, for the **Pastoria Energy Facility Expansion project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 15, 2005 Signed: Lisa Blewitt

At: Agoura Hills, California

LISA A. BLEWITT
Associate Engineer/Physical Scientist

ACADEMIC BACKGROUND
B.S., Chemical Engineering, University of California, Santa Barbara, 1996

PROFESSIONAL EXPERIENCE

Ms. Blewitt is an Associate in Engineering and Physical Sciences with experience serving as project manager as well as deputy project manager for California Environmental Quality Act (CEQA) projects. In addition, Ms. Blewitt has four years of experience evaluating the potential impacts to the physical environment, particularly with regard to air quality, plume, noise, and hazards and hazardous materials associated with proposed infrastructure projects in compliance with CEQA and the National Environmental Policy Act (NEPA). Prior experience includes working as a process engineering doing refinery and power plant design.

Aspen Environmental Group — 2001 to present

Ms. Blewitt's project experience at Aspen includes the following:

California Energy Commission (CEC) (2001-2003). Ms. Blewitt performed plume analysis and/or air quality analysis on several projects to support the Staff Assessments for the CEC's CEQA equivalent review process. She also helped manage the Aspen Team as Power Plant Coordinator (PPC). Coordination of the Aspen team with CEC project managers included providing up-to-date information to all members of the team, identifying key issues, and preparing monthly progress reports. She also managed the Aspen team as the overall Aspen PPC for all CEC projects by providing weekly progress reports to all Aspen PPCs. In addition to her work on the Staff Assessments for the CEC, Ms. Blewitt was also the Coastal Power Plant Inventory Coordinator for the Coastal Plant Study.

- **Avenal Energy Center.** AFC for 600 MW combined cycle plant located in Avenal, Kings County. Ms. Blewitt performed the plume analysis for the cooling tower, heat recovery steam generators (HRSGs), and auxiliary boiler.
- **Blythe Energy Project Phase II.** Aspen Team PPC to support the Staff Assessment of the AFC for a 520 MW combined cycle power plant located entirely within the previously approved Blythe Energy Project facility boundaries west of the City of Blythe, Riverside County. Ms. Blewitt performed the plume analysis for the cooling tower and HRSGs.
- **City of Vernon Combined Cycle.** AFC for the Malburg Generating Station (MGS), a 120 MW combined cycle power plant to be located in the City of Vernon, Los Angeles County. Ms. Blewitt performed the plume analysis for the cooling tower and HRSGs. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.
- **Colusa Power Project.** AFC for a 500 MW combined cycle power generation facility located west of the City of Williams in Colusa County. Ms. Blewitt assisted with the air quality analysis.

- **East Altamont Energy Center.** AFC for a 1,100 MW combined cycle power generation facility located southeast of Tracy in Alameda County. Ms. Blewitt assisted with the cooling tower plume analysis. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.
- **Henrietta Peaker Project.** AFC for a 91.4 MW simple cycle power plant to be located west of the City of Lemoore, in Kings County. Ms. Blewitt assisted with the air quality analysis and performed the plume analysis for the HRSGs. This plant did not require a cooling tower.
- **Inland Empire Energy Center.** AFC for a 670 MW combined cycle power plant to be located near the town of Romoland and Perris, within an unincorporated area of Riverside County. Ms. Blewitt performed the plume analysis for the cooling tower, HRSGs, and auxiliary boiler.
- **Los Esteros Critical Energy Facility.** Aspen Team PPC to support the Staff Assessment of the AFC for a 180 MW simple cycle peaking plant in San Jose, CA.
- **Magnolia Power Project.** AFC to add 250 MW of new generation at Magnolia Generation Power Plant in Burbank, CA. Ms. Blewitt assisted in the air quality analysis and performed the plume analysis for the cooling tower and HRSGs. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.
- **Modesto Irrigation District Electric Generation Station.** SPPE for a 95 MW simple cycle project located in Ripon, San Joaquin County. Ms. Blewitt assisted with the air quality analysis.
- **Roseville Energy Facility.** AFC for 900 MW combined cycle power plant five miles northwest of downtown Roseville in Placer County. Ms. Blewitt performed the plume analysis for the cooling towers.
- **Salton Sea Unit 6 Project.** Aspen Team Power Plant Coordinator to support the Staff Assessment of the AFC for 185 MW geothermal plant near Calipatria, Imperial County. Ms. Blewitt assisted with the air quality analysis and performed the plume analysis for the cooling tower and dilution water heaters.
- **San Joaquin Valley Energy Center.** Aspen Team PPC to support the Staff Assessment of the AFC for a 1,060 MW combined cycle power generation facility located in the City of San Joaquin, Fresno County. Ms. Blewitt assisted with the air quality analysis, and performed the plume analysis for the cooling tower, HRSGs, and auxiliary boiler. She also performed a cooling tower plume ground level fogging analysis to determine impacts to surrounding roadways.
- **SMUD Cosumnes Power Plant Project.** AFC for 1000 MW combined cycle power plant to be located at the Rancho Seco Nuclear Power Plant in Sacramento County. Ms. Blewitt performed the plume analysis for the cooling towers and HRSGs.
- **Tracy Peaker Power Plant Project.** Aspen Team PPC to support the Staff Assessment of the AFC for a 169 MW simple cycle power plant to be located southwest of the City of Tracy, in western San Joaquin County. Ms. Blewitt also assisted with the air quality analysis and performed the plume analysis based on results from Spartan I Energy Center Project.
- **Turlock Irrigation District Walnut Energy Center.** AFC for a 250 MW combined cycle power plant located in Turlock, Stanislaus County. Ms. Blewitt assisted with the air quality analysis and performed the plume analysis for the cooling tower and heat recovery steam generator.
- **Coastal Plant Study.** Ms. Blewitt was the Coastal Power Plant Inventory Coordinator for this special study conducted as part of Aspen's contract with the CEC. As Inventory Coordinator her responsibilities included collection of plant data and permits, coordinating and summarizing all data collected. The intent of the study is to provide sufficient background information to help identify red flag items for the CEC in order to streamline future licensing processes.

California Public Utilities Commission (CPUC) (2005). Ms. Blewitt is assisting in the alternatives analysis for this EIR/EIS, where the proposed project would include building a new 25.6-mile 500-kV transmission line between Southern California Edison's existing Antelope and Pardee Substations, which are located in Lancaster and Santa Clarita, California, respectively. The proposed route would traverse Angeles National Forest generally within the existing Saugus-Del Sur transmission corridor.

California Department of Water Resources (DWR). Ms. Blewitt performed various environmental analyses for the following projects:

- **Tehachapi East Afterbay Project (2003-2004).** Initial Study/Environmental Impact Report (IS/EIR) to construct a reservoir near the bifurcation of the East Branch and West Branch of the California Aqueduct, nine miles east of Gorman, California. The project would provide additional storage to the existing Tehachapi Afterbay to enable enhanced peaking operation of upstream pumping plants and increased operational flexibility. Ms. Blewitt acted as the Deputy Project Manager for the IS/EIR. She prepared the project description and performed the environmental analysis for air quality, cultural resources, geology/soils, hazards/hazardous materials, noise, transportation/traffic, and utilities/service systems for the Initial Study (Tehachapi Second Afterbay). It was decided to move the proposed reservoir and redesigned the project to reduce escalating costs associated with the original design. Ms. Blewitt prepared the Notice of Preparation (NOP) for the Tehachapi East Afterbay (TEA) Project, prepared the executive summary and project description, and assisted with the air quality analysis for the EIR. Ms. Blewitt also prepared the Final EIR, Statement of Findings, and Statement of Overriding Considerations for the TEA Project.

- **Pyramid Dam Emergency Access Road (PDEAR) (2005).** As Project Manager, Ms. Blewitt is managing the preparation of a Biological Evaluation/Biological Assessment (BE/BA), Initial Study and Mitigated Negative Declaration in compliance with CEQA, and obtaining the required environmental permits for an emergency access road. DWR proposes to build an emergency access road to Pyramid Dam in northwestern Los Angeles County, California, in the Angeles National Forest. The purpose of the emergency access road would be to provide full and adequate access to Pyramid Dam in the event of an emergency (dam failure and/or leakage), and for required periodic inspections and maintenance.

Los Angeles Department of Water Resources (LADWP) (2004-2005). Ms. Blewitt is serving as the Deputy Project Manager for the Lower Reach River Supply Conduit Project. She assisted with the preparation of the IS/EIR for this 7.1 mile water pipeline project, which will be located in public street rights-of-way, LADWP property, and LADWP utility easements in the communities of Silver Lake and Los Feliz (including Griffith Park) in the City of Los Angeles. For the IS, Ms. Blewitt prepared the project description, cultural resources, and hazards and hazardous materials discussions. A Draft EIR was prepared for the project in May 2005, focusing on air quality, noise, and traffic impacts.

U.S. Army Corps of Engineers (Corps). Ms. Blewitt performed various environmental analyses for the following projects.

- **Murrieta Creek (2003).** Supplemental Environmental Assessment/Environmental Impact Report Addendum to assess the differences in impacts resulting from implementation of the Modified Phase I Plan (as compared with the impacts of the Original Phase I Plan addressed in the 2000 EIS/EIR). The project involved improvements to Murrieta Creek that extend from the 1st Street Bridge in Temecula, California downstream to just north of the USGS stream gage, which is located just upstream of Murrieta Creek's confluence with Temecula Creek at the headwater of the Santa Margarita River. Ms. Blewitt performed the environmental analysis for public health and safety and utilities and public services.

- **Matilija Dam (2003-2004).** Environmental Impact Statement and Environmental Impact Report (EIS/EIR) prepared to analyze and disclose the potential environmental effects associated with the proposed Matilija Dam Ecosystem Restoration Feasibility Study. Ms. Blewitt performed the noise analysis for the various project alternatives.

- **Joint Red Flag '05 Exercise (2004-2005).** Environmental Assessment to analyze the impacts associated with the ground component of the Joint Red Flag '05 Exercise which would be performed on Bureau of Land Management (BLM) lands surrounding Nellis Air Force Base in Lincoln County, Nevada. Ms. Blewitt attended the site visits; and performed the noise, transportation, public health and safety (hazardous materials), and utilities analyses.

- **Fort Irwin EBS (2005).** Environmental Baseline Survey (EBS) report on the Russell-Soller Property near Fort Irwin, San Bernardino County, California to support the purchase of the site by the U.S. Army for the Fort Irwin National Training Center. Ms. Blewitt was the Deputy Project Manager assisting in the development of the EBS. Specifically, Ms. Blewitt conducted site investigations, prepared the project description, and reviewed the potential hazards on the site.

- **Murrieta Creek Water Quality Monitoring (2005).** The Corps of Engineers is constructing a flood control, ecosystem restoration and recreation project. Phase I of this construction project is currently occurring along an approximately one mile portion of Murrieta Creek between Highway 79 South and 1st Street. Best Management Practices applied to the project failed to provide adequate erosion and sediment control, resulting in violations of the State Water Resources Control Board Order No. 99-08-DWQ, *National Pollutant Discharge Elimination System No. CA000002, Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity*. As Project Manager, Ms. Blewitt is managing the water quality monitoring efforts to comply with Section 401 Water Quality Certification conditions, the Notice of Violation and Cleanup and Abatement Order letters received from the California Regional Water Quality Control Board Region 9.

Fluor Daniel, Inc. — 1996 to 2001

Ms. Blewitt was a Process Engineer at Fluor Daniel, Inc. in Aliso Viejo, CA, from August 1996 to July 2001. She did process design work for both refineries and power plants.

MODELS

- Seasonal/Annual Cooling Tower Impact (SACTI) Model
- Combustion Stack Visible Plume (CSVP) Model
- FHWA Traffic Noise Model®
- BEEST for Windows (BEE-Line Software's ISCST3/SCREEN3 modeling manager)

ADDITIONAL TRAINING AND COURSES

- Engineer-In-Training Certificate, October 1996
- UCSB Extension 2-day class – Preparing CEQA/NEPA Documents, January 2002
- UCSB Extension Project Management Professional Certification Program, June 2003
- BEE-Line Software 2-day course – PERMITS: Modeling for State and Federal Permit Applications Using BPIP/BPIP-Prime, AerMod, ISC-Prime & ISCST3 (BEEST software package), November 2003

DECLARATION OF
Susan D. Sanders

I, Susan D. Sanders, declare as follows:

1. I am presently employed by PAR Environmental Services, Inc., a consulting firm under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-02-004, I am serving as a Biological Resource Specialist to support the Energy Facility Planning and Licensing Program for the California Energy Commission in the Biological Resources Office of the Systems Assessments and Facilities Siting Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the final staff testimony on Biological Resources for the Pastoria Energy Facility Expansion project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 8, 2005 Signed: Susan D Sanders

At: Nevada City, California

Susan D. Sanders

PAR ENVIRONMENTAL SERVICES, INC.
Principal Biologist

EDUCATION

Ph.D Zoology University of California, Davis (1983)

M.A. Zoology University of California, Davis (1979)
B.A. Zoology University of California, Berkeley (1976)

REGULATORY COMPLIANCE EXPERTISE in coordination with state, federal, and local agencies in the environmental review process for projects regulated by the California Environmental Quality Act, National Environmental Policy Act, Federal and State Endangered Species Acts, National Fish & Wildlife Coordination Act, Clean Water Act, and California Coastal Act.

TECHNICAL EXPERTISE in surveys for threatened and endangered wildlife species; biological inventories; habitat management plans; raptor surveys; wildlife habitat assessment; mitigation monitoring; expert testimony, constraints analysis; sensitive species research. Prepared Biological Assessments for endangered, threatened, and candidate species, and conducted field surveys and literature reviews for willow flycatchers, tricolored blackbirds, Swainson's hawks, giant garter snakes, red-legged frogs, burrowing owls, California spotted owls, San Joaquin kit fox, bald eagles, valley elderberry longhorn beetles, vernal pool crustaceans, and many other special-status species.

PROJECT MANAGEMENT EXPERIENCE on large and complex projects, including a two-year survey of 11,000 acres in the Plumas National Forest for a proposed land exchange, involving supervision of eight technical specialists and subconsultants. Responsible for overseeing numerous transportation and revegetation projects and mitigation monitoring programs which involved budget, personnel, and subconsultant management, agency and client coordination, and preparation of technical reports.

CALIFORNIA ENERGY COMMISSION TECHNICAL ASSISTANCE PAR is currently assisting Aspen and the CEC in evaluating the environmental aspects of new power plant applications throughout the state, and also providing technical expertise as an avian specialist. Dr. Sanders is currently involved in the following projects:

- **Pastoria Energy Facility Expansion**. Working with CEC staff, Dr. Sanders met reviewed the Application for Certification and associated reference material, prepared Data Adequacy Form and Data Request and a Preliminary Staff Assessment.
- **San Francisco Energy Reliability Project**: For this project Dr. Sanders reviewed the Application for Certification and related information material, met with CEC staff and United States Fish and Wildlife Service regarding endangered species issues, and prepared a Preliminary Staff Assessment.
- **Black Mountain Wind Energy and 69kV Transmission Line Project**: Acting as CEC's avian specialist, Dr. Sanders reviewed the extensive literature of effects of wind development

on avian populations, met with the Public Interest Energy Research staff, and prepared a comment letter on behalf of CEC for the Notice of Preparation for this project.

CONSULTING EXPERIENCE (1982 - 2005)

Riparian/Wetland Projects. Designed and conducted studies of wildlife use of riparian/wetlands and potential impacts of reduced flows and other proposed stream modifications; provided expert testimony. Representative projects include:

- New York Creek Flat Habitat Assessment, Yuba County, Soper-Wheeler Company (PAR)
- Friends of the American River v. EBMUD, Lower American River, Sacramento County (County of Sacramento);
- Teichert/Granite Aggregate Mining Site, Sacramento County (Holliman, Hackard, & Taylor);
- Lower Laguna Drainage Master Plan, Sacramento County (PAR);
- Natomas Ditch Abandonment and Pipeline Construction Project, Sacramento County (PAR);
- Tuolumne River Wildlife Studies for FERC License, Tuolumne County (Holton & Associates);
- Turner Creek Hydroelectric Project, Plumas County (Jones & Stokes Associates);
- Calabazas Creek Flood Control Project, Santa Clara County (Santa Clara Valley Water District).

Mitigation Monitoring. Supervised the design and ongoing monitoring of wetland and sensitive species mitigation projects, including riparian revegetation, vernal pool creation, and mitigation banking. Some projects involved preparation of a Habitat Mitigation and Monitoring Plan, and long-term monitoring efforts (five years plus), as well as preparation of annual reports, and coordination with US Army Corps of Engineers, US Fish and Wildlife Service, California Department of Fish and Game, California Department of Transportation, and the US Environmental Protection Agency. Projects include:

- Dark Horse Mitigation Monitoring, Nevada County (Nevada City Engineering)
- Northpointe, Burrowing Owl Mitigation Monitoring, Sacramento County (PAR)
- Burrowing Owl Mitigation Monitoring, Meadowview, Sacramento County (PAR)
- Wilbur Avenue Overhead Project, Habitat Restoration for Lange's Metalmark Butterfly, Antioch, Contra Costa County, (PAR)
- Swainson's Hawk Nest Monitoring, Garden Highway, Sacramento, Sacramento County (PAR)
- Sierra College Boulevard Riparian Revegetation Monitoring, Roseville, Placer County (PAR);
- Roseville Sanitary Landfill Riparian Revegetation Project, Roseville, Placer County (PAR);
- State Route 99/Calvine Interchange Vernal Pool Vegetation and Fairy Shrimp Mitigation Monitoring, Sacramento County (PAR);
- Potrero Hills Landfill Bird Deterrence Monitoring, Solano County (Global Environmental);
- B&J Sanitary Landfill Bird Deterrence Monitoring, Solano County (Global Environmental);
- State Route 50/Folsom Boulevard Improvement Project, Beach Lakes Mitigation Bank (PAR);
- Niblick Bridge Riparian Revegetation and Mitigation Monitoring, San Luis Obispo County (PAR).

CEQA/NEPA Documents. Prepared biological resource sections of Environmental Impact Reports/Statements, Initial Studies, and Environmental Assessments for numerous commercial and residential developments, redevelopment projects, transportation projects, dams, and other water projects throughout northern California. Conducted wildlife and plant community surveys, habitat assessments, agency contacts, data analysis and report preparation. Secured 1602 Streambed Alteration Agreements from California Department of Fish and Game, Section 404 Permits from U.S. Army Corps of Engineers, and 401 Permits from Regional Water Quality Control Board. Some representative projects include:

- Folsom Corporation Yard Redevelopment Plan Project, Sacramento County (PAR Environmental Services, Inc. [PAR]);
- Laguna Creek Interceptor and Sewer Alignment Constraints Study, Sacramento County (PAR);
- Marin Public Safety and Emergency Radio System Project, Marin County (Cord Communication)
- Biological Studies for Endangered Species Compliance, Isabella Dam, Kern County (PAR);
- Granite Quarry, Placerville (The Bedrock Group);
- Pacific-Bell Rocklin Central Dialing Station, Rocklin, Placer County (PAR);
- Whitney Oaks Raptor Surveys, Placer County (Live Oak Enterprises/Pulte Homes);
- Croftwood Project Access Roads, Placer County (Planning Center);
- Auburn Ranch Subdivision Project, Placer County (Area West Engineers);
- Equestrian Ridge Estates, Placer County (PAR);
- Willow Creek Assessment District Swainson's Hawk Surveys, Sacramento County (PAR);
- Bucks Lake Spotted Owls Surveys, Menasha Corporation, Plumas County (PAR);
- Roseville Water Facilities Project, City of Roseville, Placer County (Geier & Geier Consulting);
- Hidden Falls Planned Unit Development, Placer County (JJD Properties);
- Sugar Bowl Ski Resort Expansion, Placer County (Omni-Means, Engineers/Planners);
- City of Lincoln Waste Water Treatment Plant Expansion, Placer County (City of Lincoln);
- Lucky/Hatch Annexation, San Joaquin County (Greystone Environmental);
- The Heritage at Bickford Ranch, Placer County (Geobotanical Phenomenology);
- Dixon Garden Apartments, Dixon, Solano County (Planning Concepts);
- South Branch 60 kV Pole Line Project, Roseville, Placer County (PAR);
- Smith-Moulton Pipeline Project, Nevada County (PAR);
- Morada Ranch Annexation, San Joaquin County (Omni-Means);
- Clover Valley Lakes Estates EIR, Placer County (Planning Concepts);
- Turtle Island, Loomis, Placer County (Export International);
- Fort Hunter-Liggett Wildlife Resource Surveys, Monterey County (Jones & Stokes Associates);
- Superconducting Super Collider EIR/EIS, Yolo and Solano Counties (EIP Associates);
- South Lake Tahoe Redevelopment Agency EIR, El Dorado County (Wagstaff & Brady);
- Stanford Ranch EIR, Placer County (Jones & Stokes Associates);
- Northeast Roseville Specific Plan EIR, Placer County, Placer County (Jones & Stokes Associates).

Transportation Projects. Prepared Caltrans Natural Environment Study Reports, Categorical Exemption/Exclusions, Preliminary Environmental Study Forms, and other documentation for bridge replacements, interchange modifications, seismic retrofits, road widenings, emergency storm damage repairs, and other transportation projects in Caltrans Districts 1, 2, 3, 4, 5, and 10. Projects include:

- I-580/Isabel Avenue Interchange Project, Livermore, Alameda County (PAR);
- Gladding Road Bridge Replacement, Coon Creek, Placer County (Planning Concepts);
- Lozanos Road Bridge Replacement, Auburn Ravine, Placer County (PAR);
- Coyote Creek Bridge Replacement Project, Calaveras County (PAR);
- Route 99/Route 120 East Interchange Project, Manteca, San Joaquin County (PAR);
- Route 99/Prado Road Interchange, San Luis Obispo County (PAR);
- Ralston Avenue/Route 101 Interchange, Belmont, San Mateo County (PAR);
- Route 1 Improvement Project, Sand City to Seaside, Monterey County, PEAR (PAR);
- Northeast Area Transportation Plan, Constraints Analysis, Sacramento (PAR);
- Wilbur Avenue Overcrossing Project, Antioch, Contra Costa (PAR);
- Alpine Road Storm Damage Repair, San Mateo County (PAR);
- Pescadero Road Storm Damage Repair, San Mateo County (PAR);
- Route 92 Widening, Half Moon Bay, San Mateo County (PAR);
- Route 99/Hammer Lane Interchange Improvements, Stockton, San Joaquin County (PAR);
- Hammer Lane Widening, Stockton, San Joaquin County (PAR);
- La Gonda Way and Paraiso Drive Bridge Seismic Retrofit, Danville, Contra Costa County (PAR);
- Highway 162 Bridge Storm Damage Repair Project, Sacramento River, Glenn County (PAR);
- Norwood Avenue Reconstruction Project, Sacramento County (Planning Center);
- HOV Lane Construction, US 50, Sunrise to El Dorado Blvd., Sacramento/El Dorado Co. (PAR);
- Dry Creek Bridge Replacement Project, Route 99, Butte County (PAR);
- Ladies Canyon Bridge Storm Damage Repair, Sierra County, (PAR);
- Emergency Storm Damage Repair, Routes 49 and 89, Sierra and Nevada Counties, (PAR);
- Emergency Storm Damage Repair Project for: Route 70/89, Feather River Canyon, Route 20, 147, Plumas, Nevada, and Butte Counties, (PAR);
- Interstate 5 - Benjamin Holt/Hammer Lane Interchange project, San Joaquin County (PAR);
- State Route 113/Interstate 5 Connector Study, City of Woodland, Yolo County, California (PAR);
- Frederickson Road Widening, Antioch, Contra Costa County (May Consulting);
- East Lime Kiln Road Reconstruction Project, Nevada County (PAR);
- Lower Sacramento Road and Bridge Widening, Stockton, San Joaquin County (May Consulting);
- Sierra College Boulevard Widening Project, Roseville, Placer County (PAR);
- State Route 50/Folsom Interchange Improvement Project, Sacramento County (PAR);
- Pico Creek Bridge Replacement Project, Route 1, San Luis Obispo County (PAR)
- Burns Creek Bridge Replacement Project, Route 1, Monterey County (PAR);
- Pajaro River Bridge Replacement Project, Monterey and San Luis Obispo Counties (PAR);

- Route 113 Widening/North 1st Street Improvements, Dixon, Solano County (Planning Concepts);
- Bridgeport School Bridge Replacement Project, El Dorado County (PAR);
- State Route 49 Widening, Auburn, Placer County (PAR);
- Claus Road Bridge Widening, Modesto, Stanislaus County (PAR);
- Interstate 80/Enterprise Boulevard Interchange, City of West Sacramento, Yolo County (PAR).

HEP Analysis. Conducted Habitat Evaluation Procedure (HEP) analyses for Farmington Canal Project, Calaveras County, and Calabazas Creek flood control project, Santa Clara County. Co-author of Habitat Suitability Model for Willow Flycatcher.

Land Exchanges. Prepared Biological Assessments/Evaluations for Forest Service land exchanges in the Plumas National Forest. The largest of these was the 11,000 acre Soper-Wheeler Company land exchange, a two-year project requiring management of eight employees and several subconsultants for surveys of rare plants, California spotted owls, northern goshawks, red-legged frogs, and other sensitive species. Other projects include the Crites Mineral Fraction Land Exchange and the Saunders Land Exchange, Plumas National Forest, (PAR Environmental Services, Inc.).

TEACHING EXPERIENCE

Lecturer. Biology 10, UCD Zoology Department (1985): Instructor - biology for non-majors.
Lab Coordinator. Zoology 2L, UCD Zoology Department (1983-1984): Trained and supervised teaching assistants, managed introductory zoology laboratories.
Teaching Assistant. UCD Zoology Department (1977-1983): General Zoology, Vertebrate Structure, Introductory Biology.
Outstanding UCD Graduate Teaching Assistant (1983).

PUBLICATIONS

Beedy, E. C., S. D. Sanders, and D. A. Bloom. 1991. Breeding status, distribution, and habitat associations of the tricolored blackbird (*Agelaius tricolor*), 1850-1989. June 21, 1991. Jones & Stokes Associates (JSA 88-187.) Sacramento, CA. Prepared for UWFWS, Sacramento, CA.

Sanders, S. D. and M. A. Flett. 1989. The ecology of a Sierra Nevada population of Willow Flycatchers (*Empidonax traillii*), 1986 and 1987. California Management Branch Administrative Report No. 89-3, California Department of Fish and Game.

Harris, J. D., S. D. Sanders, and M. A. Flett. 1987. Willow Flycatcher surveys in the Sierra Nevada. Western Birds. 18:27-36.

Flett, M. A. and S. D. Sanders. 1987. Ecology of a Sierra Nevada population of Willow Flycatchers. Western Birds. 1:37-42.

Sanders, S. D. 1983. Foraging Ecology of a Sierra Nevada population of Douglas Tree Squirrels (*Tamiasciurus douglasii*). Ph.D. Dissertation, University of California, Davis.

DECLARATION OF
Dorothy Torres

I, Dorothy Torres declare as follows:

I am presently employed by the California Energy Commission in the Environmental Office of the Systems Assessments and 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 draft initial study on Cultural Resources for the Pastoria Energy Facility Expansion 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.

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: 10/27/05 Signed: Dorothy Torres

At: Sacramento, California

Dorothy E. Torres

EXPERIENCE:

September 2002-
Present

Planner II: Biology and Cultural Unit,
Systems Assessment and Facilities Division, California Energy Commission. Duties: As a Planner II, I Identify, describe, and analyze complex cultural resources issues related to electrical energy production facilities, alternative energy technologies, energy research and development and Commission programs. This includes the preparation of sections of initial studies, environmental impact reports and Commission reports.

In addition, I prepare independent assessments of the cultural resources aspects of Notices of Intention, Applications for Certification, and Small Power Plant Exemptions. The final analyses include the preparation and presentation of expert technical testimony, which is presented at Commission hearings.

I also coordinate and work with federal, state, regional and local governments; cultural resources related agencies; environmental organization and universities; Native American or other ethnic groups; archaeological or historical professional organizations; and members of the general public regarding energy-related issues to assure their input into the Commission power plant siting process and other Commission programs.

Moreover, I lead or participate in workshops and meetings concerning Commission projects, programs and policies, amongst and between project applicants, staff, other governmental agencies, private organizations, and the public.

In addition, I examine and evaluate existing and proposed laws, ordinances, regulations, standards, and policies pertinent to the visual, cultural aspects of proposed energy facilities on Commission programs. After permitting, I evaluate the licensee's compliance with conditions of certification for power plant facilities.

April 2001-
August 2002

Planner I: Cultural, Socioeconomic and Visual Unit,

Systems Assessment and Facilities Division, California Energy Commission. Duties: I gather, organize and analyze cultural resources data and identify issues, impacts and mitigation measures ensuring compliance with the California Environmental Quality Act. I provide oversight for consultants working on siting applications in the area of cultural resources. I participate in workshops and meetings concerning Energy Commission projects and programs. In addition, I Interact with Division technical staff and staff representing other Divisions, local and regional government staff/decision makers, federal and state agency representatives and consultants/experts in the areas of anthropology, archaeology, history and related fields. I prepare written assessments of energy related documents.

December 1998-
March 2001

Energy Analyst: Community and Cultural Resources Unit, Energy Facilities Siting and Environmental Protection Division, California Energy Commission. Duties: I assist in gathering, organizing and analyzing cultural resources data and identify issues, impacts and mitigation measures. I assist in coordinating with local governments, resource protection agencies, environmental organizations and business organizations. Furthermore, I participate in workshops and meetings concerning Energy Commission projects and programs. I evaluate existing and proposed laws, ordinances, regulations, standards, and policies pertinent to the cultural resource aspect of proposed energy facilities. I prepare written assessments of energy related documents.

EDUCATION:

Spring 1988 — M.A., Anthropology
California State University, Sacramento

Spring 1980 — B.A., Anthropology and History
California State University, Sacramento

Professional Organizations — Society for California Archaeology
Sacramento Archaeological Society

DECLARATION OF
Alvin J. Greenberg, Ph.D.

I, **Alvin J. Greenberg** 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 **Hazardous Materials Management, Public Health, Waste Management, and Worker Safety/Fire Protection** sections for the **Pastoria Energy Facility Expansion** 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: Oct. 27, 2005 Signed: _____

At: Sacramento, California

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
415-479-7560 fax 415-479-7563
e-mail agreenberg@risksci.com

Name & Title: **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP**
Principal Toxicologist

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader for hazardous waste site characterization, preparation of human and ecological risk assessments, air quality assessments, interaction with regulatory agencies in obtaining permits, hazardous materials handling and risk management prevention, infrastructure vulnerability assessments, conducting lead surveys and studies, with particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, and the intrusion of subsurface contaminants into indoor air. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission. In addition to providing security expertise to the State of California, Dr. Greenberg is Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

Years Experience: 25

Education:

B.S. 1969 Chemistry, University of Illinois Urbana

Ph.D. 1976 Pharmaceutical/Medicinal Chemistry, University of California, San Francisco

Postdoctoral Fellowship 1976-1979 Pharmacology/Toxicology, University of California, San Francisco

Postgraduate Training 1980 Inhalation Toxicology, Lovelace Inhalation Toxicology Research Institute, Albuquerque, NM

Professional Registrations:

Board Certified as a Qualified Environmental Professional (QEP)
California Registered Environmental Assessor - I (REA)
Fellow of the American Institute of Chemists (FAIC)

Professional Affiliations:

Society for Risk Analysis
Air and Waste Management Association
American Chemical Society
American Association for the Advancement of Science
National Fire Protection Association

Technical Boards and Committee Memberships - Present:

Squaw Valley Technical Review Committee
(appointed 1986)

Technical Boards and Committee Memberships - Past:

July 1996 – March 2002
Member, Bay Area Air Quality Management District Hearing Board
(Chairman 1999-2002)

September 2000 – February 2001
Member, State Water Resources Control Board Noncompliant Underground Tanks Advisory Group

January 1999 – June 2001
Member, California Air Resources Board Advisory Committee on Diesel Emissions

January 1994 - September 1999
Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee

September 1998
Member, US EPA Workgroup on Cumulative Risk Assessment

April 1997 - September 1997
Member, Cal/EPA Private Site Manager Advisory Committee

January 1986 - July 1996
Member, Bay Area Air Quality Management District Advisory Council
(Chairman 1995-96)

January 1988 - June 1995
Member: California Department of Toxic Substance Control Site Mitigation Program Advisory Group

January 1989 - February 1995
Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992
Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991
Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988
ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987
California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987
Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987
Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986
Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985
Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983
Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

Present Position

January 1983- present
Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, and litigation support for toxic substance exposure cases.

Previous Positions

Jan. 2, 1983 - June 12, 1984
Member, State of California Occupational Safety and Health Standards Board (Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983
Assistant Deputy Chief for Health, California Occupational Safety and Health Administration

Feb. 1, 1979 - Aug. 1, 1979
Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979
Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975
Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

Experience

General

Dr. Greenberg has been a consultant in Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Materials Management and Security, Hazardous Waste Site Characterization and Toxic Substances Control Policy for over 25 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Since the events of 9/11, Dr. Greenberg has taken the lead for the California Energy Commission in developing a power plant vulnerability assessment methodology and model power plant security plan. He also assisted the CEC in the preparation of a "background" report on the risks and hazards of siting LNG terminals in California and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. In August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the

Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead oxide contaminated soil at DOD facilities.

Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

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)

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)

Infrastructure Security

For the past three years, 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 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 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 will be used by all 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 has also led 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, Dr. Greenberg is Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

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)

Occupational Safety and Health/Health and Safety Plans/Indoor Air Quality

Dr. Greenberg has significant experience in occupational safety and health, having directed the development, adoption, and implementation of over 50 different Cal/OSHA regulations, including airborne contaminants (>450 substances), lead, asbestos, 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.

Examples

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)

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

DECLARATION OF
Rick Tyler

I, Rick Tyler declare as follows:

I am presently employed by the California Energy Commission in the Systems Assessments and Facilities Siting Division as a Senior Mechanical Engineer.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I supervised the preparation of the staff testimony on Hazardous Materials Management and Worker Safety for the Pastoria Energy Facility Expansion Project (05-AFC-1) based on my independent analysis and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue 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: 11/17/05 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
AMANDA STENNICK

I, **AMANDA STENNICK** declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Protection of the Energy Facilities Siting and Environmental Protection Division as a Planner II.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **LAND USE**, for the **PASTORIA ENERGY FACILITY EXPANSION 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: October 24, 2005 Signed: Amanda Stennick

At: Sacramento, California

AMANDA STENNICK

EDUCATION

B.A. 1986 University of California, Davis, Urban and Economic Geography

WORK EXPERIENCE

Oct. 1993 to April 1998 **Planner I.** California Energy Commission, Energy Facilities Siting and Protection Division.

Provide technical analysis of proposed energy planning, conservation, and development programs on land use and socioeconomic resources. Specific tasks include the analysis of potential impacts, identification of suitable mitigation measures, preparation of testimony, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations. Recent work includes participation in the environmental justice task force, and preparation of environmental justice white paper, presented to Commissioners; research and preparation of discussion on discount rates and net present value for the SFEC siting project; preparation of socioeconomic section on 1996 Quincy Library Group Report; preparation of forestry section on 1997 CEC Global Climate Change Report; ongoing demographic research for environmental justice issues in siting cases.

April 1998 present **Planner II.** California Energy Commission, Energy Facilities Siting and Protection Division.

Provide technical analysis of proposed energy planning, conservation, and development programs on land use and socioeconomic resources. Specific tasks include the analysis of potential impacts, identification of suitable mitigation measures, preparation of testimony, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations. Recent work includes participation in the environmental justice task force, and preparation of environmental justice white paper, presented to Commissioners; research and preparation of discussion on discount rates and net present value for the SFEC siting project; preparation of socioeconomic section on 1996 Quincy Library Group Report; preparation of forestry section on 1997 CEC Global Climate Change Report; ongoing demographic research for environmental justice issues in siting cases.

1992 to 1993 **Environmental Analyst/Planner.** Beak Consultants.

Environmental Planner for EIR/EA for the Mammoth County Water District, involving the analyses of potential impacts resulting from lake water transfers and maintenance of instream flows in the Mammoth Lakes Basin. Prepared land use, socioeconomics, recreation, and public services and utilities sections of EIR/EA.

Environmental Planner for an Effluent Treatment Plant EIR for Simpson Paper company. Prepared land use, socioeconomics, recreation, public services and utilities, cumulative impacts sections, and mitigation monitoring.

Environmental Planner for Folsom/SAFCA Reoperation. Work involved determining parameters of project description with respect to water modeling, project geographic boundaries, and agency jurisdictional boundaries; compliance with federal, state, and local plans and policies.

1990 to 1992 **Environmental Analyst/Project Manager.** ECOS. Inc.

Project Manager/Planner. EIR for a Planned Development, General Plan Amendment, and rezone request for a 504-acre Business and Industrial Park expansion for the Port of Sacramento. Prepared work scope and budget for Public Improvements Plan and a Specific Plan for 80-acre Mixed Use/Water Related development; and Mitigation Monitoring Plan and Statement of Overriding Considerations for the City of West Sacramento. Specific tasks included coordination with subcontractors on technical sections of EIR; meetings with Assistant Port Director and City staff to present Public Improvements Plan, Specific Plan, tentative parcel map, and critical project phasing; discussion with CDFG and Port staff on regional approach to mitigation for project-impacted endangered species.

Project Manager/Planner. EIR for the Wildhorse Residential/Recreational Planned Development for the City of Davis. Specific tasks included CEQA compliance, writing technical sections on land use, project alternatives, and cumulative impacts, and determining appropriate project alternatives as based on traffic models and allowable housing densities.

Project Manager. Yolo County Powerline Ordinance. Project tasks included developing siting policies and mitigation measures for placement of powerlines and substations.

1989 to 1990 **Assistant Planner.** Sacramento County Planning Department.

Principal Author. Energy Component of the Public Services and Facilities Element of the Sacramento County General Plan. Coordinate work efforts with the CEC, SMUD, and PG&E to develop environmental and siting policies for energy facilities and transmission lines; identify environmental impacts and appropriate mitigation measures.

1987 to 1989 **Planner/Assistant Planner.** Yolo County Community Development

Planning liaison for Homestake Mining Company's (HMC) McLaughlin Mine. Conducted meetings on the Technical Review Panel's environmental monitoring of HMC's McLaughlin Mine, and prepared staff reports on the implementation of use permit phasing, regarding issues of water quality, and impacts of the tailings pond on biologic resources. Specific tasks included site visits to monitor the revegetation plan and other mitigation measures as specified in the use permit; oral and written presentations to the Planning Commission.

1988 **Consultant.** Pan Pacific Energy Development Corporation.

Consulting job to develop a regional energy plan for rural areas of developing countries including decentralized non-fossil fuel power plants in agricultural regions. Attended IREC and AWEA International Conference in Honolulu.

PROFESSIONAL AND CONTINUING EDUCATION

1988	California Environmental Quality Act (UC Davis)
1989	Subdivision Map Act (UC Davis)
1991	Fiscal Impact Analysis (UC Davis)
1994	APA Conference (San Francisco)
1994	Environmental Justice Conference (UC Berkeley)
1998	California Environmental Quality Act (California Energy Commission)

PROFESSIONAL AFFILIATIONS

Association of Environmental Professionals
American Planning Association

DECLARATION OF
Kevin Robinson and Steve Baker

We, the undersigned, declare as follows:

1. We are presently employed by the California Energy Commission in the **Engineering Office** of the Systems Assessment and Energy Facilities Siting Division as **Mechanical Engineer – Mr. Robinson** and **Senior Mechanical Engineer – Mr. Baker**.

2. Copies of our professional qualifications and experience are attached hereto and incorporated by reference herein.

3. We prepared the staff testimony on **Noise and Vibration** for the **Pastoria Energy Facility 160 MW Expansion Project** based on our independent analysis of the Application, supplements thereto, data from reliable documents and sources, and our professional experience and knowledge.

4. It is our professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. We are personally familiar with the facts and conclusions related in the testimony and if called as witness(es) could testify competently thereto.

We declare under penalty of perjury that the foregoing is true and correct to the best of our knowledge and belief.

Dated: October 24, 2005 Signed: _____

Signed: _____

At: Sacramento, California

KEVIN ROBINSON
Mechanical Engineer

Experience Summary

Five years experience in the electric generation field, including mechanical design, QA/QC and construction of hydroelectric plant systems; and engineering and policy analysis of geothermal, natural gas-fired and thermal power plant regulatory issues.

Education

- California State University, Chico—Bachelor of Science, Mechanical Engineering
- Certified EIT, California

Professional Experience

2001 to Present—Mechanical Engineer, Systems Assessment & Facility Siting Division, Engineering Section – California Energy Commission

Responsible for analysis of generating capacity, reliability, efficiency, noise, and the mechanical, civil/structural engineering aspects of power plant siting cases.

2000 to 2001—Mechanical Engineer, Oroville Field Division, Engineering Section – California Department of Water Resources

Assist in the preparation of designs, technical specifications and cost estimates for mechanical equipment at a hydroelectric power plant. Coordinate the design, installation, and inspection of mechanical equipment. Assist in preparing test reports, and recommendations for corrective action.

STEVE BAKER, P.E.
Senior Mechanical Engineer

Experience Summary

Thirty-one 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 6/30/06

Professional Experience

1990 to Present--Senior Mechanical Engineer, Siting & Environmental 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
Joseph Diamond Ph. D.

I, **Joseph Diamond**:

1. I am presently employed by the California Energy Commission.

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 **Pastoria Energy Facility Expansion 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: 8/25/2005 Signed: Joseph Diamond Ph.D.

At: Sacramento, California

Joseph Diamond Ph. D.
Work:(916)654-3877

Ph.D. with experience in economic policy.

BUSINESS AFFILIATION

California Energy Commission
1516 9th St. MS-40
Sacramento, CA 95814

EDUCATION

Michigan State University	Ph.D.	Resource Development
University of Rhode Island	M.A.	Economics
University of New Hampshire	B.A.	Economics

DECLARATION OF
Linda D. Bond

I, **Linda D. Bond**:

1. I am presently employed by the California Energy Commission in the **Environmental Office** of the Systems Assessments and Facilities Siting 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 **Pastoria Energy Facility Expansion** 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, 2005 Signed: _____

At: Sacramento, California

LDBond & Associates

Linda D. Bond, P.G.
Consulting Hydrogeologist

SUMMARY

Twenty five years experience developing science-based solutions for decision makers. Expertise in regional water-resource analyses, CEQA impacts assessments, litigation support and groundwater-basin management. Broad-based knowledge of California hydrogeology and the effects of overdraft, drought, conjunctive use, water transfers, groundwater-stream interactions, agricultural-water use, urban growth and large water-use projects. Expertise in computer modeling and co-author of FEMFLOW3D, a finite-element groundwater modeling program, published by the U.S. Geological Survey.

EDUCATION

- Master of Science, Applied Hydrogeology, 1986, Stanford University, Palo Alto, CA
- Bachelor of Arts in Geology, 1983, San Francisco State University, San Francisco, CA (Summa Cum Laude and Hood Recipient for the School of Science)

REGISTRATION, CERTIFICATIONS AND ASSOCIATIONS

- Professional Geologist, California (P.G. No. 4656)
- California State Small Business Certification (No. 37566)
- State Women Business Enterprise (SWBE and DBE) Certification (No. 34553)
- Environmental Consulting Services (NAICS Code 541620) firm listing in the California Unified Certification Program (CUCP)
- Groundwater Resources Association (GRA)
- Association of Ground-Water Scientists & Engineers (AGWSE)
- American Geophysical Union (AGU)

CAREER SUMMARY

- LDBond & Associates, Davis, CA: Consulting Hydrogeologist, 1998 to present
- Hydrologic Consultants, Inc. (HCI), Sacramento, CA: Principal Hydrogeologist, 1989 to 1998
- MWH (formerly James M. Montgomery Consulting Engineers, Inc.) Walnut Creek, CA: Hydrogeologist, 1986 to 1989
- U.S. Geological Survey, Water Resources Division, Menlo Park, CA. Hydrologist (GS-7), 1983 to 1986
- Sohio Petroleum, Alaska Exploration Division, San Francisco, CA: Exploration Geologist, 1981 to 1983

2751 Brentwood Place, Davis CA 95616-4877
Phone: (530) 757-1500 Fax: (530) 757-1577 Email: ldbond@davis.com

PROJECTS (LDBond & Associates)

California Energy Commission, Soil and Water Resources Division: Water Resource Specialist and Expert Witness since 1998

LDBond & Associates (LDBond) has served as the primary hydrogeologic consultant to the Systems Assessment and Facilities Siting Division of California Energy Commission (CEC) for over 6 years. LDBond has developed CEQA-equivalent water-use impact assessments and mitigation solutions for a wide range of hydrologic conditions and issues for the CEC. In addition to written testimony, LDB has provided expert witness testimony in regulatory licensing proceedings and post-licensing evaluations of construction compliance. All of the power projects evaluated by LDBond are large, gas-fire, water-cooled plants that depend on groundwater for all or part of their operational requirements. Power plant water requirements often have significant impacts because, on an acre-foot per acre basis, the water use for water-cooled plants exceeds agricultural and domestic requirements by an order of magnitude.

CEC Certification Assessments:

- High Desert Power Project, Victorville, CA
- Three Mountain Power Plant Project, Burney, CA
- Blythe Energy Project Phase I and II, Blythe, CA
- Mountainview Power Plant, San Bernardino County, CA
- Pico Power Project, Santa Clara, CA
- Pastoria Energy Facility Expansion, Lebec, CA

CEC Compliance Assessments:

- High Desert Power Project, Victorville, CA
- Blythe Energy Project Phase I, Blythe, CA
- Sunrise II Power Plant, Kern County, CA
- Walnut Energy Center, Turlock, CA
- Pastoria Energy Facility, Lebec, CA

HydroFocus, Inc: Hydrogeologic Consultant
LDBond has provided HydroFocus on-call hydrogeologic and geologic consulting services since 2001. Work has included QA/QC reviews, groundwater modeling, and well installation and testing supervision. Most recently, LDBond assisted HydroFocus, Inc. in the review of a regional groundwater resource model of Nevada for the Southern Nevada Water Authority. Work included the development of new regional structure maps to delineate the faulted carbonate aquifer system of southern Nevada. Work also included the testing and review of computer programs designed to construct the model.

Wolfe & Associates: Litigation Support

LDBond provided expert analysis of water supply impacts for the CEQA administrative hearing on the Boronda Crossing Draft Subsequent Environmental Impact Report. The Boronda project, to be located in Salinas, CA., proposed to pump groundwater in the vicinity of the saltwater intrusion front that threatens to degrade the Salinas Valley groundwater supply. In response to comments on the project EIR, the application for the project was withdrawn and a different location has been proposed for the project.

U.S. Bureau of Reclamation (USBR): Litigation Support

LDBond provided litigation support to the USBR in recovering repair costs for construction defects in the water supply siphons of the Central Arizona Project. LDBond identified fundamental flaws in the technical analysis, a finite element model of the siphon deterioration process that was developed by defendant's technical expert. In response to the information developed by LDBond, the defendant subsequently withdrew their technical analysis from evidence.

Butte Basin Water Users Association and Butte County: Hydrogeologic Consultant

LDBond developed a comprehensive evaluation of the regional groundwater resources of Butte Basin (Sacramento Valley, California). (Initial work was performed by Linda D. Bond at HCI.) LDBond constructed of a three-dimensional groundwater model of the region that includes a synthesis of 26 years of hydrologic and geologic data, a characterization of water use and crop consumption, and a detailed representation of agricultural and urban water service districts. LDBond has used the model to quantify the hydrologic impacts of

- 1994 drought water bank transfers on Butte County,
- potential impacts of future drought cycles,
- conjunctive use alternatives,
- potential contract-specified surface-water allocation cutbacks for the Feather River Water Districts,
- regional groundwater-use impacts on Sacramento and Feather River flows,
- water and land-use conversion, and
- urban growth impacts.

Additional projects included quantification of the regional groundwater storage potential of the proposed Feather River Watershed Restoration Project and development of the technical basis for the 1994 Butte County Well Spacing Ordinance.

OTHER PROJECTS (Linda D. Bond)

U.S. Geological Survey/HCI: Modeling Code Developer
Linda D. Bond co-authored with Timothy J. Durbin (HCI) FEMFLOW3D, a computer modeling program designed to analyze a wide rage of groundwater problems and conditions. The program provides a systematic method to evaluate the effect of variable land uses and surface water conditions on groundwater, as well as variable 3-dimensional structural and flow conditions within the aquifer system. (Publication: *Durbin, T.D., Bond, L.D.*, FEMFLOW3D: a Finite-Element Program for the Simulation of Three-Dimensional Aquifers: U.S. Geological Survey, Open File Report 97-810.)

Putah Creek Water Rights: Litigation Support
Linda D. Bond (HCI project leader) provided litigation support for water-rights adjudication investigations for Putah Creek Landowners Association (Yolo and Solano counties, CA). LDBond subsequently provided continued litigation support to individual Putah Creek landowners. Work included the development and presentation of an analysis of stream hydrology involving the historical diversions from Putah Creek, operation of Monticello Dam and changes in stream recharge to groundwater system. The work successfully supported the groundwater rights of the landowners.

City of Chico: Hydrogeologic Consultant
Linda D. Bond (HCI project leader) developed a groundwater resources analysis for the Chico General Plan Study, which estimated 20-year groundwater level changes based on projected urban growth, zoning changes, wastewater treatment conversions and changes in the urban/agricultural interface.

Yolo County Flood Control & Water Conservation District: Hydrogeologic Consultant
Linda D. Bond (HCI project leader) developed a numerical groundwater model that quantified the magnitude of potential land subsidence that would be caused by drought-bank water transfers from Yolo County, California. Land subsidence is a significant issue in some portions of Yolo County with potential to cause flood-control problems and land-leveling problems in agricultural areas.

Turlock and Modesto Irrigation Districts:
Hydrogeologic Consulting and Litigation Support
Linda D. Bond (HCI technical lead) developed a three-dimensional numerical groundwater flow model for Turlock and Modesto Irrigation Districts. Initially, this model was developed to support negotiations and license renewal for New Don Pedro Reservoir by the Federal Energy Regulatory Commission (FERC). The model was subsequently used for litigation support, urban expansion impacts and salinity analyses. Additional applications included:

- Development of a quantitative analysis that was used to successfully defend Turlock Irrigation District in a challenge to the District's right to augment surface-water deliveries with groundwater during the 1989 drought. Demonstrated the District's right to

groundwater through its contribution to long-term regional groundwater recharge from surface-water irrigation.

- Evaluation of groundwater impact of the potential use of surface water by rapidly growing municipalities in the Turlock area.
- Evaluation of salinity degradation of groundwater from wells in the Turlock area caused by the upwelling of saline water from marine formations underlying the fresh-water aquifer system.

City of Lompoc: Hydrogeologic Consulting
Linda D. Bond (HCI model development support) developed water-use parameters and calibration for a groundwater-flow model of the Santa Ynez Valley for the city of Lompoc. The model provided a technical basis for negotiations with the U.S. Bureau of Reclamation and other parities concerning the reoperation of the Cachuma Reservoir. The model analyzes the interaction between the Santa Ynez River and the regional groundwater system and accounts for the effects of groundwater pumping, reservoir operations, streambed leakage, and consumptive use by agricultural, phreatophyte vegetation and municipalities.

George Air Force Base, Victorville, CA: Hydrologic Consulting
Linda D. Bond (MWH hydrogeologist) developed groundwater flow and transport models to assess contamination at numerous industrial, municipal and federal sites. Bond applied models to identify sources and migration paths of contaminant plumes, to direct field investigations, and to evaluate alternatives for aquifer remediation.

Parjaro Valley Seawater Intrusion Study: Hydrogeologic Researcher (USGS)
Linda D. Bond developed a solute-transport groundwater model of Pajaro Valley, California to evaluate the problem of regional seawater intrusion. Bond identified the pathways, the mechanisms, and the rate of movement of seawater intrusion into the Valley's primary aquifer. Bond's study demonstrated that the location of near-shore pumping was the most critical factor in causing seawater intrusion, rather than overall pumping rates. (Publication: *Bond, L.D.* and Bredehoeft, J.D., 1987, Origins of Seawater Contamination in a Coastal Aquifer - A Case Study of the Pajaro Valley, California: Journal of Hydrology, v. 92, p. 263-388.)

DECLARATION OF
DAVID FLORES

I, **David Flores** declare as follows:

1. I am presently employed by the California Energy Commission in the **Land Use and Traffic and Transportation Unit** of the Office of the Systems Assessments and Facilities Siting Division as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Traffic and Transportation,** for the **Pastoria Energy Facility 160 MW Expansion** 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: August 25, 2005 Signed: _____

At: Sacramento, California

DAVID FLORES

WORK EXPERIENCE

Sept. 1998 to Present — **Planner 2.** California Energy Commission, Energy Facilities Siting and Protection Division.

- Provide technical analysis of proposed energy planning, conservation, and development programs on land use, visual and traffic and transportation resources. Specific tasks include the analysis of potential impacts, identification of suitable mitigation measures, preparation of testimony, and project monitoring to ensure compliance with local, state and federal environmental laws and regulations.

March 29,1988 to September 12, 1998 — **Senior Planner.** County of Yolo Planning and Public Works Department

Senior Planner - Current and Advanced Planning (Resources Management and Planning)

Responsibilities included the following:

Administered the establishment of Planning schedules and timeframe completion schedules; Administration and staff support to Planning Commission and Board of Supervisors; Staff support and liaison to citizen's committees. Preparation of Environmental documents (Negative Declarations, preparation of Environmental Impact Reports and Categorical Exemptions) in accordance with State and Federal Regulations.

PLANNING ACHIEVEMENTS

~ Principal staff involved in development of the County Right to Farm and Williamson Act/ Blue Ribbon Ordinances.

~ Staff liaison to citizen committees for the communities of Yolo County

~ Substantial experience in working successfully with community organizations and committees on controversial projects.

~ Responsible for the administration of the California Environmental Quality Act (CEQA) for all matters going before the Planning Commission and Board of Supervisors.

EDUCATION

California State University @ Sacramento
University of California @Davis
Major: Environmental Studies
Minor: Business Administration

Continuing education has included: Writing for Managers, CEQA Updates, Managing the Office, CEQA Update, Subdivision Map Act, General Plan Update

DECLARATION OF

DR. OBED ODOEMELAM

I, Obed Odoemelam declare as follows:

1. I am presently employed by the California Energy Resources Conservation and Development Commission in the Environmental Protection Office of the Energy Facilities Siting and Environmental Protection Division as a Staff Toxicologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the Staff Testimony on Transmission Line Safety and Nuisance for the Pastoria Energy Facility Expansion Project based on independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed in it.

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: 10/24/05 Signed: O Odoemelam

Executed: Sacramento, CA

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
James S. Adams

I, James S. Adams declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office of the Systems Assessment and Energy Facilities Siting Division as an Environmental Planner.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Visual Resources for the Final Staff Assessment for the Pastoria Energy Facility Expansion (05-AFC-1), 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: October 25, 2005 Signed: James S. Adams

At: Sacramento, California

James S. Adams, M.A.
Environmental Protection Office
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5504
PH (916) 653-0702, FAX (916) 651-8868
jadams@energy.state.ca.us

5/1999
Present **Environmental Planner**
Review applications for certification to acquire permits from the California Energy Commission to build electric generating power plants. Specific technical fields include socioeconomics, traffic and transportation, land use and visual resources. Work on special projects as requested.

11/1997
Present **Energy and Resource Consultant**
Provide clients with technical expertise on various issues related to natural resource use and development. Current activities include managing an intervention by the Surfrider Foundation before the California Public Utilities Commission regarding decommissioning issues concerning Humboldt Bay, Diablo Canyon and San Onofre nuclear reactors.

9/1994--
10/1997 **Senior Analyst - Safe Energy Communication Council (SECC)**
Responsible for developing and/or implementing campaigns on various energy issues involving the promotion of energy efficiency and renewable energy and advocating less reliance on nuclear power. Managed educational outreach efforts to newspaper editorial writers throughout the U.S. to encourage coverage of energy issues. Participated in meetings and negotiations with key Clinton administration officials, members of Congress and staff, national coalitions, and grassroots organizations on important energy issues (e.g. U.S. Department of Energy Budget for Fiscal Years 1996-1998). Successfully raised $140,000 from private foundations to support SECC activities.

6/1978--
12/1992 **Principal Consultant - Redwood Alliance**
Provided consulting services to the Alliance; a renewable energy/political advocacy organization. Major responsibilities included managing and/or participating in several interventions/appearances before the California Public Utilities Commission, California Energy Commission, California Legislature, U.S. Congress and the U.S. Nuclear Regulatory Commission. Issues included electric utility planning options, greater reliance on energy efficiency and renewable energy, nuclear power economic analyses, decommissioning cost estimates, and nuclear waste management and disposal.

2/1983--
8/1986 **Natural Resource Specialist**
Assisted private consulting, firms, non-profit corporations and government agencies in various projects related to the enhancement and protection of national forests in Northern California and Southern Oregon. This included contracts with the U.S. Forest Service, Fish and Wildlife Service, National Park Service, the California Coastal Conservancy, and private landowners.

6/1978--
present Consultant/Journalist/Paralegal/Lobbyist
Throughout the period of work outlined above, I have written a considerable amount of news articles and reports connected to ongoing-projects and issues of personal interest. The leg, al/administrative interventions have required extensive paralegal work to support attorneys, and technical expertise to identify and assist consultants. In addition, many of the projects required consulting services and lobbying, at the local, state and federal level whenever necessary, as well as working with the print and television media as appropriate.

From 1978 through 1984 1 served on the Board of Directors for two locals non-profit agencies devoted to sustainable community development, Redwood Community Development Council and Redwood Community Action Agency (RCAA). I also was hired on staff at RCAA as a natural resource specialist which is explained more fully above. I am proficient with computers, printers, fax machines and related equipment.

EDUCATION

M.A. Social Science. Political science and natural resources emphasis. California State University at Humboldt. Graduated December 1988.

B.A. Political Science. Political and economic aspects of natural resource development, with a particular emphasis in forest ecology and appropriate technology. California State University at Humboldt. Graduated June 1978.

Academic
Honors. Member of PI GAMMU MU Honor Society since 1986.

MILITARY SERVICE

7/1969--
9/1975 U.S. Navy. Air Traffic Controller.
Honorable Discharge.

DECLARATION OF
Dal Hunter, Ph.D., C.E.G.

I, **Dal Hunter, Ph.D., C.E.G.**, declare as follows:

1. I am presently employed by Black Eagle Consulting as Vice President under contract with 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 **GEOLOGY AND PALEONTOLOGY** for the **Pastoria Energy Facility Expansion (05-AFC-01),** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: October 20, 2005 Signed: _____

At: Black Eagle Consulting, Inc.
Reno, Nevada

REGISTERED GEOLOGIST
ROBERT DALTON HUNTER
No. 1411
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

exp. 3-31-07

Robert D. Hunter, Ph.D., C.E.G.
Engineering Geologist
Vice President

Education

- Ph.D. – Geology – 1989 – University of Nevada, Reno
- M.S. – Geology – 1976 – University of California - Riverside
- B.S. – Geology – 1972 – California State University, Fullerton

Registrations

- Professional Geological Engineer – Nevada
- Registered Geologist – California
- Certified Engineering Geologist – California

Experience

1997 to Present: Black Eagle Consulting, Inc.; Vice President. Dr. Hunter is in charge of all phases of geochemical, geological, and geotechnical projects and is responsible for conducting, coordinating, and supervising geotechnical investigations for public and private sector clients. He is very familiar with design specifications and state and federal requirements.

Dr. Hunter has also provided geological, geotechnical, and paleontological review and written and oral testimony for California Energy Commission (CEC) power plant projects including:

- El Segundo Power Redevelopment Project (Coastal)
- Magnolia Power Project (including compliance monitoring
- Ocotillo Energy Project (Wind Turbines)
- Vernon-Malburg Generating Station
- Inland Empire Energy Center (including testimony and compliance monitoring)
- Palomar Energy Project
- Henrietta Peaker Project
- East Altamont Energy Center
- Avenal Energy Center
- Teayawa Energy Center monitoring
- Walnut Energy Center (including compliance monitoring
- Riverside Energy Resource Center
- Salton Sea Unit 6 (Geothermal Turbines)
- National Modoc Power Plant
- Pastoria Energy Center
- Otay Mesa Generating Project (compliance monitoring)
- Montainview Power Plant Project (compliance)
- Consumes Power plant (compliance monitoring)
- Sunrise Power Project (compliance monitoring)

Attended Expert Witness Training Sponsored by CEC.

1978 to 1997: SEA, Incorporated; Geotechnical Manager, Engineering Geologist. Dr. Hunter was in charge of all phases of geotechnical projects for SEA, including project coordination and supervision, field exploration, geotechnical analysis, slope stability analysis, soil mechanics, engineering geochemistry, mineral and aggregate evaluations, and report preparation. Numerous investigations were undertaken on military, commercial, industrial, airport, residential, and roadway projects. He worked on many geothermal power plants, providing expertise in foundations design, slope stability, seismic assessment, geothermal hazard evaluation, expansive clay, and settlement problems. Project types included high-rise structures, airports, warehouses, shopping centers, apartments, subdivisions, storage tanks, roadways, mineral and aggregate evaluations, slope stability analyses, and fault studies.

1977 to 1978: Fugro (Ertec) Incorporated Consulting Engineers and Geologists; Staff Engineering Geologist; Long Beach, California.

Affiliations

- Association of Engineering Geologists

Publications

- Hunter, 1988, *Lime Induced Heave in Sulfate Bearing Clay Soils*, Journal of Geotechnical Engineering, ASCE, Vol. 14, No. 2, pp. 150-167.

- Hunter, 1989, *Applications of Stable Isotope Geochemistry in Engineering Geology*: Proceedings of the 25th Annual Symposium on Engineering Geology and Geotechnical Engineering.

- Hunter, 1993, *Evaluation of Potential Settlement Problems Related to Salt Dissolution in Foundation Soils*: Proceedings of the 29th Annual Symposium on Engineering Geology and Geotechnical Engineering.

DECLARATION OF
Shahab Khoshmashrab and Steve Baker

We the undersigned, declare as follows:

1. We are presently employed by the California Energy Commission in the **Engineering Office** of the Systems Assessment and Facility Siting Division as

   Mechanical Engineer-Mr. Khoshmashrab and **Senior Mechanical Engineer-Mr. Baker.**

2. Copies of our professional qualifications and experience are attached hereto and incorporated by reference herein.

3. We prepared our respective portions of the Staff Testimony on **Facility Design**, for the **Pastoria Energy Facility Expansion** based on our independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and our professional experience and knowledge.

4. It is our professional opinion that the prepared Testimony is valid and accurate with respect to the issues addressed therein.

5. We are personally familiar with the facts and conclusions related in the testimony and if called as witness(es) could testify competently thereto.

We declare under penalty of perjury that the foregoing is true and correct to the best of our knowledge and belief.

Shahab Khoshmashrab _____

Steve Baker _____

Dated: October 20, 2005

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
Steve Baker

I, Steve Baker, declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Systems Assessment and 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 **Power Plant Efficiency** and **Power Plant Reliability** for the **Pastoria Energy Facility 160 MW Expansion 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: October 20, 2005 Signed: _____

At: Sacramento, California

DECLARATION OF

Mark Hesters

I, Mark Hesters declare as follows:

I am presently employed by the California Energy Commission in the Transmission System Engineering Office of the Systems Assessments and Facilities Siting Division as an Senior Electrical Engineer.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the TSE testimony on 11-16-05 for the Pastoria Energy Facility (PEF) 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.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue 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: 11/17/05 Signed: _____

At: Sacramento, California

Mark Hesters
Associate Electrical Engineer

Mark Hesters has fourteen years of experience in electric power regulation. He worked in the Engineering Office of the California Energy Commission's Energy Facilities Siting & Environmental Protection Division since 1998 providing analysis of California transmission systems and testimony on transmission systems in several Commission power plant certification processes. Prior to that Mark worked in the CEC's Electricity Analysis Office providing lead analysis on Southern California Edison resource issues and modeling support for all areas of California. He holds a B.S. degree from the University of California at Davis in Environmental Policy Analysis and Planning.

DECLARATION OF

Sudath Arachchige

I, Sudath Arachchige declare as follows:

I am presently employed by the California Energy Commission in the Transmission System Engineering Office of the Systems Assessments and Facilities Siting Division as an Electrical Engineer.

A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

I helped prepare the TSE testimony on 11-16-05 for the Pastoria Energy Facility (PEF) 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.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue 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: 16th - November - 05 Signed: Sudath Arachchige

At: Sacramento, California

Sudath Arachchige
1916 Ackleton Way
Roseville CA 95661-USA **Phone 916-786-6468**

EDUCATION:

Bachelor of Science in Electrical Engineering at California State University Fullerton

ATTAINMENTS:

Member of the Professional Engineers in California Government
Vice President Electrical Engineering Society-California State University Fullerton.

EXPERIENCE:

November-2001 to Present: - Associate Electrical Engineer, System Assessment and Facilities Siting Division, California Energy Commission.
Conduct and perform planning studies and contingency analysis including power flow, short-circuit, stability, and post-transient analysis to maintain reliable operation of the power system. Investigates and analyzes Grid Planning problems and provides appropriate information to Grid Planning Engineers. Develops automated computer programs and other advance analysis methods for comprehensive evaluation of the operational performance of the transmission system.
Understanding of regulatory and reliability guidelines, WECC and NERC planning and operation criteria, CPUC and FERC requirements. Review technical analyses for WECC/ISO/PTO transmission systems and proposed system additions; provide support and analyses associated with Reliability Must-Run (RMR) contracts and the Local Area Reliability Services (LARS) process; review new generation interconnection studies; provide congestion analyses; and provide support for regulatory filings.

June-1998 to November-2001: - Project Electrical Engineer, Design Electrical Engineering Section, Department of Transportation, California.
Electrical Engineering knowledge and skills in the design, construction and maintenance of California state work projects involving all the public work areas; contract administration, construction management, plan checking, field engineering and provide liaison with consultants, developers, and contractors. Plan review in facility constructions, highway lighting, sign lighting, rest area lighting, preparation of project reports, cooperative agreements, review plans for compliance of construction and design guide lines for national electrical code, standards and ordinance. Review process included breaker relay coordination, detail wiring diagrams, layout details, service coordination, load, conductor sizes, derated ampacity, voltage drop calculations, harmonic and flicker determination.

June-1993 to May-1998:- Substation Electrical Engineer, City of Anaheim, California.
Performed protective relay system application, design and setting determination in Transmission & Distribution Substation. Understanding of principles of selective

coordination system protection and controls for Electric Utility Equipment. Understanding of Power theory and Analysis of symmetrical components. Ability to review engineering plans, specifications, estimates and computation for Electrical Utility Projects. Practices of Electrical Engineering design, to include application of Electro-mechanical and solid state relays in Electrical Power Systems. Software skills in RNPDC (Fuse Coordination Program), Capacitor bank allocation program, and Load Flow Program. Design projects using CAD, Excel spread sheets including cost estimates, wiring diagrams, material specifications and field coordination.
Performed underground service design 12kV and 4kV duct banks; pole riser; getaway upgrade; voltage drop calculation, ampacity calculation and wiring diagrams. Design and maintence of substations in City Electrical Utility System. Upgrade Station Light and power transformers; upgrade capacitor banks; replacement of 12kV-4kV power circuits; Breakers at Metal Clad Switchgear. Design one-line diagrams; three line diagrams; grounding circuits; schematics; coordination of relay settings; conduit and material list preparation. Calculation of derated ampacity; inrush current, short circuit current and fault current.

DECLARATION OF
NANCY TRONAAS

I, **Nancy Tronaas** declare as follows:

1. I am presently employed by the California Energy Commission in the Compliance Office of the Systems Assessment and Facilities Siting Division as a Compliance Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff General Conditions testimony to the Pastoria Energy Facility Expansion Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 1, 2005 Signed: Nancy Tronaas

At: Sacramento, California

NANCY TRONAAS
Statement of Qualifications

Work Experience

June 1999 to present — California Energy Commission
Systems Assessment and Facilities Siting Division

Compliance Project Manager—Provide oversight of energy facility construction and operation activities to ensure compliance with conditions of certification and applicable laws, ordinances, regulations, and standards. Function as team leader for all compliance monitoring activities, processing of post-certification amendments, complaints, and facility closures.

1991 to 1999 — Sacramento Regional Transit District
Sacramento, California

Associate Planner—Managed preparation of the long range transit plan and the paratransit services plan. Prepared consultant scope of services and provided oversight for preparation of EIS/Rs for transit services and infrastructure in accordance with CEQA/NEPA. Prepared amendments to EIRs, and prepared negative declarations and notices of exemption/exclusion for transit capital projects. Reviewed city and county land development applications, general plans, and zoning ordinances for effects on existing or planned transit services, and provided written comments and presented testimony to local planning commissions and boards of supervisors.

1979 to 1988 — Mono County Planning Department
Bridgeport, California

Planner—Reviewed proposed residential subdivisions and commercial projects, land divisions, use permits, and zone variances for compliance with local ordinances, the general plan, and state and federal environmental regulations. Developed project conditions and prepared reports and recommendations for the Planning Commission and Board of Supervisors. Investigated zoning complaints and instituted enforcement action through district attorney. Provided staff services to the Local Agency Formation Commission and analyzed proposed annexations, detachments, and formations of special districts for environmental impacts and local and state policies and regulations.

Education

California State University, Chico, B.A., Biology, 1978
California State University, Sacramento, Master of Public Policy and Administration, 1997

Professional Affiliations

- Association of Environmental Professionals